

ABSTRACT BOOK

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AOCPRM 2025

9th Asia-Oceanian Conference of Physical and Rehabilitation Medicine

in conjunction with

16th Annual Malaysian Rehabilitation Medicine Conference 2025



Pre-conference Workshop:
20th August 2025

Conference:
21st-23rd August 2025



**Setia SPICE Convention Centre,
Penang, Malaysia**



aocprm2025.com



**Future Proofing Rehabilitation:
Building Solid Foundations,
Embracing Change**

About Our Conference



The 9th Asia-Oceanian Conference of Physical and Rehabilitation Medicine (AOCPRM), held in conjunction with the 16th Annual Malaysian Rehabilitation Medicine Conference, took place from 21–23 August 2025 at the Setia SPICE Convention Centre in Penang, Malaysia. AOCPRM is the flagship biennial conference of the Asia-Oceanian Society of Physical and Rehabilitation Medicine (AOSPRM), uniting clinicians, researchers, educators, allied health professionals, industry stakeholders, and policymakers from across the region. With the theme “Future Proofing Rehabilitation: Building Solid Foundations, Embracing Change,” the meeting addressed the evolving role of rehabilitation in the face of demographic shifts, technological transformation, and growing health system demands. The conference provided a vibrant platform for knowledge exchange, skills development, and cross-border collaboration.

AOCPRM 2025 attracted an impressive number of participants, with 1337 delegates from 34 countries across Asia, Oceania, and beyond. This wide representation reinforced the conference as a true regional platform for collaboration. The delegate composition reflected the multidisciplinary nature of rehabilitation. Attendees included rehabilitation physicians, physiotherapists, occupational therapists, speech and language therapists, nurses, biomedical engineers, researchers, educators, industry stakeholders and policymakers. This mixture of expertise fostered rich interdisciplinary dialogue and strengthened the spirit of collaboration.

Spanning four days, the programme combined pre-conference workshops, keynote and plenary lectures, parallel symposia, mini-workshops, and abstract presentations.

- Pre-conference workshops (10 total): Delivered by both international and local experts, these sessions offered hands-on training in specialised areas including spasticity management in adults and children, dysphagia, fascia and regenerative intervention, nerve hydrodissection, critical care rehabilitation, ultrasound masterclass, and integrated pain management. Their multidisciplinary scope catered to clinicians, therapists, and researchers alike.
- Keynote Lecture: Professor Jianan Li opened the scientific programme with his address “Accelerators and Disruptors: How Does AI Shape the Future of Rehabilitation?” which set the tone for discussions on innovation and preparedness.
- Plenary Lectures (8 total): Highlights included:
 - » Professor Fary Khan (Australia): Evolving Role of Rehabilitation Medicine: Emerging Trends in Global Health
 - » Professor Eiichi Saitoh (Japan): The Evolving Landscape of Dysphagia Management
 - » Professor Der Sheng Han (South Korea): Revisiting Guidelines for Frailty
 - » Professor Michael Nilsson (Australia): The Translational Turn: Integrating Lab Discoveries and Real-World Data in Rehabilitation Research
 - » Professor Zaliha Omar (Malaysia): Staying Relevant in Rehabilitation Medicine Academic Capacity Building
 - » Professor Shi-Uk Lee (Republic of Korea): Health Policy and System Research in Strengthening Rehabilitation
 - » Professor Sheng Bi (China): Targeted Muscle Reinnervation (TMR) and Intelligent Prosthetic Limb Fitting
 - » Doctor Mary Elizabeth Nelson-Biersach (USA): Enhancing Rehabilitation Care: The Role and Potential of Rehabilitation Nursing

About Our Conference

The 29 parallel symposia covered diverse domains including neurorehabilitation, spinal cord injury, musculoskeletal medicine, neuromodulation, paediatrics, cardiopulmonary care, cancer rehabilitation, pain management, and advanced care planning. Several sessions focused on emerging frontiers such as telehealth and remote monitoring systems, virtual and augmented reality in rehabilitation and regenerative medicine approaches. This balance between established practice and innovation ensured that the scientific content was both comprehensive and forward-looking.

In line with the conference's commitment to inclusivity and accessibility, AOCPRM 2025 introduced a dedicated Mandarin-language session. This initiative enabled delegates from Mandarin-speaking regions to engage more deeply in scientific exchange, ensuring that language was not a barrier to participation. The session created a welcoming platform for sharing research, clinical practices, and policy perspectives in rehabilitation medicine within a culturally and linguistically familiar context. By broadening access and encouraging dialogue across linguistic boundaries, the Mandarin session reinforced the conference's values of diversity, collaboration, and equitable knowledge dissemination.

AOCPRM 2025 received 494 abstract submissions from 22 countries, reflecting its global reach. Submissions spanned six thematic areas: Basic Science, Biomedical Engineering, Clinical Science, Epidemiology and Policy, Rehabilitation Practice, and Therapeutics. The top contributors are Malaysia (163), China (143), Taipei Chinese (41), Indonesia (35), and Japan (35). Of these, 11 were shortlisted for the Best Young Scientist Award, 79 for Best Oral Award, 20 for the Best Poster Award and the remaining 384 as e-poster presentations. These awards underscored the society's commitment to nurturing young talent and maintaining high scientific standards.

AOCPRM 2025 also positioned itself as a conference with purpose, embedding environmental, social, and governance (ESG) principles throughout its planning and delivery. The Setia SPICE Convention Centre, a certified green facility, was deliberately chosen to reflect responsible governance and sustainable venue selection. In line with minimising environmental impact, plastic bottles were not used, delegates were provided with recyclable-material lanyards, and the programme was delivered through a digital conference e-book to reduce paper waste. An ESG survey and carbon footprint tracker further engaged participants, allowing them to reflect on and contribute to the conference's sustainability efforts. A symbolic tree planting ceremony underscored the commitment to leaving a lasting positive environmental impact beyond the event.

AOCPRM 2025 was a landmark event that celebrated rehabilitation's achievements while charting its future. With its strong scientific content, recognition of emerging researchers, and forward-looking discussions, the conference truly embodied its theme of "Future Proofing Rehabilitation." The momentum generated in Penang will carry forward into future AOSPRM activities and upcoming AOCPRM conferences, ensuring that the field remains resilient, inclusive, and ready to meet the challenges ahead.

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YS1

EFFECT OF VIRTUAL REALITY TRAINING ON VISUAL, AUDITORY, AND MIXED REACTION TIME IN THE ELDERLY

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Background

Reaction time (RT) and sensory-motor alertness help in quick reactions to moving stimuli, which are vital in innumerable real-life situations, and a lack of it may have dangerous consequences for older adults. Virtual Reality (VR) technology is new in rehabilitation. VR balance rehabilitation recreates real-life scenarios to challenge balance and stability in a safe environment. This training improves balance and the patient's confidence in daily activities, reducing the incidence of falls.

Aim

To assess and compare the effect of Virtual Reality (VR) training in conjunction with conventional exercises versus conventional exercises alone on reaction time in elderly.

Methods

RCT was done on 104 elderly participants, who were selected using purposive sampling method according to inclusion criterion. Written consent from participants and ethical approval was taken and participants were allocated equally. Pre-post assessments were taken for Visual RT (VRT), Auditory RT (ART), and Visual Auditory RT (VART) from the software program. The conventional group received only Conventional Balance Training (CBT) and the VR Training group received CBT and the VR training program with Xbox and PS4 for 30- 45min per session; 3 times per week for 8 weeks.

Results

A total of 104 elderlies with 71.88 ± 5.44 years mean age 24.78 ± 3.26 kg/m² BMI. 'Within-group analysis showed a significant difference was noted between Conventional and VR Training groups at 8th weeks at <0.001 level of significance for VRT, ART, and VART time. But there was no difference noted between-group analysis in the conventional with VRT groups in the 8th week at <0.001 level of significance in Visual RT, VART but showed difference on ART.

Conclusion

Our study safely concludes that VRT with CBT showed improvement within-group analysis seen on Visual, Auditory, and Mixed RT and between-group analysis ART. Still, it demonstrated no significant improvement in VRT, VART between-group analysis.

YS2

INCORPORATING TECHNOLOGY IN THE INDEPENDENT LIVING UNIT: THE SMART HOME EXPERIENCE

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Background and aims

Smart home technology is revolutionizing our lives by enhancing convenience, safety, and accessibility. In Malaysia, the number of smart home users is growing, with an estimated 2.7 million users by 2028. For individuals with physical disabilities, these technologies can significantly improve independence, reduce caregiver reliance, and improve daily task management. This observational study explores the experiences of people with physical disabilities with varying levels of independence after exposure to smart home technology training in the Independence Living Unit (ILU) at Universiti Malaya Medical Centre (UMMC).

Methods

Six participants with physical disabilities (2 stroke, 4 spinal cord injury) without prior experience with smart home technology were recruited. They participated in a two-day trial at the ILU, which was equipped with seven interconnected smart home devices controlled via an Android-based Smart Life Application and Google Assistant voice commands. Participants were interviewed using semi-structured questions to gather insights post-trial, and data were analyzed using a deductive thematic approach.

Results

Two main themes emerged were 'perceived benefits' and 'challenges'. Benefits reported comprised of three codes: 'reduced caregiver reliance', 'convenience' and 'feeling of independence'. The challenges comprised of four codes: 'steep learning curve', 'internet connectivity', 'space limitations' and 'difficulties in setting up devices'. Three patients (1 stroke, 2 spinal cord injury) reported possibility of adopting the devices in their own homes.

Conclusion

This study showed the potential of smart home technology in improving the quality of life for people with physical disabilities. Participants felt more independent and more in control of their environment. The feedback reinforces the role of smart home systems in the ILU and also in future healthcare models. While these results help fill some gaps, further research with larger sample size is needed to address the adoption barriers and optimize implementation strategies.

YS3

HYBRID MOTOR IMAGERY-VISUAL EVOKED POTENTIAL BRAIN-COMPUTER INTERFACE WITH EXOSKELETON FOR POST-STROKE UPPER LIMB REHABILITATION: A RANDOMIZED CONTROLLED STUDY

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Objective

To evaluate the efficacy of a hybrid BCI combining motor imagery and visual evoked potentials, integrated with exoskeleton training, on upper limb functional recovery in stroke patients.

Methods

32 participants (16 experimental, 16 control) with post-stroke hemiplegia received 2-week interventions. The experimental group underwent BCI-exoskeleton training (5 sessions/week), while the control group received conventional therapy. Outcomes included Fugl-Meyer Assessment (FMA-UE), Modified Ashworth Scale (MAS), ERD (event-related desynchronization), and motor evoked potentials (MEP).

Results

The experimental group showed significant improvements in FMA-UE ($\Delta=18.1$ vs. $\Delta=3.6$, $P<0.001$), MAS reduction ($\Delta=0.6$ vs. $\Delta=0.1$, $P=0.002$), and neural activation (ERD $\uparrow 62\%$ vs. $\uparrow 14\%$, $P=0.007$). LI shifted toward the affected hemisphere ($P=0.01$), indicating cortical reorganization.

Conclusion

The hybrid BCI-exoskeleton system effectively enhances upper limb motor function and neuroplasticity, providing a novel multimodal rehabilitation strategy for stroke.

YS4

EFFECT OF PERIOPERATIVE REMOTE ISCHEMIC CONDITIONING ON MYOCARDIAL INJURY IN PATIENTS WITH UNSTABLE ANGINA UNDERGOING PERCUTANEOUS CORONARY INTERVENTION: MULTICENTRED, RANDOMIZED, DOUBLE-BLIND CLINICAL TRIAL

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Background and aims

Periprocedural myocardial injury (PMI) and complications are common in patients with unstable angina (UA) undergoing percutaneous coronary intervention (PCI), affecting long-term prognosis. Remote ischemic conditioning (RIC) is a non-invasive intervention that activates cardioprotective mechanisms by temporarily occluding blood flow to a distant limb, thereby reducing ischemia-reperfusion injury. However, its efficacy in UA patients remains unclear. This study aims to evaluate the impact of perioperative RIC on PCI-related myocardial injury in UA patients.

Methods

This study was a multicenter, randomized, double-blind, parallel-controlled trial. Patients were randomly assigned to the RIC or sham RIC group. The RIC group underwent a three-phase intervention before, during, and after PCI. The primary endpoint was the incidence of PMI within 48 hours after PCI. Secondary endpoints included periprocedural myocardial infarction (MI), major adverse cardiovascular events (MACE), mortality, rehospitalization, arrhythmia, severity of coronary artery disease (Gensini score), angina symptoms, and changes in cardiac function.

Results

A total of 575 patients were enrolled (285 in the RIC group and 290 in the control group). The incidence of PMI was lower in the RIC group than in the control group (22.4% vs. 27.8%, OR = 0.66 [0.46-0.95], P = 0.026). The RIC group had a lower incidence of intraoperative electrocardiographic changes (P = 0.008) and postoperative angina (P = 0.004), along with higher scores for physical limitation, angina stability, and angina frequency on the Seattle Angina Questionnaire. Subgroup analysis indicated that patients with normal preoperative high-sensitivity cardiac troponin T (hs-cTnT) benefited more significantly from RIC.

Conclusion

Perioperative RIC reduces the incidence of PMI and postoperative angina in UA patients undergoing PCI, with a more pronounced effect in those with normal preoperative hs-cTnT levels. Further studies are needed to optimize the application strategy of RIC.

YS5

FALLS PREVENTION IN INPATIENT PAEDIATRIC REHABILITATION SETTING – A FOCUS ON INNOVATIVE NURSING INTERVENTIONS

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Introduction

Falls in paediatric inpatients setting has always been a serious concern for patient safety. Children and adolescents admitted for inpatient rehabilitation programs are at higher risk of falling due to the nature of their medical conditions and the rehabilitation interventions implemented. Paediatric Rehabilitation Unit, Hospital Rehabilitasi Cheras (HRC) has started introducing and implementing the Humpty Dumpty Fall Scale (HDFS) to assess fall risk since year 2018. Here, we would like to highlight measures taken, especially the innovative nursing interventions created throughout the 7 years as part of the fall prevention program.

Methods

The HDFS has seven components, namely age, gender, diagnosis, cognitive impairment, environmental factors, surgery response, and medication usage. The nursing staff perform regular fall risk assessment in and implement correspondent fall preventive measures for each patient admitted to Paediatric Rehabilitation Ward, HRC. Fall rate (number of falls per 1,000 bed days) were monitored, and root cause analysis was carried out in accordance to each fall as part of the quality improvement program. Various interventions measures were introduced and modified along the years, namely yearly staff training program (E-Humpty Dumpty Training Program & Refresher Workshop), regular audit on the effectiveness of the program implementation, strategies to increase awareness among patients and caregivers (orientation briefing during admission, weekly education and quiz assessment), and low-cost innovative equipments created.

Results

A total of 72 falls was observed in Paediatric Rehabilitation Ward, HRC throughout the 7 years duration. Highest fall rate was 4.22 per 1,000 bed days (year 2020) and lowest fall rate was 1.2 (year 2023). Most of the patients who fell sustained none-to-mild injuries and did not require further medical interventions.

Conclusion

With regular program re-assessment and modification, falls prevention program and fall rate reduction is feasible even in inpatient paediatric rehabilitation setting with high fall risk population.

YS6

PROLIFERATE TRIAL: A RANDOMIZED, CONTROLLED TRIAL TO STUDY THE EFFECTIVENESS OF PLATELET-RICH FIBRIN FOR PRESSURE INJURY HEALING IN PERSONS WITH SPINAL CORD INJURY

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Background and aims

Pressure injury (PI) is a very common secondary complications that impair quality of life of people with spinal cord injury (SCI). Platelet-rich plasma (PRP) is effective in PI, but the concentration of growth factors required for wound healing is significantly higher in platelet-rich fibrin (PRF) compared to PRP. There is only one case report on PRF membrane in PI in SCI. In this context, we conducted this study to evaluate the efficacy of PRF membrane as an autologous blood tissue graft in PI in the SCI population by assessing Pressure Ulcer Scale for Healing (PUSH) tool 3.0, cost estimation at 3 weeks.

Methods

In this double-blind, randomized, controlled trial, 20 PIs (grade II, III, IV) were randomized to two groups (PRF and control group [CG]). PRF membrane dressing was done weekly for 3 weeks in intervention group. Daily normal saline dressing was done in CG. Weekly evaluation was done with PUSH 3.0.

Results

Between-group analysis showed significant improvement in PUSH tool total score in PRF group compared to control group ($P=0.009$) at 3rd week. Statistically significant improvement was also observed in exudate amount in PRF group ($P=0.007$). Within-group analysis also showed significant changes in PRF group not in control group. Overall cost of management was also reduced in PRF group.

Conclusion

This is the first trial of PRF use in PI in SCI. PRF is effective in healing of PI and is also a cost-effective newer option in PI management in people with SCI.

YS7

PREDICTING COGNITIVE FUNCTION IN THE ELDERLY: ANALYSIS FROM A COMMUNITY STUDY IN SURABAYA

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Background and objectives

Cognitive decline presents an increasing challenge for the aging population that compromises their well-being and strains healthcare systems. Effective intervention requires a clear understanding of the factors contributing to cognitive impairment. This study aims to identify the predictors of cognitive function among elderly individuals Using the Montreal Cognitive Assessment Indonesia Version (MOCA-INA).

Methodology

A cross-sectional study was conducted on 76 elderly person participants from the community. The dependent variable was cognitive function, assessed using MOCA-INA. The independent variables included demographic factors (age, gender, education), health-related factors (BMI, hypertension, diabetes mellitus, cholesterol, uric acid levels), and functional assessments (static balance, Barthel Index, IPAQ, TUG). A logistic regression model was used to determine the significant factors predicting cognitive decline.

Results

The analysis showed several significant factors in predicting the cognitive function, including gender ($p = 0.42$, CI 95% = 1.061 – 21.875), age ($p = 0.014$, CI 95% = 0.792 – 0.974), educational background ($p = 0.4$, CI 95% = 1.062 – 13.027), and static stability (right side, $p = 0.07$, CI 95% = 0.12 – 0.497). A negative correlation was observed between age and cognitive function, with higher age associated with lower MOCA-INA scores. Conversely, higher educational levels showed a protective effect, suggesting a role in cognitive resilience. Additionally, poor balance was a significant predictor of cognitive decline, emphasizing its role in cognitive health.

Conclusion

This study identifies gender, age, education level, and balance ability as factors influencing cognitive decline in the elderly. The results emphasize how maintaining a good balance and increasing educational level may help lower cognitive impairment risks. Further research is needed to investigate the underlying mechanisms of the associations and validate the findings in larger, more diverse populations.

YS8

EARLY INTERVENTION WITH PLATELET-RICH PLASMA INJECTION FOR PRESSURE ULCERS IN SPINAL CORD INJURY PATIENT: A NOVEL APPROACH TO WOUND HEALING

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Background and Aims

Pressure ulcers (PUs) are a common complication in spinal cord injury (SCI) patients due to immobility and poor tissue perfusion. Standard treatments, including dressings and debridement, often lead to prolonged healing times. Platelet-rich plasma (PRP), rich in growth factors, has shown potential in promoting tissue regeneration. This study evaluates the effectiveness of early PRP injection in healing PUs in SCI patients.

Methods

A prospective, randomized controlled trial was conducted on 30 SCI patients with stage II and III PUs. Patients were divided into two groups: the PRP group received direct injections into the ulcer site, while the control group received standard wound care. Wound healing was assessed at baseline, 2, 4, and 8 weeks using ulcer size reduction and Pressure Ulcer Scale for Healing (PUSH) scores.

Results

PRP-treated ulcers showed significantly greater reductions in wound size and improved PUSH scores compared to controls. Histological analysis revealed enhanced fibroblast activity, angiogenesis, and re-epithelialization in PRP-treated wounds. PRP was well tolerated, with no major adverse effects reported.

Conclusion

Early PRP injection enhances PU healing in SCI patients, promoting faster wound closure and tissue regeneration. As a minimally invasive therapy, PRP may offer an effective alternative to conventional treatments. Further research is needed to validate its long-term efficacy and optimize treatment protocols.

YS9

EFFICACY OBSERVATION OF PLATELET - RICH PLASMA (PRP) INJECTION COMBINED WITH EXERCISE THERAPY IN IMPROVING POST - STROKE SHOULDER PAIN

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Objective

Post-stroke shoulder pain is a common complication among stroke patients, which seriously affects the recovery of upper limb function and the quality of life of patients. This study aims to evaluate the efficacy of platelet-rich plasma (PRP) injection combined with exercise therapy in patients with post - stroke shoulder pain.

Methods

A total of 50 patients. The control group (25) received conventional exercise therapy, while the experimental group (25) received PRP injection treatment in addition to the conventional exercise therapy. The treatment cycle was 4 weeks, with 2 - 3 treatments per week. The visual analogue scale (VAS) was used to evaluate the degree of pain, the Fugl - Meyer assessment was used to evaluate the upper limb function, and the changes in the quality of life of the patients were observed.

Results

After 4 weeks of treatment, the VAS score of the patients in the experimental group was significantly lower than that of the control group, and the degree of pain was significantly reduced. At the same time, the Fugl -Meyer score and the quality of life of the patients in the experimental group were also significantly improved, indicating a significant improvement in upper limb function and quality of life. In addition, no serious adverse reactions occurred in the patients of the experimental group during the treatment process.

Conclusion

PRP injection combined with exercise therapy is an effective method for treating post - stroke shoulder pain. This treatment method can significantly reduce the pain level of patients, improve upper limb function and quality of life, and has high safety. It is recommended to use this treatment method as one of the routine treatment means for patients with post - stroke shoulder pain to improve the rehabilitation effect and quality of life of patients. Keywords: PRP; Stroke; Shoulder Pain

YS10

CURATIVE EFFECT ANALYSIS OF SCALP ACUPUNCTURE NEEDLE COMBINED WITH TDCS IN TREATING UPPER LIMB MOTOR DYSFUNCTION AFTER STROKE

Bian Li

Background

Upper limb motor impairment following stroke critically disrupts activities of daily living and quality of life. While both scalp acupuncture needle(SAN) and transcranial direct current stimulation (tDCS) demonstrate individual therapeutic benefits for post-stroke motor recovery, the potential synergistic effects of combined intervention remain unexplored. This study investigates the therapeutic efficacy of integrated SAN and tDCS for upper limb rehabilitation in stroke survivors, with parallel exploration of neurophysiological mechanisms through functional neuroimaging and behavioral assessments.

Methods

This study describes a randomized controlled trial, using the blind method of evaluation. Sixty patients with post-stroke upper limb motor dysfunction were randomized in a 1: 1: 1 ratio to tDCS, scalp needle treatment, and combination groups (scalp needle treatment+tDCS). All three groups will receive conventional rehabilitation treatment. Participants in the tDCS group will receive tDCS stimulation in the M1 area for 20 minutes, and acupuncture group will receive acupuncture for 20 minutes. The combined treatment group will receive two kinds of therapies. All treatments were carried out 3 times a week for 4 weeks.

Results

The primary outcome measure of this study was the Fugl-Meyer upper extremity component of motor function. Secondary outcome measures included functional MRI, modified Barthel finger number scale, and self-rating scales for anxiety and depression. All scale results will be assessed at baseline, at 2 weeks and 4 weeks, and during the follow-up period at 3 months after discharge. Repeated analysis of variance will be conducted to observe the time interaction effects of the joint intervention group.

Conclusions

Scalp acupuncture needle combined with tDCS has a synergistic effect on the treatment of motor dysfunction after stroke, and has a beneficial effect on promoting the recovery of upper limb movement and enhancing daily participation of patients with subacute stroke.

Keywords

scalp acupuncture needle, transcranial direct current stimulation, stroke, upper limb, motor function

YS11

THE EFFECTIVENESS OF WHOLE-BODY VIBRATION TRAINING ON PAIN, MUSCLE STRENGTH, AND PHYSICAL FUNCTION IN PATIENTS WITH KNEE OSTEOARTHRITIS: A RANDOMIZED CONTROLLED TRIAL

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Background and aims

Knee osteoarthritis (KOA) is a common chronic degenerative joint disease that often leads to pain, muscle weakness, and functional impairment. Whole-body vibration training (WBVT), as an emerging rehabilitation intervention, may serve as a safe and effective adjunctive treatment for KOA. This study investigates the effects of whole body vibration training on pain, muscle strength and physical function in patients with KOA.

Methods

A total of 24 outpatients were recruited and randomly assigned to two groups (control group and experimental group) using a random number method, with 12 participants in each group. Both groups received conventional rehabilitation and vibration training three times per week for a total of 24 sessions. The control group underwent conventional rehabilitation for 30 minutes, while the experimental group received an additional 20 minutes of WBVT on top of conventional rehabilitation. Participants stood barefoot on a vibration platform with their hip joints flexed at 45 degrees, knee joints flexed at 60 degrees, and performed hip abduction simultaneously. This randomized controlled trial (RCT) evaluated the efficacy of WBVT in KOA patients, with assessments conducted at baseline and after 8 weeks of treatment. The evaluation included pain (VAS), range of motion (ROM), muscle strength (peak torque of the quadriceps), Knee injury and Osteoarthritis Outcome Score (KOOS), and Timed Up and Go test (TUG).

Results

All 24 participants completed the treatment protocol and assessments. After 8 weeks of treatment, a reduction in VAS scores and an increase in quadriceps peak torque (PT) were observed both within and between groups, indicating significant improvements in pain and muscle strength ($p < 0.05$). However, while TUG showed significant improvement within groups, no significant difference was found between groups. KOOS and ROM showed no significant improvements either within or between groups ($p > 0.05$).

Conclusion

Compared with conventional rehabilitation, WBVT can enhance muscle strength and reduce pain in patients with KOA. The results suggest that whole-body vibration training may be a promising rehabilitation option for improving KOA.

OP1

EFFECTS AND POTENTIAL MECHANISMS OF REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION ON MOTOR FUNCTION IN RATS WITH INCOMPLETE SPINAL CORD INJURY

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Background and aims

To investigate the effects of repetitive transcranial magnetic stimulation (rTMS) on motor function and its mechanisms in rats with spinal cord injury (SCI).

Methods

Forty-five SD rats were randomly assigned to three groups: Control, SCI, and rTMS, with 15 rats per group. The SCI rat model was established using the modified Allen's method. rTMS at 15 Hz was administered once daily for 56 days, starting on day 2 post-surgery. Bioinformatics analysis identified differential genes and enriched pathways between the Control and SCI groups. Western blotting assessed the expression of MMP9, β -DG, Occludin, Claudin-5, ZO-1, TNF- α , IL-1 β , and IL-18 in spinal tissue. Immunofluorescence staining evaluated the expression of MMP9, Occludin, Claudin-5, and ZO-1-positive cells. ELISA measured serum inflammatory cytokines like TNF- α , IL-1 β , and IL-18. Evans Blue (EB) staining assessed blood-spinal cord barrier integrity, and hematoxylin and eosin (HE) staining examined spinal tissue pathology. Motor function was evaluated via MEP assessment and BBB score.

Results

Bioinformatics analysis revealed that MMP9, IL-1 β , and IL-18 are involved in SCI pathology and enriched in inflammation-related pathways. Compared to the SCI group, the rTMS group exhibited a decrease in MMP9 protein levels and positive cells, an increase in Occludin, Claudin-5, and ZO-1 protein levels and positive cells, a reduction in TNF- α , IL-1 β , and IL-18 protein expression, and an increase in β -DG protein expression ($P<0.001$). rTMS treatment showed lower peripheral serum levels of inflammatory cytokines and reduced EB content in the damaged spinal cord ($P<0.001$). rTMS intervention exhibited a reduction in spinal cord damage area, a shortened MEP latency, an increased MEP amplitude, and an improved BBB score ($P<0.001$).

Conclusion

rTMS suppresses MMP9 expression, reduces the degradation of tight junction proteins, prevents basement membrane damage, and restores blood-spinal cord barrier integrity. Simultaneously, it alleviates inflammation response and promotes motor function recovery in SCI rats.

OP2

DMPFC SUPPRESSION PROMOTES THE GENERATION AND MAINTENANCE OF CHRONIC MUSCLE PAIN VIA MICROGLIAL SYNAPTIC PHAGOCYTOSIS

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Background and aims

The dorsomedial prefrontal cortex (dmPFC) is implicated in the descending pain regulatory pathway; however, the underlying mechanisms of its changes remain poorly understood. This study aimed to explore the role of the dmPFC in chronic muscle pain (MP), focusing on neuronal excitability, synaptic plasticity, and its potential functional involvement in pain regulation.

Methods

A rat model of chronic MP was established to assess pain-related behavioral test. Non-invasive micro-test technology and in vivo fiber photometry were used to detect changes in neuronal activity in the dmPFC, while transmission electron microscopy and patch-clamp electrophysiology were employed to assess synaptic plasticity. Chemogenetic approaches were employed to suppress or activate dmPFC activity in normal and MP rats, respectively, to evaluate its role in pain progression. Single-cell RNA sequencing was performed to identify molecular changes in the dmPFC of MP rats. Microglial activation was inhibited using minocycline, and CR3 expression was knocked down in microglia to examine its functional role in synaptic phagocytosis, neuronal excitability, and pain behaviors.

Results

Reduced neuronal excitability and impaired synaptic plasticity were seen in dmPFC of MP rats. Chemogenetic suppression of dmPFC induced pain in normal rats, while its activation alleviated pain in MP rats, underscoring dmPFC's role in chronic MP. Single-cell RNA sequencing showed CR3 upregulation in CD86+ microglia in dmPFC of MP rats. Minocycline inhibition reduced CD86+ microglia activation, normalized synaptic function, restored dmPFC excitability, and alleviated pain. CR3 knockdown in microglia prevented synaptic phagocytosis, enhanced dmPFC excitability, and reduced pain, confirming its role in chronic MP.

Conclusion

These findings highlight the critical roles of dmPFC excitability and microglial CR3 in chronic MP progression, identifying them as potential therapeutic targets and providing new insights into pain mechanisms and intervention strategies.

OP3

VAGUS NERVE STIMULATION ALLEVIATES CHRONIC MUSCLE PAIN BY SUPPRESSING MICROGLIAL-NEURONAL C3-CR3 PATHWAY-INDUCED NEURONAL METHYLATION AND RESTORING DMPFC ACTIVITY

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Background and aims

Vagus nerve stimulation (VNS) has emerged as a potential therapy for chronic pain, yet its underlying mechanisms remain elusive. This study aimed to investigate whether VNS alleviates chronic muscle pain (MP) by modulating the microglial-neuronal C3-CR3 pathway and reversing neuronal methylation-induced dorsomedial prefrontal cortex (dmPFC) dysfunction.

Methods

A rat model of chronic MP was established. VNS was administered daily for two weeks. Pain-related behaviors were assessed using mechanical allodynia and thermal hyperalgesia tests. Neuronal activity in the dmPFC was monitored using in vivo fiber photometry, while synaptic plasticity was evaluated via transmission electron microscopy and patch-clamp electrophysiology. Chemogenetic approaches were employed to selectively inhibit or activate dmPFC neurons to validate their role in VNS-mediated pain relief. Neuronal methylation levels were measured using bisulfite sequencing and methylated DNA immunoprecipitation (MeDIP). Microglial activation and C3-CR3 signaling were assessed using immunohistochemistry and flow cytometry.

Results

Chronic MP rats exhibited reduced dmPFC neuronal excitability, impaired synaptic plasticity, and increased microglial C3-CR3 signaling, accompanied by elevated neuronal methylation levels. VNS treatment significantly alleviated pain behaviors, restored dmPFC activity, and normalized synaptic plasticity. VNS also suppressed microglial activation, downregulated C3-CR3 signaling, and reduced neuronal methylation in the dmPFC. Chemogenetic inhibition of dmPFC neurons abolished the analgesic effects of VNS, while activation of dmPFC neurons mimicked VNS-induced pain relief. Single-cell RNA sequencing revealed that VNS reversed chronic MP-associated gene expression changes, particularly in microglia and neurons.

Conclusion

This study demonstrates that VNS alleviates chronic MP by suppressing the microglial-neuronal C3-CR3 pathway, reducing neuronal methylation, and restoring dmPFC activity. These findings identify the C3-CR3 pathway and neuronal methylation as key mechanisms underlying chronic MP and highlight VNS as a promising therapeutic strategy for pain management. This work provides new insights into the neural mechanisms of chronic pain and the potential of neuromodulation therapies.

OP4

REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION ATTENUATES CEREBRAL ISCHEMIA-REPERFUSION INJURY IN RATS: INVOLVING THE WARBURG EFFECT AND MICROGLIAL M2 POLARIZATION

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Background and aims

Stroke is a huge threat. In this study, a middle cerebral artery embolization model (MACO) was constructed by wire embolization to explore whether repeated transcranial magnetic stimulation to alleviate cerebral ischemia-reperfusion injury (CIRI) involves Warburg effect and microglial polarization, in order to clarify a new mechanism of rTMS anti-CIRI.

Methods

Three-month-old male SD rats were randomly divided into sham operation group, model group and intervention group, with 10 rats in each group. Rats in the model group and intervention group made a MACO model. The rats in the intervention group were successfully modeled for 24 hours after rTMS intervention, once a day for 7 consecutive days, and all rats were neurologically scored after 7 days of modeling and intervention, and the whole brain of the rats was stained with TTC, HE and Nissl staining. ELISA was used to detect inflammatory factors and lactate levels in rat cerebrospinal fluid. The levels of Warburg effector-related protein and microglial polarization-related protein in the penumbra of cerebral cortical ischemia were detected by qRT-PCR and Western blot.

Results

After modeling, the rats in the model group showed symptoms of neurological deficit, increased cerebral infarction area, severe cerebral cortical damage, increased levels of pro-inflammatory factors, decreased levels of anti-inflammatory factors, increased Warburg effect-related proteins, increased levels of M1 microglial polarization-related proteins, and decreased the levels of M2 microglial polarization-related proteins. After intervention, the symptoms of neurological ischemia, cerebral cortical infarction and injury were reduced, the levels of pro-inflammatory factors were significantly reduced, the levels of anti-inflammatory factors were increased, the levels of Warburg effect-related proteins were reduced, the levels of M1 microglia polarization-related protein were reduced, and the levels of M2 microglia polarization-related protein were increased.

Conclusion

RTMS may alleviate CIRI in rats by inhibiting the Warburg effect and promoting microglial M2 polarization.

OP5

TRANSCRIPTOMICS-BASED INVESTIGATION OF THE MECHANISM OF ACTION OF ELECTROACUPUNCTURE IN THE TREATMENT OF EARLY SYNOVIAL INFLAMMATION IN KNEE OSTEOARTHRITIS

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Background and aims

To explore the effects of electroacupuncture on the early synovium of rats with knee osteoarthritis model based on transcriptomic sequencing (mRNA sequencing, mRNA-Seq).

Methods

Twenty-four 3-month-old SD male rats were randomly divided into 3 groups of control, model and electroacupuncture groups, with 8 rats in each group. The model group and electroacupuncture group were induced by ACLT (Anterior cruciate ligament transection, ACLT) in the knee osteoarthritis rat model, and the control group was left untreated. After 4 weeks of modeling, the electroacupuncture group performed electroacupuncture interventions at “Zusanli”, “Xuehai”, “Taixi” and “Yanglingquan” on both sides of the rats. Electroacupuncture intervention was carried out with sparse and dense waves of 3HZ/15HZ, the current intensity of 1mA, 30min per intervention, once/d, 5d/week for 2 weeks. Immediately after the end of the intervention, the synovial membrane of the left knee joint was taken for mRNA sequencing, and the right knee joint was stained with HE and evaluated for Mankin’s score.

Results

Compared with the control group, the staining results showed that the cartilage surface was rough. The synovial cells were disorganized, and Mankin’s score was elevated in the model group ($P<0.05$). Compared with the model group, the cartilage surface of rats in the electroacupuncture group was smoother, the inflammatory infiltration of synovial tissue was reduced, and Mankin’s score was decreased ($P<0.05$). Transcriptomics and KEGG enrichment analysis showed that electroacupuncture intervention to improve early synovial inflammation in knee osteoarthritis was related to cell adhesion molecules, PI3K-Akt, NF- κ B, and PPAR pathway.

Conclusion

Electroacupuncture intervention can effectively improve early synovial inflammation in knee osteoarthritis, and its mechanism may be related to the signaling pathways of cell adhesion molecules, PI3K-Akt, NF- κ B, and PPAR.

OP6

NEUROPROTECTION AND FUNCTIONAL RECOVERY IN SPINAL CORD INJURY VIA CLMAGR-EXPRESSING MESENCHYMAL STEM CELLS TO ALLEVIATE FERROPTOSIS

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Background and aims

Mesenchymal stem cell (MSC) transplantation for spinal cord injury (SCI) has been widely studied, but low graft survival remains a major limitation. Studies have shown that iron overload during the acute phase of injury triggers ferroptosis. Previous work demonstrated that bone marrow-derived MSCs expressing the iron-based magnetosensor (cIMagR) can convert extracellular free iron ions into iron oxide nanoparticles. This study aimed to investigate whether cIMagR-overexpressing human umbilical cord MSCs (cIMagR-hUC-MSCs) could chelate excess iron ions, enhance graft survival during the acute phase of SCI, and promote functional recovery.

Methods

Lentiviral transduction was used to overexpress cIMagR in hUC-MSCs. SCI rat models were treated with cIMagR-hUC-MSC transplantation combined with repetitive transcranial magnetic stimulation (rTMS). Motor function was assessed using BBB scores and electromyography. The viability of cIMagR-hUC-MSCs under high-iron conditions and their neuroprotective effects in co-culture systems were evaluated using CCK-8, flow cytometry, Western blot, and immunofluorescence.

Results

The transplantation of cIMagR-hUC-MSCs significantly improved BBB scores, gait analysis, and motor-evoked potentials in rats. Immunofluorescence revealed that cIMagR-hUC-MSCs persisted longer in the spinal cord compared to hUC-MSCs. In vitro experiments showed that cIMagR-hUC-MSCs exhibited enhanced viability under high-iron conditions, with reduced Acsl4 and MDA levels, improved mitochondrial function, and increased neuronal survival in co-culture systems. Flow cytometry confirmed that cIMagR-hUC-MSCs restored mitochondrial membrane potential and reduced reactive oxygen species (ROS) accumulation in neurons.

Conclusion

The transplantation of cIMagR into hUC-MSCs prolongs their retention in the spinal cord, mitigates iron overload-induced neuronal damage, and provides neuroprotection, thereby promoting functional recovery after SCI.

Keywords

Spinal cord injury, mesenchymal stem cells, cIMagR, iron overload, ferroptosis

OP7

REPETITIVE TRANS-SPINAL MAGNETIC STIMULATION PROMOTES AXL-MEDIATED MICROGLIAL EFFEROCYTOSIS TO ALLEVIATE NEUROPATHIC PAIN

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Background and aims

Neuropathic pain (NP) is one of the most challenging chronic pain conditions in clinical practice. A single-cell RNA sequencing study published in Science in 2022 revealed that Axl in spinal microglia is closely associated with pain resolution in peripheral nerve injury-induced NP models. However, the specific mechanisms remain unclear. This study aims to explore a therapeutic approach to enhance Axl function in spinal microglia in peripheral nerve injury-induced neuropathic pain (NP) models and elucidate its underlying mechanisms.

Methods

Chronic constriction injury of the sciatic nerve (CCI) in rats was established the neuropathic pain model. Repetitive trans-spinal magnetic stimulation (rTSMS) was used for intervention. Von Frey hairs were used to assess the nociception. Axl inhibitor R428 and recombinant Gas6 were employed for signaling studies. Primary microglia were used for in vitro experiments. Western blotting, immunofluorescence, and ELISA were used for molecular biological detection.

Results

Intrathecal injection of R428 to inhibit Axl activation in the spinal cord induced mechanical hypersensitivity in the hind limbs of healthy rats and led to the accumulation of apoptotic cells and increased levels of inflammatory factors in the spinal cord. In the CCI-induced NP rat model, Axl was inhibited, accompanied by increased apoptotic cell accumulation and elevated inflammatory factor levels. rTSMS alleviated mechanical hypersensitivity and reduced apoptotic cell accumulation and inflammatory factor levels via activating Axl. Single-cell RNA sequencing data revealed that spinal Axl is primarily expressed in microglia in NP models. In vitro experiments showed that healthy microglia could phagocytose apoptotic cells, Pre-treatment with R428 or lipopolysaccharide (LPS) weakened the microglial efferocytosis, while repetitive magnetic stimulation (rMS) restored the microglial efferocytic function. Additionally, CCI-induced NP rats exhibited reduced levels of Gas6, the sole ligand for Axl in the spinal cord, but rTSMS increased spinal Gas6 levels. Both in vivo and in vitro experiments revealed that Gas6 can mimic the analgesic effects and the promotion of microglial efferocytosis of rTSMS.

Conclusion

rTSMS upregulates spinal Gas6 in the CCI-induced NP model, thereby promoting Axl-mediated microglia efferocytosis and inhibiting spinal neuroinflammation to reduce NP. This study provides support and a theoretical basis for the clinical translation of the findings reported in Science.

OP8

MICROGLIA-NEURONAL INTERACTIONS MEDIATED BY P2X4R - BDNF - TRKB DRIVE SYNAPTIC PLASTICITY AND ACC HYPERACTIVITY IN MUSCLE PAIN CHRONICITY

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Background and aims

Microglia-neuronal interactions are crucial in pain modulation, yet their role in the anterior cingulate cortex (ACC) during chronic muscle pain (MP) remains unclear. This study explores how P2X4R-BDNF-TrkB signaling in ACC microglia-neuronal interactions drives synaptic plasticity and cortical hyperactivity in MP chronicity, contributing to pain and anxiety-like behaviors.

Methods

An animal model of MP chronicity was used to evaluate the level of pain and anxiety. Microglia were suppressed with minocycline administration. We injected lentivirus to specifically knocked down microglia P2X4R expression and TrkB receptor (TrkB) inhibitor to decreased the level of BDNF-TrkB. Behavioral tests, molecular biology and electrophysiological recordings were used to detect pain behavioral, cortical excitability and synaptic plasticity markers. Finally, the neural excitation of ACC was activated or suppressed by gene editing, opto-chemical genetics and in vivo fiber photometry recording, sequentially the levels of pain and related emotion changes were observed.

Results

The mechanical and thermal pain threshold was decreased, the expression of ACC microglia and P2X4R was up-regulated, the synaptic plasticity was enhanced, and the excitability of ACC was increased in MP chronicity. Knock-down of P2X4R or inhibition of BDNF-TrkB alleviated pain and anxiety levels, which were associated with significant suppression of synaptic plasticity and cortical excitability in ACC. The activation or inhibition of ACC activity increased or decreased pain sensitivity and anxiety scores in animals.

Conclusion

ACC microglia-neuronal interaction induced by P2X4R-BDNF-TrkB are involved in the regulation of synaptic plasticity and promote ACC excitability. These molecular and cellular mechanisms may become new strategies for the treatment of chronic pain and provide new targets for clinical treatment.

OP9

REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION MODULATES MICROGLIAL ACTIVATION THROUGH THE IDO1-KYNURENINE PATHWAY TO AMELIORATE POST-STROKE DEPRESSION

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Background and aims

Post-stroke depression (PSD) is a prevalent and debilitating complication following stroke, and its pathogenesis is closely associated with neuroimmune dysregulation, particularly the activation of microglia. Recently, repetitive transcranial magnetic stimulation (rTMS) has emerged as a promising non-invasive therapeutic approach for alleviating PSD. While the role of the IDO1-kynurenine pathway in microglial activation and the immune response is increasingly recognized, its precise mechanism in the context of rTMS remains poorly understood. The present study aims to investigate whether rTMS ameliorates the pathological features of PSD by modulating the IDO1-kynurenine pathway, thereby regulating microglial activation.

Methods

A PSD mouse model was established and divided into three groups: control, PSD, and PSD+rTMS, with a 4-week rTMS intervention. Depression-like behavior was assessed through the source preference test (SPT), forced-swimming test (FST) and tail-suspension test (TST). Microglial activation was evaluated in terms of cell count, morphology, and the expression of IDO1, along with the activation of the kynurenine pathway. The levels of pro-inflammatory cytokines (e.g., TNF- α , IL-6) and anti-inflammatory cytokines (e.g., IL-10) in plasma and brain tissue were quantified by ELISA.

Results

Transcranial magnetic stimulation significantly attenuated depressive-like behaviour in post-stroke depressed mice, as evidenced by a significant reduction in the immobility time of FST and FST and an increase in sugar-water preference. In addition, transcranial magnetic stimulation treatment greatly attenuated microglia activation in the hippocampus, which inhibited M1 polarisation by upregulating IDO1 and its metabolite kynurenine, while promoting M2 polarisation. In addition, transcranial magnetic stimulation intervention significantly reduced the expression of pro-inflammatory cytokines such as TNF- α and IL-6 in the hippocampus, while increasing the level of the anti-inflammatory cytokine IL-10.

Conclusion

rTMS effectively alleviates post-stroke depression by activating the IDO1-kynurenine pathway, thereby modulating microglial polarization and suppressing neuroinflammation. This mechanism highlights a novel therapeutic strategy and molecular target for the treatment of post-stroke depression.

OP10

NEURAL CIRCUITS MAGNETIC STIMULATION MODULATES INFLAMMATORY RESPONSE AND NEURAL PLASTICITY IN THE INJURED REGION TO PROMOTE MOTOR FUNCTION RECOVERY IN RATS AFTER SPINAL CORD INJURY

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Background and aims

Motor function deficits following SCI, stemming from structural disorganization of sensorimotor circuits and secondary neuroinflammatory cascades, represent a pivotal challenge in post-injury neural rehabilitation. Conventional neuromodulation strategies focusing on singular central targets demonstrate constrained therapeutic efficacy, as their spatially restricted stimulation patterns inadequately address multi-level circuit dysfunction.

Methods

Adult male Sprague-Dawley (SD) rats (n=8) underwent T10 spinal cord clip compression injury modeling. Animals were stratified into four cohorts on postoperative day: 1) Sham-sham group (sham surgery + sham stimulation), 2) Sham Stimulation group, 3) NRMS group (L5-L6 peripheral spinal nerve root stimulation), and 4) neural circuits magnetic stimulation group (NC-MS, combined motor cortex transcranial magnetic stimulation and NRMS). This study investigated the specific neuromodulatory effects of early multi-target intervention on spinal cord functional reorganization and its contribution to motor function rehabilitation by administering multi-target magnetic stimulation to rats at the acute phase (postoperative day 3) following T10 spinal cord injury.

Results

Behavioral tests, electrophysiological recordings, and immunohistochemical analyses revealed that the magnetic stimulation groups exhibited significantly better motor recovery than controls, including shortened motor-evoked potential (MEP) latency, reduced neuronal damage in the lesion area, improved functional states, increased neuronal density, enhanced dendritic arborization, upregulated expression of PSD95, GAP43, and BDNF, as well as downregulated CD68 and upregulated CD206 and CCR7. Furthermore, multi-target stimulation (NC-MS) demonstrated superior efficacy compared to single-target interventions (NRMS), highlighting the critical advantage of multi-target neuromodulation in functional recovery.

Conclusion

The results demonstrate that multi-target magnetic stimulation alleviates pathological damage, improves neuronal function and synaptic plasticity, promotes neural circuit reconstruction, and ultimately restores motor function. Additionally, it suppresses neuroinflammation and shifts microglial polarization from pro-inflammatory M1 to anti-inflammatory M2 phenotypes, creating a supportive microenvironment for neural repair. This study demonstrates multi-target magnetic stimulation promotes motor recovery post-SCI through coordinated immunomodulation and circuit plasticity, informing targeted neuromodulation therapy.

OP11

EFFECTS OF A NOVEL ELBOW JOINT TORQUE MEASUREMENT DEVICE ON ASSESSING ELBOW JOINT MOVEMENTS IN HEALTHY SUBJECTS AND STROKE PATIENTS: A PILOT STUDY

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Background and aims

Current clinical practice lacks quantitative assessment methods for elbow joint movements. To explore the effectiveness of the novel elbow joint torque measurement device (EJTMD) in assessing elbow joint movements in both healthy subjects and stroke patients using surface electromyography.

Methods

Healthy subjects (n=22) and stroke patients (n=22) were recruited in this randomized crossover study. Each participant underwent two measurement methods: EJTMD or traditional tools like a protractor and muscle strength tester. Participants were randomly allocated to EJTMD first or traditional tools first. The efficacy of EJTMD was assessed by comparing muscle strength and AROM with traditional tools. Integrated EMG (iEMG) and root mean square (RMS) were utilized to analyze outcomes during elbow movements. The peak torque (PT) and peak torque/body weight (PT/BW) were examined to explore the differences in mechanical characteristics of bilateral elbow joints. Motor evoked potentials (MEP) and central motor conduction time (CMCT) were employed to investigate potential mechanisms of underlying motor discrepancies post-stroke.

Results

EJTMD demonstrates superior muscle strength, AROM, iEMS, and RMS during elbow movements compared to traditional tools ($P<0.05$). Repeated EJTMD measurement outcomes have a good correlation on the same day ($r\geq 0.999$, $P<0.001$). EJTMD exhibits a statistical difference in measurement outcomes pre- and post-treatment among stroke patients than traditional tools ($P<0.05$). Stroke patients reveal weaker PT and PT/BW on the lesion side during low-speed testing ($P<0.05$). Stroke patients show decreased iEMS and RMS on the affected side during elbow movements ($P<0.05$), with prolonged MEP latency and CMCT ($P<0.001$), and reduced MEP amplitude ($P<0.001$).

Conclusion

EJTMD demonstrates reliability and effectiveness in elbow movements for healthy subjects and stroke patients, showing sensitivity to minor joint changes. Stroke patients have decreased flexor and extensor function on the lesion side, potentially due to blocked corticospinal tract conduction.

OP12

EFFECTIVENESS OF ROBOTIC-ASSISTED GAIT TRAINING ON CARDIOPULMONARY FITNESS AND EXERCISE CAPACITY FOR INCOMPLETE SPINAL CORD INJURY

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Background and aims

To determine the effects of robotic-assisted gait training on cardiopulmonary fitness and exercise capacity for people with incomplete spinal cord injury.

Methods

PubMed, Embase, Web of Science, PEDro, CENTRAL and CINAHL were searched from inception until September 4, 2022. Randomized controlled trials that evaluated the effects of robotic-assisted gait training on cardiopulmonary fitness and exercise capacity for individuals with incomplete spinal cord injury were selected. Mean differences (MD) with 95% confidence interval (CI) were calculated. The methodological quality was evaluated by the Cochrane Risk of Bias 2.0 tool. Subgroup analyses were conducted according to the time since injury.

Results

In total 19 studies involving 770 patients were eligible for analysis. Individuals with acute incomplete spinal cord injury in robotic-assisted gait training groups showed significantly greater improvements in 6-minute walking test (MD 53.32; 95% CI 33.49 to 73.15; $P < 0.001$), lower extremity motor scale (MD 5.22; 95% CI 3.63 to 6.80; $P < 0.001$) and walking index for spinal cord injury II (MD 3.18; 95% CI 1.34 to 5.02; $P < 0.001$). Robotic-assisted gait training improved peak oxygen consumption to a greater degree for chronic incomplete spinal cord injury patients (MD 4.90; 95% CI 0.96 to 8.84; $P=0.01$)

Conclusion

Robot-assisted gait training may be a feasible and effective intervention in terms of cardiopulmonary fitness and exercise capacity for individuals with incomplete spinal cord injury.

OP13

EFFECTIVENESS OF VIRTUAL REALITY-BASED TRAINING IN CHRONIC LOW BACK PAIN

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Background and aims

To evaluate the immediate- and short-term effects of virtual reality-based training on pain, pain-related fear, and disability in people with chronic low back pain.

Methods

We searched the PubMed, Embase, Web of Science, PEDro, CENTRAL, and CINAHL databases from inception until January 2024. Only randomized controlled trials assessing the effects of virtual reality-based training on individuals with chronic low back pain were selected. The outcomes were focused on pain, pain-related fear measured by the Tampa Scale of Kinesiophobia, and disability measured by the Oswestry Disability Index. The immediate term was defined as the immediate period after intervention, and the short term was defined as 3 to 6 months after intervention. The Cochrane Risk of Bias tool and the GRADE approach were used to evaluate the quality of the methodology and evidence, respectively.

Results

In total, 20 randomized controlled trials involving 1059 patients were eligible for analysis. Virtual reality-based training showed significant improvements in pain (MD -1.43; 95% CI -1.86 to -1.00; $P < .001$), pain-related fear using the Tampa Scale of Kinesiophobia (MD -5.46; 95% CI -9.40 to -1.52; $P = .007$), and disability using the Oswestry Disability Index (MD -11.50; 95% CI -20.00 to -3.01; $P = .008$) in individuals with chronic low back pain immediately after interventions. However, there were no significant differences observed in pain ($P = .16$), pain-related fear ($P = .10$), and disability ($P = .43$) in the short term.

Conclusion

These findings indicated that virtual reality-based training can be used effectively for individuals with chronic low back pain in the immediate term, especially to reduce pain, alleviate pain-related fear, and improve disability. However, the short-term benefits need more high-quality trials to be demonstrated.

OP14

FUGL MEYER ASSESSMENT AND MODIFIED ASHWORTH SCALE: A DUAL LENS ON UPPER LIMB SPASTICITY RECOVERY USING BOTULINUM TOXIN TYPE A INJECTION

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Background and aims

Upper limb spasticity after stroke or traumatic brain injury (TBI) causes abnormal postures, functional impairment, activity limitations and reduces quality of life. This study aimed to evaluate the effectiveness of Botulinum Toxin Type A (BTXA) in managing spasticity.

Methods

This prospective, observational pre-post cohort study included patients with upper limb spasticity from brain injury (stroke or TBI) who received intramuscular BTXA injections. Treatment effectiveness was assessed using the Modified Ashworth Scale (MAS) for muscle tone and the Fugl-Meyer Assessment Upper Extremity (FMA-UE) for function. Evaluations were conducted at baseline and at 4, 12, and 24 weeks post-treatment. Data analysis was performed using SPSS version 26.

Results

A total of 61 participants were included. The mean MAS score at baseline was 2.39 (SD 0.69), which significantly improved at 4 weeks [1.31 (SD 0.76), $p < 0.001$], with further improvements at 12 weeks [1.18 (SD 0.66), $p < 0.001$], and sustained effects at 24 weeks [1.33 (SD 0.80), $p < 0.001$]. The mean FMA-UE scores at baseline 67.55 (SD 24.71) also showed significant improvements, with notable gains at 4 weeks [73.73 (SD 24.85), $p < 0.001$], further enhancement at 12 weeks [76.07 (SD 22.86), $p < 0.001$], and maintained improvement at 24 weeks [77.37 (SD 25.97), $p < 0.001$]. FMA-UE analysis revealed that mean motor function and sensation showed the most significant improvements at 12 weeks, while joint motion and pain improved the most at 24 weeks. Younger age ($\beta = -0.90$, 95% CI [-1.45, -0.36], $p = 0.002$) and inpatient rehabilitation ($\beta = 15.12$, 95% CI [1.39, 28.86], $p = 0.032$) were identified as significant predictors of better functional outcomes.

Conclusion

BTXA treatment significantly improved muscle tone and functional outcomes in patients with upper limb spasticity following brain injury. These improvements were observed as early as 4 weeks and sustained through 24 weeks. Younger patients and those undergoing inpatient rehabilitation demonstrated higher rates of treatment success.

OP15

EXOSKELETAL ROBOT-ASSISTED GAIT TRAINING FOR INPATIENTS WITH HIGH REHABILITATION MOTIVATION AFTER STROKE: A PILOT CASE-CONTROLLED STUDY

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Background and aims

Patient-initiated exoskeletal robots that provide knee flexion and extension support have been used to improve gait performance in stroke patients with higher motor capabilities. However, their therapeutic effectiveness remains uncertain. Additionally, it is unclear whether the timing of robot-assisted rehabilitation, initiated earlier or later in the recovery process, influences the functional outcomes achieved. In this study, we investigated the treatment effects of robot-assisted training in stroke patients during the early recovery stage, comparing different intervention time points: more than 30 days versus less than 30 days.

Methods

Thirty-one patients with stroke onset durations of less than three months were included (more than 30 days, n=18; no more than 30 days, n=13). All patients underwent 6 sessions of 40-minute robot-assisted gait training within 2 weeks. Clinical measurements were performed before, midway, and after training, including the Barthel Index, Berg Balance Scale, 5-meter walking speed test (5MWS), 6-minute walking test, Fugl-Meyer Assessment for upper limb (FMA-UE) and lower limb, and the Timed Up and Go test.

Results

The results of the within-group analysis showed that all clinical measurements significantly improved after training in patients who began robot-assisted rehabilitation more than 30 days after stroke onset ($P < 0.05$). However, for those who started earlier, no significant step-by-step improvements were observed in the 5MWS and FMA-UE. In the between-group comparison, no significant differences were found.

Conclusion

Exoskeletal robot-assisted gait training promotes functional recovery in post-stroke patients at the early stage, but no significant differences were found in the timing of the rehabilitation intervention. In the future, randomized controlled trials with larger sample sizes and long-term follow-ups are needed.

OP16

EFFECT OF DIGITAL THERAPEUTICS ON PATIENTS AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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Objective

Driven by software programs, evidence-based Digital Therapeutics (DTx) can remotely assess the functions of patients after orthopedic surgery and provide professional rehabilitation guidance. However, there is insufficient evidence to support the functional recovery of patients after orthopedic surgery. In this study, we independently developed an orthopedic rehabilitation DTx product based on clinician and orthopedic patient research and explored its feasibility, effectiveness, and safety for use in patients with anterior cruciate ligament reconstruction (ACLR).

Methods

The YUOGO APP independently developed by the team is suitable for tablet computers and mobile phones. Patients can be regularly reminded of training and evaluation, and test data can be automatically stored and uploaded to the cloud to facilitate clinical follow-up and tracking. This study was a prospective randomized controlled trial (ChiCTR2300078138). 130 patients undergoing ACLR in the Fourth Medical Center of the PLA General Hospital were selected and divided into the experimental group (APP) and the control group (traditional rehabilitation therapy) by block randomization method, 65 patients in each group. The experimental group received rehabilitation training guidance and index evaluation at home using our YUOGO APP. The control group received traditional inpatient rehabilitation treatment. Both groups underwent 6-week rehabilitation training starting from the first day after surgery. Range of motion (ROM), quadriceps muscle strength, Knee joint function (KSS) score, Lysholm score, SDS Depression Self-rating Scale and SF-36 Quality of Life questionnaire were performed in both groups every two weeks before and after intervention. The improvement of various indicators, gait and balance function, and treatment cost were observed in both groups after treatment for 6 and 12 weeks after intervention.

Results

After 6-week rehabilitation intervention: 1. ROM, quadriceps muscle strength, KSS score, Lysholm score and SF-36 quality of life questionnaire score of 2 groups were significantly higher than before intervention (all $P < 0.05$), SDS self-rating depression scale score was significantly lower than before intervention (all $P < 0.05$); 2. ROM, quadriceps muscle strength, KSS score of experimental group were significantly lower than those of control group ($P=0.043$, $P=0.032$, $P=0.035$, all $P < 0.05$). SDS self-rating depression scale score was significantly higher than that of control group ($P=0.021 < 0.05$), but Lysholm score and SF-36 quality of life score had no statistical difference compared with control group (all $P > 0.05$). 3. The 12-week follow-up data showed that there were no significant differences in ROM, quadriceps muscle strength, KSS score, Lysholm score, SDS self-rating depression Scale and SF-36 quality of life score between the two groups (all $P > 0.05$). 4. Regarding gait and balance analysis, there were no significant differences in step speed, step frequency, joint flexion angle, extension angle, and balance control scores between the two groups at 6 and 12-week postoperative (all $P > 0.05$). 5. The cost analysis showed that experimental group was significantly lower than control group ($P < 0.001$). 6. No adverse events occurred.

Conclusion

DTx can effectively improve knee joint mobility, gait, balance function and quality of life of patients after ACLR, and relieve postoperative pain. DTx improves the accessibility and convenience of rehabilitation and the motivation of patients to self-manage, and its efficacy is comparable to traditional rehabilitation, while the medical cost is lower. With the help of precision telemedicine technology, orthopedic patients can get personalized rehabilitation services after surgery.

Keyword

Digital Therapeutics, orthopedic rehabilitation, anterior cruciate ligament reconstruction, tele-rehabilitation

OP17

COMPARISON AND CORRELATION ANALYSIS OF SWALLOWING MOTOR IMAGERY AND EXECUTION: A COMBINED EMG AND EEG STUDY

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Background and aims

The relationship between swallowing motor imagery and actual swallowing remains unclear, leading to a lack of physiological basis for the application of swallowing imagery-based brain-computer interface (BCI) paradigms in rehabilitation. This research explores the link between swallowing execution and imagery, aiming to optimize brain-computer interface applications for swallowing rehabilitation in dysphagia patients.

Methods

30 healthy participants performed swallowing imagery and saliva swallowing tasks under video cues, while EEG signals from 64 channels and electromyographic signals from the suprahyoid muscles were recorded. This study analyzes swallowing onset detection through EMG, time-frequency and functional connectivity analysis via EEG, and nonlinear dynamic analysis (Sample Entropy) to compare neural dynamics during swallowing imagery and execution.

Results

The results revealed event-related desynchronization (ERD) in the central (CPz, CP1-CP4) and parietal (Pz, P1-P4) regions for both swallowing imagery and actual swallowing. Pearson correlation analysis indicated a weak but significant correlation ($P = 0.0102$). The ERD phenomenon during swallowing imagery was more similar to that of the pharyngeal stage, with a weak but significant correlation ($P = 0.0139$). Functional connectivity analysis revealed greater central region activation during swallowing imagery than during actual swallowing. In terms of sample entropy, swallowing motor execution exhibited higher signal complexity and dynamic characteristics compared to imagery.

Conclusion

This study highlights neural differences in swallowing imagery and execution, particularly in the central and parietal regions, with similar activation patterns supporting the use of BCI technology in swallowing rehabilitation. Further research is needed to enhance BCI applications for swallowing disorders.

OP18

THE EFFECT OF AGE AND WALKING SPEED ON PARAMETERS AND VARIABILITY OF SPATIOTEMPORAL GAIT

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Background and aims

Spatiotemporal gait parameters are influenced by age and walking speed, reflecting gait stability and variability. Increased variability is associated with age-related functional decline and reduced motor control. However, how these parameters vary with age and walking speed remains unclear. This study aimed to investigate age-related differences in spatiotemporal parameters and the effect of walking speed on gait variability in healthy adults.

Methods

A total of 139 healthy adults were categorized into three groups: young (20–39 years), middle-aged (40–59 years), and older adults (≥ 60 years). Participants walked on a treadmill at fixed speeds of 1, 2, 3, 4, and 5 km/h. The measurement was conducted using KinemaTracer[®]. Spatiotemporal parameters were analyzed, including stride length, gait cycle time, swing time, and double-support time, along with their variation coefficients (CV). Data were collected for 20 seconds per trial at 60 Hz and analyzed using two-way ANOVA ($p < 0.05$).

Results

In older adults, stride length, gait cycle, swing, and double support time were significantly shorter. The CVs for stride length, gait cycle, swing time, and double-support time were higher. At higher walking speeds, most parameters had lower CVs. However, at 5 km/h, the CV for double support time was significantly higher than at all other walking speeds.

Conclusion

These findings suggest that aging is associated with shorter strides, reduced gait cycle, and increased gait variability, which may reflect diminished gait stability. The inverse relationship between walking speed and CV implies that faster walking can enhance step consistency. However, the increased CV for double support time at 5 km/h suggests that very high speeds may lead to greater variability in weight transfer, potentially compromising stability. These results underscore the importance of gait monitoring in assessing mobility decline and fall risk in older adults.

OP19

CONSTRUCTION AND VALIDATION OF A DYNAMIC ASSESSMENT FRAMEWORK BASED ON MULTI-MODAL SENSING DATA-DRIVEN EXERCISE REHABILITATION

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Background and aims

Traditional exercise rehabilitation programs often struggle with rigidity and insufficient personalization. This study presents a dynamic assessment framework that uses multi-modal sensing data and machine learning algorithms to develop individualized rehabilitation strategies, enhancing the effectiveness of rehabilitation efforts.

Methods

By systematically searching nine clinical studies in Pub Med and Web of Science databases during the rehabilitation period of movement disorders, we extracted the movement trend identification (3D motion capture), joint mobility (IMU sensor), and surface electromyography (sEMG) data of 538 patients; we extracted the movement time-series features by employing a bi-directional LSTM network and designed the dual-feedback mechanism with the increase in mobility positive incentives and negative constraints for decreased muscle strength to construct a dynamic optimization framework with machine learning algorithms, and evaluated by 10-fold cross-validation.

Results

The mean accuracy of prediction of rehabilitation goal attainment was 93.8% (95%, CI:92.5%-95.1%), which was 11.6% ($p < 0.05$) higher than the traditional clinical assessment method (82.2%), and according to the relevant clinical data, patients' adherence to the treatment was improved by 12.3% (81.5% in the dynamic group vs. 69.2% in the static group).

Conclusion

In this study, a decision framework for machine learning optimization of exercise rehabilitation programs was constructed by fusing multi-modal sensing data, which provides a new approach for the clinical personalization of intelligent rehabilitation systems the development of precise rehabilitation strategies, and the development of accurate rehabilitation strategies.

OP20

ANALGESIC EFFICACY OF TRANSCRANIAL COMBINED PERIPHERAL MAGNETIC STIMULATION IN CHRONIC NONSPECIFIC LOW BACK PAIN: A PILOT FNIRS STUDY

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Background and aims

Magnetic stimulation may offer therapeutic benefits for individuals suffering from chronic nonspecific low back pain (CNLBP). This study aims to examine the analgesic efficacy of repetitive transcranial magnetic stimulation (rTMS) in conjunction with repetitive peripheral magnetic stimulation (rPMS) in patients suffering from chronic non-specific low back pain (CNLBP).

Methods

Thirty individuals with chronic non-specific low back pain were randomly assigned to an experimental group and a control group, with fifteen individuals in each group. Both groups received health education related to CNLBP. Consequently, participants in the experimental group underwent a two-week regimen of rTMS in conjunction with rPMS treatment, whereas the control group received rPMS treatment alongside sham-rTMS stimulation. The Visual Analogue Scale (VAS), Oswestry Disability Index (ODI), and Neurometer CPT sensory nerve quantitative detector were employed to assess participants before and following treatment. Furthermore, functional near-infrared imaging (fNIRS) was utilized to evaluate participants' brain function.

Results

Post-treatment, both groups demonstrated a significant reduction in VAS and ODI scores relative to their pre-treatment levels. No statistical significance was observed between the two groups. The Neurometer CPT indicated that the experimental group exhibited an enhancement in the pain threshold of C-fiber on the unaffected side. The experimental group demonstrated a significant increase in SAC region activation and enhanced functional connectivity among brain regions, including SAC and PMC, relative to the control group following treatment.

Conclusion

The combination of rTMS and rPMS demonstrates significant efficacy in alleviating pain and remodelling brain regions in individuals with chronic non-specific low back pain (CNLBP). This closed-loop rehabilitation model paradigm requires further clinical investigation and implementation.

OP21

ELEVATED RISK OF COGNITIVE DECLINE AND DEMENTIA IN CHRONIC WIDESPREAD PAIN MEDIATED BY SYSTEMATIC INFLAMMATION AND BRAIN STRUCTURE: A LONGITUDINAL POPULATION-BASED STUDY

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Background and aims

Despite preliminary research suggesting an impact of chronic pain on cognition, the direct effects of chronic widespread pain (CWP) on cognition and its underlying mechanisms remain unclear. This study aims to investigate the effects of CWP on dementia and cognitive performance and explore its potential neurobiological mechanisms.

Methods

This was a population-based cohort study utilizing data from the UK Biobank, which enrolled 500,000 individuals aged 37 to 73 years from 2006 to 2010, with brain imaging scans initiated in 2014. Chronic widespread pain was defined based on participants' self-reported pain all over the body lasting for ≥ 3 months. Incidence of dementia and mild cognitive impairment identified through inpatient records. Cognitive performances were assessed using eight tests: fluid intelligence, numeric memory, trail making (A and B), symbol digit substitution, paired associate learning, matrix pattern completion, and pairs matching. Systemic inflammatory markers were extracted from baseline blood samples. Participants with incomplete demographic, pain, cognitive, or covariate data were excluded from the analysis. Data analysis was conducted from April 2024 to August 2024.

Results

We analyzed 13 years of follow-up data from 371,620 participants to assess the relationship between CWP and cognitive outcomes, while exploring the mediating effects of brain structure and systemic inflammation. Individuals with CWP have an elevated risk of mild cognitive impairment (HR [95%CI]: 1.99[1.30-3.05]) and dementia (HR [95%CI]: 1.78[1.50-2.10]). Additionally, brain structural volumes (thalamus, insular cortex, prefrontal cortex, amygdala, precentral gyrus, and postcentral gyrus) and systemic inflammatory markers (lymphocytes, platelets, neutrophils, and leukocytes) significantly mediate the relationship between CWP and cognitive performance.

Conclusion

CWP is significantly associated with an elevated risk of cognitive impairment and dementia, mediated by alterations in brain structure and systemic inflammation. This study suggests that early screening and management of chronic widespread pain could potentially reduce the risk of dementia.

OP22

THE EFFECTS OF VISUAL STIMULATION ON THE CORTICAL ACTIVITY OF BRAINSTEM STROKE DYSPHAGIA PATIENTS: A FUNCTIONAL NEAR-INFRARED SPECTROSCOPY STUDY

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Objective

To investigate the difference in cortical activity under visual stimulation between patients with brainstem stroke dysphagia and healthy adults by using functional near-infrared spectroscopy (fNIRS). Additionally, we seek to identify any potential relationship between cortical activity and swallowing.

Methods

30 patients with dysphagia after brainstem stroke and 16 healthy adults were selected. The changes in oxygenated hemoglobin concentration (ΔHbO_2) at rest and during the task were monitored by fNIRS.

Results

In the resting state, the functional connection strength of healthy adults ($r=0.514$, $s=0.021$) was higher than that of patients ($r=0.472$, $s=0.009$) ($P<0.05$). In comparison, functional connectivity in the ROI brain region was enhanced in the patient group compared to the healthy adult group. In the task state, the patient's ΔHbO_2 concentration in the left Frontopolar area, right Frontopolar area, left Orbitofrontal area and left Dorsolateral prefrontal cortex dramatically decreased in comparison to the healthy adult group. The correlation analysis revealed a moderate negative correlation between SSA and the MMSE score, VAS score, and the average ΔHbO_2 concentrations in specific brain regions, including the right Frontopolar area, left Frontopolar area, left Orbitofrontal area, and left Dorsolateral prefrontal lobe. Furthermore, the VAS scores exhibited a moderate positive correlation with the average ΔHbO_2 concentrations in the right Frontopolar area, left Frontopolar area, left Orbitofrontal area, and left Dorsolateral prefrontal lobe.

Conclusion

Patients with brainstem stroke dysphagia showed reduced activity during visual stimulation in the Frontopolar region, the left Orbitofrontal area, and the left Dorsolateral prefrontal cortex as compared to healthy individuals. The overall strength of functional connections was decreased, while the ROI between different brain areas increased. Following a brain stem stroke, all of these might be related to pre-oral swallowing issues.

Keywords

Brainstem stroke; Dysphagia; Preoral area; Food visual cues; Functional near-infrared spectroscopy

OP23

VISUAL REHABILITATION PROGRAM FOR CHILDREN AND ADOLESCENTS WITH DISABILITIES

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Background and aims

In response to the urgent need for vision care for children and adolescents with disabilities, we aim to establish an integrated medical model for visual rehabilitation in children and adolescents with disabilities.

Methods

This study, part of Visual Rehabilitation Program by Taiwan's Ministry of Health and Welfare, was conducted at Changhua Christian Hospital from November 2022 to March 2024. The children and adolescents with disabilities who have visual rehabilitation needs and difficulty with standard assessments were enrolled. All cases initially underwent ophthalmological evaluation, followed by visual function assessment. Treatment included ophthalmological interventions (including refractive correction, strabismus therapy and amblyopia training) and visual rehabilitation (were one hour in duration, including visual perception, hand-eye coordination, sensory integration and motor coordination). We divided the participants into three groups: under 3 years (two sessions), moderate-to-severe disability (nine sessions), and basic services (two sessions). Effectiveness was evaluated through Functional Vision Questionnaire (FVQ), with final reports provided for care continuity.

Results

We enrolled 160 participants across three groups: under 3 years (n=25), moderate-to-severe disability (n=75), and basic services (n=60). Primary diagnoses included cerebral palsy (22%), severe developmental delay (16%), ophthalmological conditions (14%), rare diseases/chromosomal abnormalities (13%), and autism (9%). FVQ revealed significant improvement post-intervention in total score (p=0.002), performance in low luminance environment (p=0.000), interpersonal communication (p=0.029), play and leisure participation (p=0.009), and spatial orientation/mobility (p=0.011). In subgroup analyses, the group with moderate-to-severe disability significantly improved in overall performance (p=0.043) and dim-light vision (p=0.011), while the under-3 year group showed gains in overall performance (p=0.003) and play and leisure participation (p=0.005).

Conclusion

Visual examination, function vision assessment, and vision rehabilitation are closely interconnected for children with developmental delays. This study demonstrates that the visual rehabilitation program significantly improves functional vision in children with disability. Future efforts should focus on establishing an integrated visual rehabilitation model through ophthalmology-rehabilitation collaboration.

OP24

BETA BAND DYNAMICS IN POSTURAL CONTROL: A NEUROCOGNITIVE MARKER OF CHRONIC ANKLE INSTABILITY

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Background and aims

Chronic ankle instability (CAI) involves not only peripheral musculoskeletal impairments but also neurophysiological and cognitive deficits. Approximately 40% of individuals develop CAI after initial ankle sprains, while others recover fully (termed “copers”), suggesting neurocognitive contributions. Beta band (13-30 Hz) power, linked to cortical alertness, information processing, and decision-making, may reflect posture control mechanisms. This study compared β -band power between CAI and copers during lateral hop landing to explore neurocognitive differences.

Methods

Forty-six CAI (23 males, 23 females) and 41 copers (18 males, 23 females) performed a single-leg lateral hop task (16 cm height) while wearing a 64-channel EEG system. Beta power at Fz (frontal midline) and Cz (central midline) electrodes was analyzed. Independent t-tests compared group differences (normality confirmed).

Results

CAI exhibited significantly lower β -power at Fz (CAI: 0.75 ± 0.22 vs. copers: 0.94 ± 0.25 , $*P < 0.001$), while no differences emerged at Cz (CAI: 0.52 ± 0.22 vs. copers: 0.50 ± 0.25 , $*P > 0.05$).

Conclusion

Reduced frontal β -power in CAI suggests impaired top-down cognitive control during posture regulation, reflecting diminished attentional maintenance or cognitive resource allocation. These findings highlight neurocognitive mechanisms underlying CAI, emphasizing the need to integrate cognitive strategies into rehabilitation programs.

OP25

EFFICACY AND SAFETY OF FREE WATER PROTOCOL FOR STROKE SURVIVORS WITH DYSPHAGIA: A MULTI-CENTER RANDOMIZED CONTROLLED TRIAL

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Background and aims

The aim of this study was to investigate the efficacy and safety of the free water protocol (FWP) for dysphagia rehabilitation in post-stroke patients in China.

Methods

A multi-center, randomized controlled trial with 4-week follow-up was conducted at one general hospital, one geriatric hospital, and three rehabilitation institutions in Jiangsu, China. A total of 116 patients were randomized into two groups. The intervention group received FWP protocol, while the control group followed the texture-modified diets (TMDs), which involved using thickening agents to modify food consistency. Swallow function, quality of life, body function, and adverse events were compared.

Results

All eligible participants enrolled in the trial. Mixed-models analysis of variance revealed a significant time effect ($F = 122.055$, $p < 0.01$, $\eta^2 = 0.517$), group effect ($F = 7.626$, $p = 0.007$, $\eta^2 = 0.063$), and a group-time interaction ($F = 17.231$, $p < 0.001$, $\eta^2 = 0.131$) for Water Swallow Test (WST) levels, indicating a greater rate of improvement in the FWP group compared to the controlled group. Post-intervention, significant differences were found between the groups in Functional Oral Intake Scale (FOIS) (4.79 ± 1.936 vs 3.75 ± 2.005 , $t = 2.802$, $P = 0.06$), d550 Eating (4.41 ± 2.984 vs 5.75 ± 3.179 , $t = -2.29$, $P = 0.024$), and b134 Sleep Functions (3.97 ± 2.515 vs 5.23 ± 2.676 , $t = -2.557$, $P = 0.012$). The incidence of aspiration-related complications was 2%-7% lower in the FWP group compared to the control group (12%-15%, all $P < 0.05$).

Conclusion

The FWP demonstrated potential benefits over TMDs for stroke survivors with dysphagia, including improvements in swallowing function, quality of life, physical function, and reduced aspiration-related complications. Future studies should focus on optimizing FWP parameters, including timing, frequency, and manipulation, as well as mechanism exploration.

OP26

CHRONOMETRIC CORTICO-CORTICAL ASSOCIATED STIMULATION MODULATES BRAIN NETWORK TOPOLOGY IN POST-STROKE MOTOR RECOVERY: A GRAPH THEORY ANALYSIS

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Background

Based on prior evidence that cortico-cortical associated stimulation (ccPAS) enhances functional connectivity within motor circuit related brain regions. This study expands the investigation to explore the effect on the whole brain global and nodal properties in post-stroke patients with upper limb motor deficits.

Methods

Thirty post-stroke patients with limb motor dysfunction were recruited in a randomized, double-blind, placebo-controlled trial, and randomly assigned to the ccPAS group which targeting the supplementary motor area (SMA) and primary motor cortex (M1) or sham stimulation group, with a 12-day session stimulation, combined with same standard rehabilitation. Resting-state functional MRI scans were acquired at baseline and after ccPAS intervention for graph theory analysis, respectively.

Results

At the global level, the ccPAS group exhibited significantly reductions in area under the curve (AUC) for community index, hierarchy, and local efficiency, compared to sham group. In terms of nodal properties, there were significant changes in different brain regions in betweenness centrality, degree centrality, nodal clustering coefficient, nodal efficiency, and nodal local efficiency ($P < 0.05$), especially in the left primary motor cortex and bilateral primary sensory cortex, the DC values were significantly increased.

Conclusion

The study suggests that the ccPAS facilitates the transition to a more integrated and flexible brain network architecture in stroke patients, characterized by enhanced centrality of motor and sensory regions. Such plasticity alterations could support functional recovery by optimizing global information processing and strengthening critical nodal-regions involved in motor control. This findings emphasizes the potential of neural circuit related-targeted neuromodulation in neurorehabilitation.

Keywords

Cortico-cortical paired associated stimulation, graph theory, stroke, neuroplasticity, nodal properties.

OP27

PLATELET-RICH PLASMA IMPROVES PAIN AND FUNCTION IN KNEE OSTEOARTHRITIS: A COHORT AND SUBGROUP ANALYSIS STUDY

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Background and aims

The application of platelet-rich plasma (PRP) therapy for treating knee osteoarthritis (KOA) has been on the rise. However, the factors that may influence on the effectiveness remain debated. This study retrospectively analyzed the effectiveness of PRP in the treatment of KOA and investigated whether baseline characteristics and PRP intervention parameters are associated with variations in treatment outcomes.

Methods

This study retrospectively analyzed 140 patients with KOA who received PRP treatment, with a follow-up period of three months. Pain and function were assessed using the Visual Analog Scale (VAS) and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) total. Individuals were categorized into effective group and ineffective group based on the Minimal Clinically Important Difference (MCID) of outcomes. Statistical analyses were performed to identify factors influencing the efficacy of PRP treatment.

Results

The VAS score was 65.3 ± 17.1 , and the WOMAC score was 29 (19, 40.8) before treatment. At the 3-month follow-up, these scores decreased to 35 (20.1, 49.5) and 15.5 (9, 23), respectively. A total of five adverse events was reported, all of which were post-injection pain and resolved with observation. Subgroup analysis identified gender and Kellgren-Lawrence (KL) grade as key factors influencing PRP efficacy. Males showed greater improvement in pain relief and functional recovery compared to females ($\chi^2=7.079$, $P=0.008$; $\chi^2=4.305$, $P=0.038$), while higher KL grades were associated with poorer treatment outcomes ($\chi^2=9.917$, $P=0.021$). No significant associations were found between age, disease duration, body mass index, injection frequency, or number of injections and PRP efficacy.

Conclusion

PRP is an effective and safe treatment for KOA, particularly for males and those with lower KL grades.

OP28

ITBS ENHANCES BCI EFFICACY FOR UPPER LIMB RECOVERY POST-STROKE

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Objective

To investigate synergistic mechanisms of intermittent theta burst stimulation (iTBS) combined with brain-computer interface (BCI) training on upper limb rehabilitation in subcortical stroke.

Methods

16 patients were randomized into iTBS+BCI (n=8) and BCI-only (n=8) groups. The experimental group received iTBS (600 pulses, 80% RMT) over lesioned M1 followed by BCI training, 5 days/week for 4 weeks. Outcomes included: 1) Neuroplasticity: transcranial magnetic stimulation (TMS)-measured motor evoked potential (MEP) amplitude, EEG-based event-related desynchronization (ERD) laterality index (LI); 2) Function: Fugl-Meyer Assessment-Upper Extremity (FMA-UE), Modified Barthel Index (MBI); 3) Training performance: Schulte Grid time, BCI accuracy.

Results

The iTBS+BCI group showed superior outcomes: 13.3% higher BCI accuracy ($76.67 \pm 8.16\%$ vs $63.33 \pm 4.71\%$, $p=0.006$), 47.7% shorter attention time ($10.99 \pm 4.67s$ vs $21.01 \pm 6.12s$, $p=0.032$). Neuroplastic changes included 47.5% MEP increase ($1.82 \pm 0.45mV$ vs $1.23 \pm 0.31mV$, $p=0.014$) and 50% ERD-LI enhancement (0.63 ± 0.15 vs 0.42 ± 0.11 , $p=0.023$). Functional improvements demonstrated 167% greater FMA-UE gains (23.75 ± 12.53 vs 8.88 ± 5.21 , $p=0.007$) and 86.2% higher MBI improvement (20.38 ± 12.34 vs 11.00 ± 8.57 , $p=0.072$).

Conclusion

iTBS augments BCI efficacy by enhancing cortical excitability and EEG feature discriminability, establishing a novel neuromodulation-BCI paradigm for stroke rehabilitation.

OP29

RESULT OF THE OUTCOME OF COMPUTER-BASED REHABILITATION THERAPY IN CHILDREN WITH AUTISM

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Background and aims

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by persistent impairments in social communication and restricted, repetitive patterns of behavior (APA, 2022). The prevalence of autism has increased by 178 percent since 2000, and is four times more common in boys than girls. The World Health Organization estimates that autism occurs in one in every 100 children worldwide. In Mongolia, in 2022, 1 out of every 121 children have autism. Recently, the use of technology-based methods in the rehabilitation of children with autism has been increasing internationally, and it is an easy and effective way to improve cognitive abilities such as executive function, memory, attention, vision, and auditory perception, as well as to increase children's motivation and interest. Although technology-based approaches are beginning to be introduced in the rehabilitation of children with autism in Mongolia, there is a paucity of outcome studies, which is why this study was conducted.

Methods

The study was conducted using an analytical research hospital-based case study design. We used the computer-based therapy which was played for 30 minutes a day, twice a week, for a total of 4 times over 2 weeks. The results were evaluated for cognitive, motor, memory and attention activities by points and stages of each game. Core autism symptoms were assessed before and after computer-based treatment using the Social Communication Questionnaire.

Results

The average age of the participants was 5.1 ± 1.2 years. When evaluating the average scores of computer-based therapy tasks, there was an increase of 7.5 points for cognition, 33.9 points for motor, and 6.4 points for memory and attention function. Also, the mean SCQ score decreased from 14.8 to 13 after treatment, which was statistically significant ($p < 0.001$).

Conclusion

Computer-based rehabilitation therapy is feasible and effective in improving cognitive function, motor, memory and attention in children with autism.

OP30

TRANSCUTANEOUS AURICULAR VAGAL NERVE STIMULATION FOR CONSCIOUSNESS RECOVERY IN PATIENTS WITH PROLONGED DISORDERS OF CONSCIOUSNESS (TAVREC): A MULTICENTRE, TRIPLE-BLIND, RANDOMIZED CONTROLLED TRIAL IN CHINA

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Background and aims

Transcutaneous auricular vagal nerve stimulation (taVNS), a safe, non-invasive intervention, is a possible treatment option of prolonged disorders of consciousness (pDoC). We aimed to assess the effectiveness of taVNS on consciousness recovery in patients with pDoC.

Methods

The TAVREC program was a multicenter, triple-blind, randomized controlled trial with 4 weeks intervention followed by 4 weeks follow-up period. Eligible patients was recruited and randomly received either conventional therapy plus taVNS or conventional therapy plus taVNS placebo. Participants, operators and assessors were blinded to group allocation. Primary outcome of TAVREC was the rate of improved consciousness level (RIC, e.g., moving from vegetative state to minimally conscious state) based on the Coma Recovery Scale-Revised (CRS-R) at week 4. Secondary outcomes were CRS-R total and subscale scores, GCS score, FOUR score, electrocardiogram parameters, serum biomarkers, and adverse events.

Results

Of 188 individuals pre-screened for eligibility, 135 participants were enrolled and randomly assigned to either the taVNS group (n=68) or the control group (n=67). Eleven participants withdrew their consent prior to the initiation of treatment or identified as incorrectly included, so 124 participants were included for analysis. The unadjusted ITT analysis indicated a higher RIC in the taVNS group compared to the control group at week 4, with an odds ratio (OR) of 2.355 (95% CI 1.011 to 5.488, p = 0.048). By week 4, the taVNS group demonstrated superior CRS-R total scores compared to the control group, with an estimated treatment effect of 2.609 points (95% CI 0.149 to 5.069; p=0.039). No significant differences were found in the scores of subscales of CRS-R, GCS total scores, and FOUR total scores between the two groups. In resting-state EEG data, the relative percentage contribution of theta and alpha bands in the aVNS group was higher than that in the control group. No significant difference was found in serum biomarkers between the two groups. Adverse effects were considered not to have any obvious relation with taVNS treatment.

Conclusion

Our trial provide evidence indicated that taVNS can promote the consciousness recovery in patients with pDoC.

OP31

CORTICOMUSCULAR COUPLING DURING WRIST EXTENSION IN SUBACUTE STROKE: A FNIRS AND EMG STUDY

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Background and aims

Corticomuscular coupling (CMC) reflects the neural communication between the central and peripheral nervous systems, particularly during motor control. However, the cortical-muscular coupling characteristics during upper limb motor tasks in stroke patients remain unclear. This study aims to explore the differences in corticomuscular coupling characteristics between stroke patients and healthy subjects.

Methods

A total of 25 subacute-phase stroke patients with dominant hemisphere involvement and 20 age-matched healthy subjects were recruited. During an isometric wrist extension task at 60% of maximum voluntary contraction (MVC) for 15 seconds, surface electromyography (sEMG) signals from the extensor carpi radialis and flexor carpi radialis muscles were recorded. Functional near-infrared spectroscopy (fNIRS) was used to simultaneously acquire cortical activity from the prefrontal cortex, supplementary motor area, and primary motor cortex. Cortical activation, functional connectivity, and corticomuscular coupling indices (phase synchronization index and coherence values) were analyzed.

Results

Compared to healthy subjects, stroke patients exhibited stronger functional connectivity in the cortex but lower cortical activation ($P < 0.05$). During the task, phase synchronization indices and coherence values between the extensor and flexor carpi radialis muscles and the ipsilateral and contralateral regions of interest in stroke patients were significantly lower than those in the healthy group ($P < 0.05$).

Conclusion

This study reveals differences in the mapping relationship between cortical activation and surface electromyography signals across time-domain and frequency-domain indices in stroke patients compared to healthy subjects, providing new theoretical insights into the interaction between brain activity and motor execution. It emphasizes the potential of corticomuscular coupling to serve as an important tool in post-stroke rehabilitation assessment.

OP32

EFFECT OF UPPER LIMB TASK-ORIENTED TRAINING COMBINED WITH RTMS ON UPPER LIMB MOTOR FUNCTION IN SUBACUTE STROKE: A RANDOMIZED CONTROLLED TRIAL

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Background and aims

Non-invasive repetitive transcranial magnetic stimulation (rTMS) and upper limb task-oriented training have shown potential in improving motor function in stroke subjects. However, the combined effects of rTMS and virtual reality (VR)-based task-oriented training have not been extensively studied. This trial aimed to explore the synergistic effects of rTMS combined with VR-based upper limb task-oriented training on motor function in stroke patients.

Methods

In this study, 40 subacute stroke patients were randomly allocated to receive either 10Hz, 1200-pulses of real or sham rTMS on the affected hemisphere, followed by semi-immersive VR-based upper limb task-oriented training. Both groups underwent 12 interventions over two weeks. Primary outcomes included the Fugl-Meyer Assessment for Upper Extremity (FMA-UE) and the Modified Barthel Index (MBI). Surface electromyography (sEMG) and functional near-infrared spectroscopy (fNIRS) were used to monitor muscle activity and cortical responses during isometric elbow flexion and wrist extension. Phase synchronization index and coherence values were calculated to assess cortical-muscle coupling. All outcomes were assessed before and after the intervention.

Results

After the intervention, both groups showed significant improvements in FMA-UE and MBI scores ($p < 0.05$). Further comparisons revealed that the experimental group demonstrated significantly greater improvements in FMA-UE scores compared to the control group. Only the rTMS combined with upper limb task-oriented training group showed significant increases in phase synchronization index and coherence values between the biceps brachii, radial wrist extensor, and the corresponding ipsilesional brain regions ($p < 0.05$), while the control group showed no significant changes.

Conclusion

rTMS enhances the effects of task-oriented upper limb training, improving motor function and activity participation in stroke patients. This combined therapy shows promise in optimizing post-stroke rehabilitation by enhancing corticomuscular coupling. Further studies are needed to explore the long-term effects.

OP33

EFFECTS OF TRANSCUTANEOUS AURICULAR VAGUS NERVE STIMULATION ON NEURAL FUNCTIONAL CONNECTIVITY IN MOTOR AREAS OF STROKE PATIENTS

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Background and aims

To evaluate the effects of transcutaneous auricular vagus nerve stimulation (taVNS) on neural functional connectivity in motor-related brain regions of stroke patients using high-resolution magnetic resonance imaging (HRMRI) technology.

Methods

This study enrolled stroke patients in the recovery phase, randomly divided into an observation group and a control group. The control group received conventional rehabilitation therapy, while the observation group received additional taVNS treatment. The taVNS parameters were: frequency of 20Hz, intensity ranging from 0.5mA to 5mA (adjusted to patient tolerance), applied to the left ear concha area for 20 minutes per session, 5 times per week for 4 weeks. All participants underwent HRMRI scanning before and after the intervention. Regions of interest (ROIs) included the left and right corticospinal tracts (CST), and the affected Brodmann areas 4 and 6. Diffusion Tensor Imaging (DTI) was used to calculate fractional anisotropy (FA), mean diffusivity (MD), axial diffusivity (AD), and radial diffusivity (RD) in the ROIs. Neurite Orientation Dispersion and Density Imaging (NODDI) was employed to measure neurite density (ND) and orientation dispersion (OD). High Angular Resolution Diffusion Imaging (HARDI) was utilized to calculate fiber density (FD), fiber cross-section (DFC), and fiber density cross-section (FDC).

Results

Inter-group comparisons showed that post-intervention, the observation group exhibited significantly higher values of FA, MD, AD, RD, ND, OD, FD, DFC, and FDC in the affected corticospinal tract and Brodmann areas 4 and 6 compared to the control group ($P < 0.05$). No significant differences were observed between groups before intervention ($P > 0.05$). Intra-group comparisons revealed that all measured values increased compared to pre-intervention levels but remained lower than those in the unaffected hemisphere ($P < 0.05$). Detailed mean values of the nine diffusion parameters in the ROIs are provided in the supplementary materials.

Conclusion

Transcutaneous auricular vagus nerve stimulation can enhance neural functional connectivity in motor-related brain regions of stroke patients. These findings provide insights into the cerebral mechanisms underlying taVNS-mediated functional improvement in stroke patients and offer objective evidence for the clinical application of taVNS in stroke rehabilitation. HRMRI proves valuable for both structural and functional imaging in stroke patients.

OP34

INTERNET-BASED EXERCISE REHABILITATION PROMOTES EARLY RECOVERY FOR PATIENTS POST TOTAL HIP ARTHROPLASTY: A PROSPECTIVE, RANDOMIZED CONTROLLED STUDY

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Background and aims

Total hip arthroplasty (THA) is commonly performed for end-stage hip osteoarthritis, but postoperative rehabilitation is challenging due to limited resources and short hospital stays. This study compares internet-based remote rehabilitation to traditional home-based rehabilitation for improving hip function and reducing pain after THA. The goal is to enhance patient adherence, reduce costs, and improve accessibility, potentially integrating digital strategies into standard postoperative care for better long-term outcomes.

Methods

In a prospective, randomized controlled trial, patients undergoing unilateral THA were randomly assigned to a control group (CG) with paper-based rehabilitation or an intervention group (IG) using digital video-guided rehabilitation via WeChat. Both groups followed a 9-week rehabilitation program based on AAHKS guidelines, including strength, balance, endurance, and health education. Primary outcomes included pain reduction and functional improvement measured by WOMAC scores, while secondary outcomes assessed quality of life (EQ-5D), walking ability (30-second sit-to-stand test, timed up-and-go test [TUG]), and complications. Assessments were conducted preoperatively and at 9 and 24 weeks postoperatively.

Results

Seventy-two patients were enrolled (38 IG, 34 CG). Baseline characteristics were comparable. The IG completed more therapy sessions, and clinical outcomes were significantly better at 9 weeks, except for EQ-5D ($P > 0.05$). No significant differences were observed at 24 weeks ($P > 0.05$). Four IG patients and one CG patient were readmitted for THA on the contralateral side during the 24-week follow-up.

Conclusion

WeChat-based remote rehabilitation effectively improves short-term recovery following THA, particularly in the early postoperative phase. While long-term outcomes were similar, the intervention group showed higher therapy adherence and better short-term functional improvements, highlighting the potential of digital rehabilitation for enhancing postoperative care.

OP35

ENHANCED PREFRONTAL CORTEX θ WAVE POWER DURING SINGLE-LEG STANCE IN CHRONIC ANKLE INSTABILITY PATIENTS: EVIDENCE OF NEURAL COMPENSATION

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Background and aims

Chronic Ankle Instability (CAI) is a common consequence of ankle sprains, affecting approximately 40% of those injured. It is characterized by persistent instability, impaired balance, and fear of movement, often leading to early-onset osteoarthritis. Some individuals, known as Copers, recover full balance function through compensatory mechanisms, but the neurophysiological differences between CAI patients and Copers remain unclear. Theta waves (4-8 Hz) in EEG reflect cognitive regulation and sensorimotor integration. Power differences at the frontal (Fz) and central (Cz) sites may reveal neuroregulatory differences, influencing rehabilitation strategies. This study aims to compare theta wave power at Fz and Cz during single-leg stance between CAI patients and Copers.

Methods

Participants included 46 CAI patients (23 males, 23 females) and 41 Copers (18 males, 23 females). EEG data were recorded during a 10-second single-leg stance task using a 64-channel system. Data were preprocessed and analyzed with SPSS for between-group comparisons. The Mann-Whitney U test (two-tailed) assessed group differences in theta power at each electrode site.

Results

- Cz Electrode: No significant differences in theta power were observed (CAI group: mean rank = 48.35; Copers: mean rank = 39.12; U = 743.000, Z = -1.701, p = 0.089).
- Fz Electrode: CAI patients exhibited significantly higher theta power compared to Copers (CAI group: mean rank = 50.39; Copers: mean rank = 36.83; U = 649.000, Z = -2.501, p = 0.012).

Conclusion

CAI patients may compensate for ankle instability by enhancing cognitive regulation through the prefrontal cortex. This highlights the potential value of neural plasticity training in rehabilitation.

OP36

DIFFERENTIAL CORTICAL ACTIVATION PATTERNS DURING MIRROR VS. ACTIVE ROBOT-ASSISTED UPPER LIMB TRAINING: AN fNIRS-BASED COMPARATIVE STUDY OF NEUROPLASTICITY IN STROKE AND HEALTHY POPULATIONS

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Background and aims

Robot-assisted training (RAT) effectively improves upper limb function in post-stroke hemiplegia. This study compared cortical responses between mirror-therapy mode (MTM) and active-movement mode (AMM) during robotic-assisted training in stroke patients and healthy controls.

Methods

Sixteen right-handed participants (8 chronic stroke patients, 8 age-matched healthy controls) underwent RAT sessions with MTM and AMM. Functional near-infrared spectroscopy (fNIRS) monitored hemodynamic changes in five regions: primary motor (M1), somatosensory (S1), supplementary motor (SMA), premotor (PMC), and prefrontal cortices (PFC).

Results

In stroke patients' ipsilateral hemisphere, MTM elicited significantly stronger activation in M1 and S1 versus AMM, with SMA, PFC, and PMC showing analogous trends. Healthy controls exhibited higher PFC/PMC activation during MTM but reduced M1/SMA/S1 responses. Patients demonstrated globally elevated ipsilateral activation during MTM compared to controls, whereas controls showed superior non-PFC activation during AMM. Contralaterally, both groups displayed greater PFC engagement during AMM versus MTM, with reduced M1/PMC/S1 activation in MTM.

Conclusion

MTM preferentially activates ipsilateral motor-sensory networks in stroke patients, suggesting compensatory neuroplasticity mechanisms, while AMM engages contralateral prefrontal regions associated with cognitive-motor integration. The distinct activation profiles between populations underscore MTM's therapeutic potential for post-stroke recovery through residual pathway recruitment and AMM's utility in challenging intact neural circuits.

OP37

ANKLE MOTOR-COGNITIVE DUAL-TASK PERFORMANCE IN STROKE PATIENTS: A COMPARATIVE ANALYSIS USING EYE-TRACKING AND KINEMATIC PARAMETERS

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Background and Aims

Dual-task performance is essential for daily functioning, but stroke patients often experience impairments in sensory, cognitive, and motor abilities, which significantly reduce their quality of life. This study introduces a novel eye-tracking-based dual-task training system designed to capture and analyze real-time ankle and eye movement parameters in stroke patients, comparing them to those of healthy individuals.

Methods

The study was conducted at Tsinghua Changgung Hospital in Beijing from January 2022 to October 2023. It involved 20 healthy adults and 30 stroke patients who underwent a standardized dual-task evaluation. The system measured 17 parameters, including ankle kinematics (range of motion, velocity) and eye-tracking metrics (gaze duration, saccade latency), simultaneously during cognitive-motor tasks.

Results

Significant differences were observed between the stroke and healthy groups. Stroke patients demonstrated increased eye movement parameters, including fixation counts (160.0 vs. 32.00, $P < 0.05$), fixation duration (25.82 vs. 17.25, $P < 0.05$), number of saccades (4176.00 vs. 2167.00, $P < 0.05$), and saccade amplitude (26126.74 vs. 13833.61, $P < 0.05$). Additionally, ankle motor function in the affected limb of stroke patients showed increased average time to reach (40.60 vs. 25.50, $P < 0.05$), number of velocity peaks (84.50 vs. 64.00, $P < 0.05$), and total task duration (48.10 vs. 25.50, $P < 0.05$) compared to the healthy group.

Conclusion

The study highlights that stroke patients exhibit significant alterations in both eye movement and ankle motor function during dual-task activities. These findings suggest that stroke patients experience increased eye-tracking movements and saccades, alongside a notable decline in ankle motor performance during dual-task conditions. This system provides valuable insights for developing targeted rehabilitation strategies to improve dual-task abilities in stroke patients.

OP38

THE EFFECTS OF AN AR-BASED REHABILITATION PROGRAM FOR PATIENTS WITH PATELLOFEMORAL PAIN: A RANDOMIZED CONTROLLED TRIAL

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Background and aims

Patellofemoral pain (PFP) is one of the most common disorders of the knee joint. Augmented Reality (AR) technology is becoming increasingly prevalent in the field of rehabilitation by integrating virtual environments with the real world to facilitate patient rehabilitation exercises. This study is aimed to evaluate the effects of AR-based exercise program for patients with PFP.

Methods

Patients who had PFP were randomly allocated to an intervention group (IG) or control group (CG). Patients in the IG received a 6-week tailored AR-based exercise program, while patients in the CG group received usual care. Clinical outcomes were compared using the Anterior Knee Pain Scale (AKPS) to measure function and the Visual Analog Scale (VAS) to measure “worst pain”.

Results

Among a total of 148 participants screened for eligibility, 38 were randomized and analyzed, including 19 participants in the intervention group and 19 participants in the control group. There were no significant differences in baseline characteristics between the groups. At 6-week follow-up, the intervention group had better improvements in AKPS (between-group difference, 11.5 [95%CI, 5.0 to 18.1]; $P < 0.01$) compared to the control group. The intervention group showed a greater worst pain reduction (between-group difference, -4.6 [95%CI, -12.1 to 2.9]; $P = 0.22$) than the control group. No adverse events were reported.

Conclusion

AR-based exercise program resulted in better function, but not less pain compared with usual care in patients with PFP. A large randomized controlled trial with long-term follow-up is required to confirm these findings.

OP39

ROBOTIC TKR WITH ERAS ACCELERATES EARLY MOBILIZATION – A CASE SERIES

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Background and aims

Total knee replacement (TKR) aims to restore mobility and reduce pain. Enhanced Recovery After Surgery (ERAS) protocols combined with robotic assistance may optimize postoperative recovery. This case series reports the *first* implementation in Indonesia of robotic-assisted TKR within an ERAS protocol, evaluating early mobilization outcomes at Cipto Mangunkusumo National Referral Hospital (RSCM) since January 2025.

Methods

Ten patients (mean age: 59.7 ± 13.76 years; 8 females) undergoing primary TKR with the Velys Robotic system and a standardized ERAS protocol were studied. The ERAS protocol included passive mobilization (2 hours post-op), active mobilization (4 hours post-op), sitting (6 hours post-op), in-bed exercises (6 hours post-op), and ambulation (12 hours post-op). Primary outcome: time to independent mobilization (walking 10 meters unassisted). Secondary outcomes included pain scores (VAS), length of stay (LOS), range of motion (ROM), and complications.

Results

Patients achieved independent mobilization at a mean of 14.1 ± 1.3 hours post-op. Average LOS was 4.1 ± 0.83 days, with ROM at discharge averaging $116 \pm 11.79^\circ$ flexion and full extension achieved in all cases. Mean VAS pain score at 24 hours was 2.5 ± 1.02 . No intraoperative complications occurred. Comorbidities in the patients included hypertension (6 patients), with ASA classifications: I (1 patient), II (5 patients), III (4 patients). Most patients (7 patients) received cruciate-retaining implants, with 3 patients receiving posterior-stabilized implants.

Conclusion

This first Indonesian experience with robotic-assisted TKR within an ERAS protocol at a national referral centre demonstrates rapid, safe mobilization (≤ 16 hours post-op) and short hospital stays, with minimal pain and no complications. These findings suggest that integrating robotic precision and structured ERAS components (early ambulation, graded exercise) accelerates functional recovery after TKR. Further studies with larger cohorts are needed to validate these results and explore wider applications.

OP40

BREAKING BARRIERS IN CARDIAC REHABILITATION: EARLY EXERCISE VS. NO REHABILITATION AFTER PCI FOR ACUTE MYOCARDIAL INFARCTION

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Background and Aims

The optimal timing for initiating **exercise-based early cardiac rehabilitation (EB-ECR)** after acute myocardial infarction (AMI) remains uncertain. Some studies suggest that initiating rehabilitation within 24 hours post-procedure may enhance cardiac function recovery, yet safety concerns persist. This study aims to evaluate the impact of **EB-ECR within 24 hours post-AMI** on cardiac function and major adverse cardiovascular events (MACE).

Methods

This single-center, prospective randomized controlled trial (RCT) enrolled patients with acute myocardial infarction (AMI) who underwent percutaneous coronary intervention (PCI). Clinically stable patients within 24 hours post-procedure were randomly assigned to an **EB-ECR group** (exercise initiated within 24 hours) or a control group (no exercise, medication only). **Primary outcomes:** Left ventricular ejection fraction (LVEF), maximal oxygen uptake (VO_2 max), 6-minute walk test (6MWT), and B-type natriuretic peptide (BNP) levels. **Secondary outcomes:** MACE, including mortality, reinfarction, and heart failure hospitalization. Follow-up: **3 months**.

Results

At **3-month follow-up**, the **EB-ECR group** showed significantly greater improvement in LVEF ($P < 0.05$), VO_2 max ($P < 0.01$), and 6MWT distance ($P < 0.05$). BNP levels significantly decreased ($P < 0.01$). MACE incidence showed no significant difference between groups ($P > 0.05$).

Conclusion

EB-ECR within 24 hours post-AMI is a safe and effective strategy to improve cardiac function, reduce BNP levels, and enhance exercise tolerance without increasing MACE risk. These findings support the integration of **EB-ECR** into standard AMI rehabilitation protocols, with further studies needed for long-term validation.

OP41

EFFECT OF LONG-TERM REHABILITATION USING WEARABLE ROBOT SUIT ON WALKING ABILITY IN PATIENTS WITH NEUROMUSCULAR DISEASES

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Purpose

In our institute, gait rehabilitation using robot suit Hybrid Assistive Limb® (HAL) was started for patients with neuromuscular diseases from 2017. A total of 36 patients underwent HAL gait training to date. The purpose of this study was to investigate the effect of consecutive HAL gait training in the long term on walking ability.

Methods

Ten patients (8 males and 2 females, mean age 56.8 ± 11.2 years) who had received consecutive HAL gait training for at least 2 years were involved in the study. Walking speed in the 10-m walking test (10MWS) and walking distance in the 2-minute walking test (2MWD) were measured before and after each training series consisting of 9 sessions of HAL gait training. 10MWS and 2MWD were statistically compared before and after the first and final training series.

Results

The patients received HAL gait training with the average of 15.1 ± 6.1 (7 - 25) series for the mean duration of 4.7 ± 1.8 (2.3 - 7.6) years. 10MWS (m/s) before and after the first and last training series were 0.90 ± 0.30 , 1.02 ± 0.34 , 0.89 ± 0.32 , 0.92 ± 0.34 , and 2MWD (m) were 93.8 ± 37.4 , 105.5 ± 35.9 , 101.3 ± 35.3 , 108.0 ± 35.3 . In the first and final series, 2MWD was significantly improved after the HAL gait training ($P=0.01$). There was no significant difference in 10MWS and 2MWD between the first and final series.

Discussion

The results of this study indicate that consecutive repetitions of HAL gait training at an appropriate frequency can preserve walking ability for a certain period in patients with neuromuscular diseases.

OP42

MODALITY-SPECIFIC CORTICAL ACTIVATION PATTERNS AND NETWORK CONNECTIVITY IN ROBOT-ASSISTED UPPER LIMB TRAINING: AN FNIRS STUDY ON POST-STROKE NEUROPLASTICITY

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Background and aims

Robot-assisted upper limb training(RAT) is widely used clinically, but the neurophysiological effects of different training modes on cortical activation remain unclear. This study applied functional near-infrared spectroscopy (fNIRS) to investigate how four robotic-assisted training modes affect motor and sensory cortex activation in stroke patients with hemiplegia.

Methods

A block-design experiment included 13 hemiplegic stroke patients. Participants performed four training modes (passive, assistive-active, active, and mirror modes) with robotic assistance. A multichannel fNIRS system monitored real-time oxygenated hemoglobin (HbO) concentration changes in bilateral prefrontal cortex (PFC), primary motor cortex (M1), supplementary motor area (SMA), premotor cortex (PMC), and primary somatosensory cortex (PSC).

Results

Active mode predominantly activated bilateral PFC and contralateral M1. Mirror mode activated ipsilateral M1, ipsilateral PSC, and contralateral PMC. Assistive-active mode engaged ipsilateral PSC and contralateral SMA. Passive mode activated ipsilateral M1 and contralateral SMA. Compared to passive/assistive-active modes, active mode showed stronger ipsilateral PFC activation. Mirror mode induced greater contralateral PMC activation than assistive-active mode. Active mode elicited stronger ipsilateral SMA activation than assistive-active mode. Regarding functional brain connectivity, active training shows generally lower connectivity strength in motor-related regions (e.g., M1, premotor cortex). Mirror training exhibits enhanced connectivity between the supplementary motor area and prefrontal cortex. Passive training demonstrates stronger connectivity in primary sensory cortices.

Conclusion

Different training modalities influence motor recovery through distinct neural mechanisms: Active training enhances cognitive-motor integration, tending to suppress redundant motor pathways and improve task efficiency. Mirror training strengthens prefrontal-supplementary motor area synergy, facilitates interhemispheric compensation, and supports imitation-based learning. Assisted-active training requires task optimization to reduce execution delays. Passive training primarily relies on sensory information integration with weaker cognitive control, making it suitable for severe impairments in early rehabilitation stages.

OP43

EFFICACY OF BACKWARD DISEQUILIBRIUM SCALE AND MINI MOTOR SCALE IN PREDICTING FALLS IN THE HEALTHY ELDERLY: A COMPARISON

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Background and aims

Falls are the leading cause of unintentional injury death in the elderly. Balance and postural control deficits are the common causes of falls. Backward disequilibrium (BD) is a postural disorder associated with the risk of falling backward. Therefore, the primary aim of the study was to correlate the efficacy of the Backward Disequilibrium Scale (BDS) and Mini Motor Scale (MMS) in predicting falls in healthy elderly.

Methods

The cross-sectional study was conducted on 75 healthy elderly adults with mean age of 70.1 ± 5.1 years, selected from outdoor community and physiotherapy settings. Participants who ambulated independently with or without assistive aids, were included in the study. The Participants were further divided into two groups, fallers and non-fallers, on the bases of history of fall in the previous 6 months. They were assessed for balance using the Berg Balance Scale (BBS) and the BDS and MMS.

Results

The mean scores of BBS, BDS and MMS are 47.4 ± 8.9 , 0 ± 0 and 19.2 ± 1.3 respectively. Further, Spearman's Correlation Coefficient showed significant correlation for both BDS and MMS with the BBS ($r = -0.8965$ and $r = 0.7610$, respectively). The BDS score for the fallers group and non-fallers group was compared, which had a mean of 6.05 ± 3.31 and 1.19 ± 2.28 respectively (p -value < 0.0001). The MMS score for the fallers group and non-fallers group was compared, which had a mean of 17.55 ± 2.20 and 19.61 ± 0.83 (p -value < 0.0001). The cut-off score on the AUC-ROC curve, for the BDS was 2.50 with a sensitivity of 0.77 and the cut off score for the MMS was 17.50 with a sensitivity of 0.72.

Conclusion

The study is conclusive of significant correlation of BDS and MMS with the BBS. However, BDS has better sensitivity and specificity as compared to MMS to predict falls.

OP44

EVALUATION OF MYELOPATHY HAND USING FORCE CONTROL INDEX (FCI) IN PATIENTS WITH CERVICAL SPINAL DISORDER

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Background and aims

Myelopathy hand is one of the common symptoms in patient with disorders of cervical cord. For diagnosis of myelopathy hand, 10-second test (10-ST), in which on examiner counts the number of repetitive grip-release-grip motion cycles in a 10-second period is frequently used. The results of 10-ST are multi-factorial, however, the factors have not been elucidated. Force control index (FCI) is to evaluate grip and release reaction time using rehabilitation robot PABLO® (Tyromotion) system. The purpose of this study is to determine the association between the results of 10-ST and FCI in patient with myelopathy hand.

Methods

Twenty-eight hands of 14 cervical disorder (5 cervical spondylotic myelopathy, 8 ossification of posterior longitudinal ligament) involved in this study. Four different modes of FCI, such as evaluate force reaction time, flexion control time, release reaction time and extension control time, were measured using PABLO®. Statistical analysis using Mann-Whitney U test and two sample t test was performed to compare FCI between the impaired group 19 repetitions or less in 10-ST and the preserved group with 20 repetitions or more in 10-ST.

Results

FCI for the impaired group (11 hands) and the preserved group (17 hands) was 499.2 ± 285.3 ms and 312.0 ± 164.3 ms of force reaction time, 2283.7 ± 418.6 ms and 1844.5 ± 449.1 ms of flexion control time, 390.1 ± 154.8 ms and 391.9 ± 102.1 ms release reaction time, 987.4 ± 168.8 ms and 962.0 ± 121.7 ms of extension control time, respectively. The force reaction time and the flexion control time in the impaired group, respectively ($p=0.044$, 0.022), while no significant difference was detected in release reaction time and extension control time ($p=0.971$, 0.677).

Conclusion

Force reaction time and flexion control time can be used as another measurement items showing severity of myelopathy hand during the rehabilitation phase in patients with cervical spine disorders.

OP45

A RETROSPECTIVE ANALYSIS INVESTIGATING IMPACT OF EARLY MOBILISATION ON MECHANICAL VENTILATION DURATION FOR STROKE PATIENTS IN THE INTENSIVE CARE UNIT (ICU)

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Background and aims

Previous studies suggest that early mobilisation provides significant benefits for mechanically ventilated ICU patients, including improved muscle strength, enhanced physical function, reduced ventilation duration, and shorter ICU stays. However, evidence on its effectiveness in acute stroke patients requiring mechanical ventilation remains limited and inconclusive. Therefore, the study aims to investigate the correlation between early mobilisation and mechanical ventilator duration for acute stroke patients admitted to the ICU at Brunei Neuroscience Stroke and Rehabilitation Centre.

Methods

A retrospective cohort study using patient clinical notes and data from the electronic health records of acute stroke patients admitted to the ICU from January 2020 to May 2022 who received early mobilisation. Early mobilisation in our study is defined as the process of gradually helping a patient out of bed such as sitting up, standing, or walking, as soon as their condition allows.

Results

111 out of 182 patients meeting the inclusion criteria received early mobilisation. 88 (42%) patients required invasive mechanical ventilation, with 42 patients receiving early mobilisation. Of these, 27 patients were extubated within two weeks ($p=0.009$), while 32 patients were successfully weaned off mechanical ventilation in under two weeks ($p=0.026$). Additionally, patients undergoing early mobilisation had shorter ICU ($p<0.001$) stays.

Conclusion

In our cohort of intubated acute stroke patients, early mobilisation improved extubation timing, reduced the duration of mechanical ventilation, and shortened ICU stays. However, not all patients received early mobilisation due to challenges faced by both physicians and physiotherapists in mobilising mechanically ventilated stroke patients. These challenges may stem from concerns about the safety of mobilising patients in the acute phase. Future research is needed to standardise definitions and better understand the role of early mobilisation, considering contextual factors, patient-staff collaboration, and decision-making processes, with the goal of establishing standardised early mobility protocols.

OP46

ATELOCOLLAGEN INJECTION WITH POLYDEOXYRIBONUCLEOTIDE IN SUPRASPINATUS TENDON TEAR

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Background and aims

To evaluate the clinical and ultrasound (US) findings after atelocollagen injection combined with polydeoxyribonucleotide (PDRN) in the patients with high grade partial-thickness or small size full-thickness tears of the supraspinatus (SSP) tendon.

Methods

Ten patients (7 men, 3 women; mean age, 61.7; range, 55-73 years) that were diagnosed as high grade partial-thickness (Grade 3) or small size full-thickness tears in SSP tendon on US were recruited. The patients visited due to unilateral shoulder pain, radiograph and US examinations were conducted. After US examination, triamcinolone acetonide (20 mg, 2mL), lidocaine (2%, 2 ml), and normal saline (4 ml) were injected in subacromial subdeltoid (SASD) bursa under ultrasound guidance. After six weeks of SASD bursa corticosteroid injection, the shoulder pain was reduced. Atelocollagen and PDRN was injected in supraspinatus tendon tear site under US guidance twice every four weeks. The visual analogue scale (VAS) was used to measure the intensity of shoulder pain.

Results

Ten shoulders with eight high grade partial-thickness SSP tendon tear (5 bursal side, 3 articular side) and two small size full-thickness SSP tendon tear were diagnosed on US examination. The mean number of previous corticosteroid injection before atelocollagen and PDRN injection was 2.2 (range, 1-5). The shoulder pain was decreased after six weeks of SASD bursa corticosteroid injection in all patients. After four weeks of the second atelocollagen and PDRN injections in patient one, the size of partial-thickness supraspinatus tendon tear (grade 3) was decreased to the grade 2. In a patient, the shoulder pain increased temporarily after the first injection, but decreased on the second injection.

Conclusion

Injection with atelocollagen and PDRN were successfully performed in tendon tear site under US guidance in ten patients with high grade partial-thickness or small size full-thickness SSP tears, and no serious side effect was observed.

OP47

COMPARISON OF PATIENT AND NURSE RATINGS ON THE RICHARDS-CAMPBELL SLEEP QUESTIONNAIRE IN NEUROREHABILITATION INPATIENTS

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Background and aims

Sleep disturbances are prevalent among neurorehabilitation inpatients and hinders recovery process. Several self-reported questionnaires are commonly used to evaluate sleep conditions, but their usage in patients undergoing neurorehabilitation may face the challenge of the patients' impaired cognition to provide accurate information. The Richards-Campbell Sleep Questionnaire (RCSQ) is a self-reported sleep questionnaire that has been used in ICU settings and validated for proxy's ratings. Patients with neurological deficits may struggle to self-report their sleep condition, necessitating proxy evaluations by others such as nurses. This study aims to compare the assess the patient and nurse ratings on the RCSQ to validate its reliability and validity in neurorehabilitation in-patients.

Methods

This prospective, observational study was conducted in a rehabilitation ward from September 2023 to June 2024, including 88 adult patients with neurological conditions that required intensive neurorehabilitation. Patients completed the RCSQ, a 5-item visual analog scale (0–100), alongside nurse proxy assessments at admission, two weeks, and discharge. Data analysis included Wilcoxon Signed-Rank Tests for interrater differences, Pearson correlation for questionnaire comparisons, Bland-Altman plots for interrater agreement, and ROC curve analysis to determine optimal cut-off points of the RCSQ.

Results

Continuous improvement of sleep quality was observed throughout the admission. A strong positive correlation was found between patient and nurse RCSQ scores at all time points ($r=0.853, 0.802, 0.764$). However, nurse-assessed scores were consistently higher than patient self-reports. ROC analysis showed a high AUC for patient RCSQ (0.941 at admission, 0.950 at discharge), with optimal cut-off points of 68.3 and 72.4 mm, respectively. Nurse RCSQ had lower AUC values, with a cut-off of 87.6 and 94.1 mm respectively.

Conclusion

Despite differences in absolute scores, strong interrater reliability suggests that nurse RCSQ assessments accurately reflect relative sleep quality trends. Future studies should explore adjusted cut-off points for nurse assessments to improve sleep quality evaluations in neurorehabilitation in-patients.

OP48

REAL-WORLD OUTCOMES OF MLC 901(NEUROAID™II) IN MODERATE TO SEVERE TRAUMATIC BRAIN INJURY: A MALAYSIAN PERSPECTIVE

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Background and aims

Traumatic Brain Injury (TBI) is the most common cause of significant disability and morbidity after trauma¹. MLC901 (NeuroAiD II™) is a traditional Chinese medicine that may help to facilitate the restoration of neuronal circuits after TBI²⁻³. This study aimed to evaluate the safety and effectiveness of MLC901 in improving outcomes for patients with moderate and severe traumatic brain injury (msTBI).

Methods

This observational study used a quasi-experimental (repeated measures) design within the ongoing NeuroAiD Safe Treatment (NeST) Registry, established to collect real-world data on the use and safety of MLC901. In this study, msTBI patients received MLC901 within the first month post-injury for a duration of three months. Outcomes related to functional, physical, cognitive, behavioural, and mood improvements were assessed at various time points (baseline, 1, 2, 3, and 6 months). These outcomes included the Glasgow Coma Scale, Montreal Cognitive Assessment, Glasgow Outcome Scale-Extended (GOS-E), Barthel Index, modified Rankin Scale, Berg Balance Scale, and Hospital Anxiety Depression Score. Statistical analyses included one-way repeated measures ANOVA or Friedman's Test with Bonferroni post-hoc corrections. Effect sizes were calculated using Cohen's D method. Side effects were documented throughout the study period. The sample size was not predetermined, as this serves as a preliminary study.

Results

Twenty consecutive msTBI patients referred for rehabilitation were enrolled and received MLC901 alongside standard post-TBI rehabilitation. The treatment was well-tolerated, with no reported side effects. Significant improvements were observed across all measured domains, with mean scores showing a statistically significant increase from baseline to six months ($p < 0.05$). All outcome measures demonstrated large effect sizes ($d > 0.8$), with the most pronounced effect seen in GOS-E ($d = 2.61$).

Conclusion

MLC901 is safe, well-tolerated, and shows potential for sustained positive effects on cognitive, functional, physical, mood, and behavioral outcomes for up to six months in patients with msTBI.

OP49

EVALUATING REHABILITATION IMPACT IN MULTIPLE SCLEROSIS: A DESCRIPTIVE COHORT STUDY OVER 6 YEARS IN A NATIONAL REHABILITATION CENTRE

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Background and aims

Multiple sclerosis (MS) is a demyelinating disease of the central nervous system, leading to progressive functional impairment¹. Rehabilitation Impact Indices (RIIs) are composite rehabilitation outcome measures². This study aims to evaluate the impact of inpatient rehabilitation on MS patients.

Methods

This descriptive cohort study examined 16 MS patients who underwent inpatient rehabilitation at Hospital Rehabilitasi Cheras (HRC) between 2018 and 2023. Data collected included age, gender, MS type, and length of stay (LOS). Expanded Disability Status Scale (EDSS) and Modified Barthel Index (MBI) were collected at admission and discharge. RIIs calculated include Absolute Functional Gain (AFG), Rehabilitation Efficiency (REy), and Rehabilitation Effectiveness (REs). Descriptive statistics summarized patient characteristics and outcomes. ANOVA & t-tests assessed differences in RIIs across MS types and genders. Pearson correlation determined relationships between RIIs and demographic factors. Multiple linear regression models identified predictors of REy and REs.

Results

The mean age was 40.8 years, with LOS averaging 22.5 days. MBI improved from 65.3 (moderate dependency) to 76.0 (mild dependency), with an AFG of 10.7. REy averaged 0.47, while REs averaged 39.7%. Comparative analysis found no significant differences in RIIs across MS types or genders ($p > 0.05$). The mean of EDSS at admission was 7.0 which then improved to 6.1 upon discharge while mode for EDSS improved from 7.0 on admission to 6.0 at discharge. Correlation analysis showed that age negatively correlated with Efficiency ($r = -0.61$) and Effectiveness ($r = -0.74$). Regression analysis did not identify EDSS or LOS as significant predictors of rehabilitation effectiveness.

Conclusion

Structured inpatient rehabilitation improves MS patients' function, as evident by RIIs and reduced EDSS level. Patient characteristics do not predict rehabilitation efficiency or effectiveness in this cohort. Further research with larger cohorts may explore additional predictive factors for rehabilitation outcomes in MS.

OP50

CORTICAL MECHANISMS OF COMPREHENSION AND VERBAL EXPRESSION IN POST-STROKE APHASIA: A NATURALISTIC PARADIGM INVESTIGATION USING FNIRS

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Background and aims

Auditory comprehension and verbal expression deficits represent core impairments in post-stroke aphasia (PSA). This study investigates the cortical mechanisms underlying these dysfunctions using a naturalistic paradigm designed to simulate real-world communication scenarios.

Methods

Twenty-one healthy controls (HC) and 26 PSA patients underwent functional near-infrared spectroscopy (fNIRS) monitoring during an auditory comprehension-verbal expression task. The protocol comprised three phases: listening to questions embedded in brief narrative scenarios, subsequent deliberation, and verbal response, repeated across six trials. Cortical hemodynamic responses were recorded bilaterally from temporal, parietal, and prefrontal regions. Language function in PSA patients was assessed using the Western Aphasia Battery (WAB).

Results

During auditory comprehension, HC exhibited bilateral cortical activation with right-hemispheric dominance, involving the superior temporal gyrus (STG, $P=0.041$), middle temporal gyrus (MTG, $P=0.002$), and supramarginal gyrus (SMG, $P=0.028$). In contrast, PSA patients showed preferential reliance on right-hemispheric Wernicke's homologues, including the STG ($P=0.030$) and MTG ($P=0.024$), with markedly reduced left-hemispheric engagement. During verbal expression, HC demonstrated robust left-lateralized Broca's area activation, encompassing the pars triangularis (PT, $P=0.036$), pars opercularis (PO, $P=0.001$), and premotor cortex (PMC, $P=0.002$), alongside symmetric right-hemispheric activation. PSA patients exhibited compensatory right-hemispheric recruitment, including PT ($P=0.035$), PO ($P=0.002$), and PMC ($P=0.017$), coupled with diminished left-hemispheric (particularly Broca's area) activation. WAB auditory comprehension scores correlated with bilateral dorsolateral prefrontal cortex (DLPFC, $r=-0.401, p=0.047$), posterior middle temporal sulcus complex (PMSC, $r=-0.417, p=0.038$), and PMC ($r=-0.414, p=0.040$) activity. Spontaneous speech scores were associated with left DLPFC ($r=-0.423, p=0.035$), PMC ($r=-0.400, p=0.048$), and primary somatosensory cortex (PSC, $r=-0.481, p=0.015$), as well as right STG ($r=-0.404, p=0.045$) activation.

Conclusion

This study delineates distinct cortical activation patterns underlying auditory comprehension and verbal expression deficits in PSA under naturalistic conditions, highlighting the critical compensatory role of right-hemispheric regions. These findings advance our understanding of neuroplasticity mechanisms in post-stroke language recovery.

OP51

CAN GROUP-BASED TRAINING IMPROVE CLINICALLY-ORIENTED SELF-PERCEIVED INSTABILITY AND DYNAMIC STABILITY IN CHRONIC ANKLE INSTABILITY?

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Background and aims

Ankle sprains are common musculoskeletal injuries. Without proper management, acute ankle sprains may lead to chronic ankle instability (CAI), characterized by self-reported instability, recurrent injuries, and reduced quality of life. Traditional exercise therapy for CAI typically involves one-on-one interventions, which are resource-intensive and impractical in settings with limited healthcare resources. This study compared the efficacy of group-based training versus one-on-one training to explore a more feasible rehabilitation model.

Methods

Forty-four CAI patients were randomized into a group-based training cohort (n=22) or a one-on-one cohort (n=22). Both groups underwent identical balance training (25-30 min/session, 3 sessions/week for 4 weeks). Outcomes included the Cumberland Ankle Instability Tool (CAIT) and Y-Balance Test (YBT) scores. Paired and independent t-tests analyzed within-group and between-group differences.

Results

Significant differences were observed in the CAIT scores before and after the intervention in both groups ($P < 0.05$), with no significant differences between the groups ($P > 0.05$). Similarly, significant differences were found in the YBT composite scores before and after the intervention in both groups ($P < 0.05$), with no significant differences between the groups ($P > 0.05$).

Conclusion

Group-based training effectively improves clinically-oriented self-perceived instability and dynamic stability in CAI patients, achieving comparable outcomes to one-on-one training. This approach enhances rehabilitation efficiency, reduces resource demands, and offers a viable alternative for CAI management.

Keywords

Chronic ankle instability; Group-based training; One-on-one training; Clinically-oriented

OP52

CONTENT VALIDITY OF HOLISTIC KNEE ASSESSMENT SCORING SCALE (HKASS) FOR KNEE OSTEOARTHRITIS AND KNEE-INJURIES PATIENTS

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Background and aims

Numerous outcome measures for knee OA and knee injury have been developed. However, the majority are Patient-Reported Outcomes (PROs). There are only a few outcome measures based on Clinician-Reported Outcomes (ClinROs) and Performance Outcomes (PerfOs), and these typically assess only certain aspects of knee OA without a comprehensive clinical evaluation. Holistic Knee Assessment Scoring Scale (HKASS) has been developed by integrating both ClinROs and PerfOs. This study aims to test HKASS content validity.

Methods

An online meeting with a rehabilitation physician, orthopedic surgeon, and epidemiologist reviewed the HKASS draft. All domains and items were thoroughly reviewed and clarified. Experts' feedback guided revisions for the second version. A content validation form ensured clarity, and experts rated item relevance on a four-point scale (1 = not relevant, 4 = highly relevant). Ratings of 3 and 4 were categorized as "relevant" (scored 1), while 1 and 2 were "not relevant" (scored 0). Six experts submitted completed forms with written comments. The content validity index (CVI) was calculated as the average score across all items.

Results

The content validation analysis was conducted using six expert evaluations. Each item was assessed for relevance, and Item-Level Content Validity Index (I-CVI) and Universal Agreement (UA) among experts were calculated. The overall Scale-Level Content Validity Index/Average (S-CVI/Ave) was 0.98, demonstrating a high level of agreement across all items. The Scale-Level Content Validity Index/Universal Agreement (S-CVI/UA) was 0.89, further supporting the validity of the scale. The proportion of items deemed relevant by all experts was 0.94, indicating strong content validity. HKASS demonstrated excellent content validity, with high agreement among experts on most items. However, minor refinements may be needed for item 1 and 12 to enhance consensus.

Conclusion

I-CVI, S-CVI/Ave, and S-CVI/UA meet the acceptable thresholds, indicating that HKASS has attained a satisfactory level of content validity.

OP53

EFFECTS OF EARLY EXERCISE TRAINING FOLLOWING SEVERE BURN INJURY

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Background and aims

Severe burn injury often leads to significant muscle wasting, yet evidence on the efficacy and safety of early exercise training during acute burn care remains limited. This study evaluated the impact of early resistance and aerobic exercise on muscle size, strength, and quality of life in adults with severe burns.

Methods

In this randomized controlled trial, 58 adults (aged 18–64 years) with $\geq 40\%$ total body surface area (TBSA) burns were allocated to either standard care ($n=29$) or standard care plus a 6- to 12-week exercise program ($n=29$). Outcomes included ultrasound-derived quadriceps muscle layer thickness (QMLT), rectus femoris cross-sectional area (RF-CSA), lower limb muscle force, and quality of life (BSHS-B and EQ-5D-5L) assessed at baseline, 6 weeks, and 12 weeks.

Results

A total of 58 adults [42 (95% confidence interval 40-45) years old; 40-94% TBSA range, 86% previously mechanically ventilated] participated in this study. Exercise commenced 7 days [IQR (interquartile range) 5-9] after burn center admission with an attendance rate of 93%. Allocation to the exercise group had a protective effect on the loss of muscle size from baseline to 6 weeks of follow-up (QMLT: β -coefficient: 0.05 cm, $p = 0.010$; RF-CSA: β -coefficient: 0.05 cm², $p = 0.045$), and resulted in an improved recovery from 6 to 12 weeks (QMLT: β -coefficient: 0.04 cm, $p = 0.01$; RF-CSA: β -coefficient: 0.06 cm², $p < 0.001$). Muscle force increased significantly more in the exercise group than in the control group (β -coefficient: 3.102 N, $p < 0.001$) between 6 and 12 weeks. Besides a marginally significant effect for the BSHS-B domains 'affect' and 'interpersonal relationships' between 6 and 12 weeks, no benefits were observed in the other assessed quality-of-life measures. No serious adverse events were reported in the exercise group.

Conclusion

Early exercise training during acute burn care is feasible, safe, and effective in attenuating muscle wasting and enhancing strength recovery in severely burned adults. While functional benefits were modest, the intervention addresses critical metabolic and physical sequelae, advocating for its integration into standard burn rehabilitation protocols.

OP54

ENHANCING PEDIATRIC COMMUNITY-BASED REHABILITATION USING SENSORY INTEGRATION THERAPY MODULE

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Background and aims

Community-Based Rehabilitation (CBR) plays a pivotal role in extending access to rehabilitation services whilst decentralising care. However, its implementation across Persatuan Pemulihan Dalam Komuniti (PPDK) centres varies due to limited structured intervention frameworks. At PPDK Puncak Alam, challenges included the limited staff training, a higher teacher-to-student ratio and underutilized therapy equipment. Teachers struggled to integrate therapy into daily activities, while caregivers lacked the confidence to continue therapy at home. Project S.H.I.N.E (supporting hope, innovation, nurturing and empowerment) aimed to develop and implement a structured “Sensory Integration Therapy Module” to equip PPDK teachers and caregivers with a standardized guide.

Methods

A structured Sensory Integration Therapy Module was developed under occupational therapist guidance, focusing on fundamental sensory systems from the “Pyramid of Learning” (vestibular, proprioceptive and tactile). The module incorporated developmental milestones, sensory processing principles and therapy implementation strategies. Teachers and caregivers underwent hands-on training led by an occupational therapist, supplemented with pre-recorded video demonstrations for continued reference. Pre- and post-training surveys assessed knowledge acquisition, confidence in therapy implementation and module usability.

Results

Post-training, participants found sensory therapy easier to integrate into the students’ daily routines and 85.8% of participants rated the module as practical. Participants preliminary feedback led to further refinements such as adding video demonstration, using simplified language and reducing text burden. Training by an occupational therapist significantly enhanced caregivers ability to replicate therapy techniques in PPDK as well as at home.

Conclusion

Project S.H.I.N.E successfully introduced a structured, scalable rehabilitation module tailored for PPDK setting with potential for home-based applications. While promising, the initiative was limited to a single-site, highlighting the need for expansion to multiple centres and the development of complementary modules. Future recommendations include wider adaptation across centres, sustained training initiatives and policy support to ensure continuous enhancement of pediatric community-based rehabilitation.

OP55

TYOLOGY OF COMMUNITY-BASED REHABILITATION NEEDS AND PROFILES OF OLDER ADULTS IN CHINA: A LATENT CLASS ANALYSIS

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Background and aims

Global populations are aging rapidly, and this demographic shift will affect societies worldwide. In response, the United Nations designated 2021-2030 as the Decade of Healthy Ageing, highlighting the importance of improving the lives of older adults. Effective community-based rehabilitation (CBR) programs have emerged as a cost-effective way to enhance the health, independence, and quality of life of older individuals. However, many studies overlook the diversity within older populations, treating them as a homogenous group. This can lead to ineffective rehabilitation services, as the varying needs of elderly individuals are often not addressed.

Methods

This cross-sectional study, conducted in Guizhou Province, China, between June and October 2024, used a two-stage probability sampling method to assess the rehabilitation needs of older adults in 50 randomly selected communities. Latent Class Analysis (LCA) was used to identify subtypes of rehabilitation needs, while ANOVA and logistic regression examined the influencing factors.

Results

A total of 3940 valid responses were collected. The analysis revealed five subtypes of community rehabilitation needs: C1 (physical functioning - mental and psychological), C2 (low comprehensive needs - perceptual), C3 (social participation), C4 (social participation - environmental), and C5 (high comprehensive needs). Significant differences were observed in individual characteristics and rehabilitation behaviors among these subtypes.

Conclusion

The findings highlight the heterogeneity of rehabilitation needs among older adults. Tailoring community-based rehabilitation services to these subtypes could improve service effectiveness and satisfaction, ensuring better outcomes for diverse groups of elderly individuals.

OP56

DEVELOPMENT OF A QUESTIONNAIRE TO EVALUATE THE HEALTH IMPACT OF CLIMATE CHANGE AMONG PEOPLE WITH SPINAL CORD INJURY USING THE DELPHI METHOD: A PRELIMINARY STUDY

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Background and aims

Climate change significantly impacts human health through direct effects such as extreme weather events (e.g., heatwaves, droughts, heavy rainfall), indirect effects on natural systems (e.g., vector-borne diseases, air pollution), and human-system disruptions (e.g., economic instability, malnutrition, psychological stress). Taiwan's unique geographic and climatic conditions increase vulnerability to disasters such as typhoons, floods, heat and earthquakes. Individuals with spinal cord injuries (SCI), face heightened risks due to mobility limitations, impaired body functions, economic disadvantages, and inadequate living conditions. This study aims to develop a questionnaire to explore what difficulties SCI patients faced related to climate change and extreme weather in recent years.

Methods

This study employs the Delphi method with three iterative rounds to develop a questionnaire aimed at evaluating the difficulties and disadvantages faced by SCI patients under climate change conditions. Experts from various disciplines, including physicians, therapists, and social workers, are recruited to provide insights. Through structured questionnaires and controlled feedback, expert opinions are systematically gathered, analyzed, and refined to ensure the questionnaire comprehensively assesses the challenges encountered by SCI patients in extreme climate events.

Results

A consensus-based questionnaire was successfully developed using the Delphi method to evaluate the challenges faced by SCI patients under climate change conditions. The questionnaire consists of approximately 70 to 80 questions covering key aspects such as baseline characteristics, vulnerability, climate-related hazards, exposure, behavioral adaptations, and perceptions of climate change.

Conclusion

Through the Delphi method, we successfully developed a comprehensive questionnaire to assess the challenges faced by SCI patients under climate change conditions. The result of this study could contribute to targeted interventions and policies to support SCI patients in mitigating climate-related health risks. Future research should focus on validating the questionnaire and implementing adaptive strategies to improve the resilience of this vulnerable population.

OP57

SCALING UP REHABILITATION MEDICINE IN SABAH: LEVERAGING THE HOSPITAL CLUSTER CONCEPT FOR EXPANSION

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Background and aims

Sabah faces significant challenges in delivering Rehabilitation Medicine services due to geographical barriers, workforce shortages, and limited healthcare accessibility. Previously, patients from remote areas had to travel long distances to a primary referral hospital for treatment, delaying access to care and rehabilitation. To address these gaps, the Ministry of Health Malaysia (MOH) introduced the Hospital Cluster Concept (HCC) - a model designed to decentralize healthcare by grouping hospitals into networks, enabling resource sharing and coordinated patient management. This study evaluates the effectiveness of the HCC in expanding Rehabilitation Medicine services and explores key strategies for further improvement.

Methods

A situational analysis was conducted using MOH reports, hospital data, and patient referral records to assess service distribution, workforce capacity, and patient movement patterns. Semi-structured interviews with key stakeholders provided qualitative insights into implementation challenges and opportunities.

Results

Since 2012, three of the six planned hospital clusters in Sabah have been successfully established: Kota Kinabalu, Keningau, and Sandakan Clusters. These clusters have facilitated the permanent placement of Rehabilitation Medicine specialists in lead hospitals, ensuring continuous service availability, while also enabling the expansion of services to non-lead hospitals, reducing the need for long-distance patient travel. Additionally, initial steps toward telemedicine integration have been made, though implementation remains limited in remote areas due to poor internet access. The cluster model has also enhanced multidisciplinary collaboration, improving service continuity.

Conclusion

The HCC model has successfully expanded Rehabilitation Medicine services in Sabah. Future efforts should focus on fully implementing the remaining clusters, optimizing workforce distribution, and strengthening digital health solutions to further improve accessibility.

OP58

EXPLORING THE STATE AND DRIVERS OF COMMUNITY INTEGRATION FOR OLDER ADULTS IN CHINA: INSIGHTS FROM A SOCIAL ECOSYSTEM PERSPECTIVE

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Background and aims

Social participation is a key indicator of healthy aging, with community integration being a vital component. Existing research has mainly focused on specific populations like those with disabilities or chronic illnesses, often neglecting the broader aging population. In China, a rapidly aging society, research on community integration among older adults is limited. Understanding this gap is crucial for improving the lives of older Chinese adults and informing global aging policies and strategies.

Methods

A cross-sectional survey was conducted from May to October 2024 in Guizhou Province, where 3,940 community-dwelling older adults (≥ 60 years) were surveyed using a two-stage probability proportional to size (PPS) sampling method. Data were collected on sociodemographic characteristics, Barthel Index scores, and community integration status. Univariate analysis and hierarchical linear regression analysis were used to explore the influencing factors.

Results

The average community integration score was 17.98 (SD=6.17). Univariate analysis showed significant differences in scores across 19 variables. Hierarchical linear regression identified key factors: gender ($\beta=2.115$, $P<0.001$), income ($\beta=0.742$, $P<0.001$), weekly exercise frequency ($\beta=0.560$, $P<0.001$), community exercise facilities ($\beta=0.353$, $P<0.001$), and social insurance coverage ($\beta=0.815$, $P=0.022$) positively impacted scores. Conversely, age ($\beta=-2.584$, $P<0.001$), chronic diseases ($\beta=-0.659$, $P=0.003$), comorbidity ($\beta=-0.809$, $P<0.001$), Barthel Index score ($\beta=-2.458$, $P<0.001$), marital status ($\beta=-0.160$, $P=0.035$), number of children ($\beta=-0.417$, $P=0.033$), and living alone ($\beta=-2.243$, $P<0.001$) had negative impacts. Interpersonal and organizational factors influenced scores more than macro - level environmental factors.

Conclusion

The level of community integration among older adults in Chinese communities is relatively low. Future work should target factors influencing integration, customize interventions, and use social resources to create sustainable services. These actions are key to reducing integration gaps, boosting participation, and advancing healthy aging.

OP59

COMPREHENSIVE REHABILITATION NURSING THROUGHOUT THE ENTIRE CYCLE: A STRATEGY TO IMPROVE THE QUALITY OF RECOVERY AND QUALITY OF LIFE IN ELDERLY PATIENTS WITH HIP FRACTURES

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Background and aims

With the intensification of population aging, hip fractures in the elderly have become a significant public health issue. These fractures not only affect the physiological functions of patients but also severely impact their quality of life and social participation. Therefore, developing and implementing effective comprehensive rehabilitation nursing strategies are crucial for improving the prognosis of elderly patients with hip fractures. This study aims to evaluate and optimize comprehensive rehabilitation nursing strategies to enhance the quality of recovery and quality of life in elderly patients with hip fractures.

Methods

This study employed a randomized controlled trial (RCT) design, enrolling 200 patients over the age of 60 with hip fractures. Patients were randomly assigned to a traditional nursing group and a comprehensive rehabilitation nursing group. The comprehensive rehabilitation nursing group received integrated nursing care, including preoperative education, early postoperative activity, multidisciplinary team collaboration, personalized rehabilitation plans, and post-discharge community support. The primary assessment indicators included recovery time, functional recovery, pain control, quality of life, and readmission rates.

Results

Compared to the control group, the comprehensive rehabilitation nursing group showed significant improvements in recovery time (an average reduction of 21 days), functional recovery (an average increase of 15% as assessed by the Katz Index), pain control (a reduction of 2.5 points in the Visual Analogue Scale, VAS), and quality of life (an average increase of 10% as assessed by the SF-36 questionnaire). Additionally, the readmission rate in the comprehensive rehabilitation nursing group was reduced by 30%.

Conclusion

Comprehensive rehabilitation nursing strategies can significantly improve the quality of recovery and quality of life in elderly patients with hip fractures. Through multidisciplinary team collaboration and personalized nursing plans, it is possible to effectively reduce recovery time, enhance functional recovery, control pain, and improve the overall quality of life of patients.

OP60

HOME-BASED REHABILITATION VERSUS INSTITUTION-BASED REHABILITATION FOR RURAL STROKE PATIENTS IN POST-ACUTE CARE STAGE

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Background and aims

With the new disease trend, stroke related disability has become an important health issue in Bangladesh like rest of the world. But, it is not possible to ensure institution (hospital) based rehabilitation services for every rural stroke patient. This study aims to compare the efficacy of home-based rehabilitation (HBR) with institution-based rehabilitation (IBR) in post-acute stage of rural stroke patients.

Methods

A prospective study was conducted at Manikganj Medical College Hospital from February 2024 to October 2024. A total of 78 post-acute stroke patients (age 45-75) were purposively assigned to either HBR (n=39) or IBR (n=39). The study utilized the Modified Rankin Scale (MRS) for functional outcomes, the Caregiver Burden Inventory (CBI) and cost analysis based on healthcare resources used.

Results

In the HBR group, 69% of patients showed improvement in MRS scores, compared to 72% in the IBR group. Caregiver burden decreased by 25% in the HBR group compared to 18% in the IBR group. Healthcare costs for home-based rehabilitation were 30% lower than institution-based rehabilitation. Statistical analysis revealed a significant difference in caregiver burden ($p=0.02$) and costs ($p=0.01$) between the two groups.

Conclusion

Home-based rehabilitation proves to be an effective alternative to institution-based rehabilitation in post-acute rural stroke patients, offering similar functional outcomes, reduced caregiver burden and lower healthcare costs.

OP61

ELECTROACUPUNCTURE ALLEVIATES SENILE OSTEOARTHRITIS BY INHIBITING CHONDROCYTE FERROPTOSIS IN DOWN-REGULATING PINK/PARKIN-DEPENDENT MITOPHAGY MANNER

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Background and aims

Ferroptosis contributes to Osteoarthritis (OA) progression, and electroacupuncture (EA) shows therapeutic value in attenuating the cartilage degeneration of OA. Here, we investigated whether EA interferes in chondrocyte ferroptotic cell death during osteoarthritic cartilage degeneration, and its underlying mechanism.

Methods

Natural aging 24-month-old rats were selected as the animal model of senile osteoarthritis, and 6-month-old rats were chosen as the control. We investigated the impact of EA on senile osteoarthritis by evaluating articular cartilage degeneration, inflammatory response, and ferroptosis and mitophagy-related protein expressions.

Results

EA remarkably attenuated cartilage degeneration and extracellular matrix degradation, while also decreasing the levels of pro-inflammatory cytokines IL-1 β , TNF α . Furthermore, EA intervention decreased the mRNA and protein expressions of PTEN-induced putative kinase 1, Parkinson protein 2 E3 ubiquitin-protein ligase and Acyl coenzyme A synthetase long-chain member 4, and increased the mRNA and protein expression of Glutathione peroxidase 4.

Conclusion

EA has demonstrated therapeutic value in cartilage protection and alleviating the senile OA progression. The potential mechanism may be to antagonize chondrocyte ferroptosis by inhibiting PINK-Parkin-dependent mitophagy. The mechanistic insights into the interaction between ferroptosis and mitophagy provides a novel therapeutic target for the treatment of EA on OA and many other aged- and ferroptosis-related disorders.

Keywords

Osteoarthritis, Electroacupuncture, Aging, Ferroptosis, Autophagy

OP62

UTILIZATION OF ARTIFICIAL INTELLIGENCE IN EDUCATION AND CLINICAL PRACTICE OF PHYSICAL MEDICINE AND REHABILITATION RESIDENTS

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Background and aims

Artificial Intelligence (AI) is progressively used in medical education and clinical practice, including Physical Medicine and Rehabilitation (PM&R). AI has the potential to improve education and also aid clinical decisions. However, its use among PM&R residents is uncertain. This study investigates AI knowledge, usage, perception, and barriers among PM&R residents and evaluates RehabGuide by ZEN, a custom GPT tool for PM&R residents.

Methods

This cross-sectional study involved 107 PM&R residents from 7 residency centers in Indonesia. A structured questionnaire assessed AI knowledge, skills, perception, barriers, usage in education and clinical practice, and feedback on RehabGuide. SPSS was used to conduct data analysis.

Results

Residents self-reported basic to moderate AI knowledge (Mean = 3.4/5) and showed strong internal consistency (Cronbach's Alpha = 0.93). The main barriers identified were lack of training (Mean = 3.6/5) and accuracy concerns (Mean = 3.3/5). AI knowledge was positively associated with both general AI use in education ($r = 0.39$, $p < 0.05$) and clinical use ($r = 0.31$, $p < 0.05$). RehabGuide had high ease of use (Mean = 3.67/5) and relevance (Mean = 3.65/5) but had lower ratings for accuracy (Mean = 3.31/5) and lack of evidence-based references (Mean = 3.72/5). Residents who believed that AI improves efficiencies were more likely to support RehabGuide ($p = 0.02$). Although disbelief regarding AI displayed a weak negative association with satisfaction, this result was not statistically significant ($p = 0.10$).

Conclusion

AI shows promise in PM&R education and practice, but training gaps and accuracy loss face challenges. AI training programs would drive further adoption. While RehabGuide serves potential, it still needs improvements in areas such as the accuracy of the content and better integration of evidence.

OP63

ANALYSIS OF FACTORS AFFECTING THE FUNCTIONAL LANGUAGE RECOVERY IN PATIENTS WITH APHASIA AFTER ACUTE STROKE: A 3-YEAR FOLLOW-UP STUDY

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Background

Aphasia is one of the most common neurologic deficits after stroke, with 20% of stroke survivors suffer from long-lasting aphasia problem. However, whether acute-phase language performance can predict long-term prognosis is still unknown. Here we used cognitive-linguistic related assessment scales to investigate whether the characterization in the acute phase, including the clinical and linguistic factors can contribute to the prognostic factors for aphasia long-term recovery

Methods

We enrolled 86 acute post-stroke aphasia patients from Beijing Tiantan Hospital (Oct 2020–Oct 2021). Linguistic ability was assessed using the Chinese Aphasia Language Battery (CALB). A good functional outcome at three years was defined as an Aphasia Severity Rating Scale (ASRS) score of 4–5. Baseline demographic, clinical, and follow-up factors (e.g., stroke type, location, comorbidities, rehabilitation, and medication) were analyzed for association with outcomes. A subgroup of first-time stroke patients (n=58) underwent a multivariate analysis to identify independent linguistic predictors.

Results

The stroke location was the only significant predictor ($P=0.046$, $OR=3.574$, 95%CI 1.021-12.513) in the univariate analysis of baseline demographic and clinical factors. The subgroup analysis of the first-time stroke patients showed that the three baseline linguistic-component (phonology/semantic/lexical) scores, fluent/non-fluent type and aphasia quotient were associated with functional outcome at 3 years after stroke. These baseline scores explained 51.0% of the variance in multivariable analysis, with phonology score being the only significant predictor ($P=0.020$, $OR=1.069$, 95%CI 1.011-1.131).

Conclusion

This research has come to the conclusion that subcortical lesion and linguistic ability (phonology) at stroke onset can predict the long-term functional language recovery.

OP64

THE EFFECT OF INTERACTIVE VISUAL FEEDBACK-BASED BALANCE TRAINING ON CLINICALLY-ORIENTED DYNAMIC BALANCE FUNCTION IN PATIENTS WITH CHRONIC ANKLE INSTABILITY

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Background and aims

Recent studies show that CAI patients rely more on visual information for postural control due to lost somatosensory input from recurrent ankle sprains, and this reliance can be modified through sensory reweighting. Balance training aids in rehabilitation and injury prevention, with visual feedback providing a safe way to correct movements. However, it is unclear if combining visual feedback with traditional balance training enhances its effectiveness. This study aims to investigate the impact of interactive visual feedback during balance training on dynamic balance and compare it to traditional methods.

Methods

Twenty-three CAI patients were randomly assigned to two groups: the Interactive Visual Feedback Balance Training (IVFBT) group and the Traditional Balance Training (TBT) group. The IVFBT group used the D-Wall free training mode for real-time visual feedback during single-limb balance (SLB) training, while the TBT group performed SLB training without visual feedback. Both groups trained for 20-30 minutes, three times a week, over four weeks, with similar training intensity. Pre- and post-treatment assessments included the CAIT, FAAM-ADL, FAAM-S, Side Hop Test (SHT), and Multiple Single-Limb Hop Stability Test (MSLHST).

Results

At baseline, there were no significant differences between groups ($p > 0.05$). After 4 weeks, the FAAM-S score increased in both groups: IVFBT from 74.36 ± 15.95 to 89.55 ± 16.05 ($p = 0.005$) and TBT from 75.27 ± 12.84 to 91.27 ± 10.08 ($p < 0.001$). Both groups showed changes exceeding the minimal clinically important difference (MCID). The IVFBT group also showed a decrease in SHT time from 11.71 ± 3.89 to 9.51 ± 1.83 ($p = 0.025$), suggesting clinical significance. However, no significant inter-group differences were found for any indices ($p > 0.05$).

Conclusion

Interactive visual feedback balance training improves dynamic balance in CAI patients, but offers no superior benefit over traditional balance training.

OP65

EXOSKELETON ENHANCES MUSCLE ACTIVITY IN HEALTHY ADULTS AND PATIENTS WITH SPINAL CORD INJURY DURING SEMI-SQUAT MOVEMENT

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Background and aims

Although previous studies have shown that exoskeleton robots can reduce users' muscle strength requirements, enhancing muscle activity remains an important objective in neurorehabilitation. Limited research exists on whether exoskeleton-assisted training increases muscle activity. We observed changes in lower limb muscle activity during exoskeleton-assisted semi-squatting in healthy adults and subjects with spinal cord injury (SCI) to provide a new idea for rehabilitation.

Methods

Ten healthy adults performed semi-squatting under different conditions: (1) without an exoskeleton (EXO), with EXO in lower assistance torque (L-EXO) or higher assistance torque (H-EXO); (2) anterior, middle or posterior location of the center of gravity (COG), (3) 25 or 45 squat degrees. Five subjects with SCI performed semi-squatting with and without an exoskeleton. Surface electromyography of the lower limbs analyzed changes in RMS under different conditions.

Results

During semi-squatting, the exoskeleton increased tibialis anterior amplitude by 37.1% ($P < 0.05$, L-EXO, anterior COG, 45° squat, isometric phase) to 59.0% ($P < 0.05$, L-EXO, middle COG, 25° squat, ascending phase). Lateral gastrocnemius amplitude increased by 52.7% ($P < 0.01$, H-EXO, anterior COG, 25° squat, descending phase). Semitendinosus amplitude was elevated by 54.1% ($P < 0.05$, H-EXO, anterior COG, 25° squat, descending phase) and 109.5% ($P < 0.01$, H-EXO, anterior COG, 45° squat, isometric phase). The trend of altered muscle activation in lower limbs of SCI subjects resembled that of healthy adults: the exoskeleton increased RMS of 80% tested posterior thigh muscles by 14.0-78.6% and 60% examined calf muscles by 6.4-100%.

Conclusion

Exoskeletons can increase activation of knee flexors, ankle dorsiflexors, and plantar flexors in healthy adults during semi-squatting. Exoskeleton-assisted repetitive semi-squat training may be feasible in SCI rehabilitation and increase activation of posterior thigh and calf muscles in individuals with SCI. Clinical application of exoskeletons for semi-squat training should consider the assistant level, center of gravity location, and squat depth on muscle activation to design individualized training programs.

OP66

MEASUREMENT OF COPING STRATEGIES OF PERSON WITH DISABILITIES (PWD) GROUP AND ITS ASSOCIATION WITH DEPRESSION AND ANXIETY

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Background and aims

Coping is defined as a response aimed at diminishing physical, emotional and psychological burden that is linked to stressful life events. Adult PWD is reportedly prone to depression and anxiety, and health-related risk behaviors. This study aims to provide sociodemographic profiles of adults PWD in local setting, and prevalence of depression and anxiety in them. Also to examine type of coping strategies being used specific to each PWD group, and how usage of coping strategies is associated with depression and anxiety.

Methods

A cross-sectional study from October 2023 - October 2024. Study population involves patient with established diagnosis (> 1 year) of stroke, acquired brain injury (ABI) and spinal cord injury (SCI) patients who receives outpatient treatment, with inclusion and exclusion criteria fulfilled. Questionnaires involved are Brief-Coping Orientation to Problems Experience (COPE), PHQ-9 and GAD-7.

Results

A total of 137 patients were included in the study, with 42 ABI patients, 48 SCI patients and 47 stroke patients. The mean age of patients was 47.64 years old. Majority of patients were married (57.7%), Malay (51.8%), male (65.0%) who studied up to secondary level (44.5%) and were professionals (18.2%). The ABI group was observed to have the lowest level of anxiety and depression, and highest were among the stroke patients.

Among ABI patients, coping strategies that significantly related to anxiety and depression include emotion coping, self-blaming and avoidance coping. In spine patients, increase in self-blame and avoidance coping significantly increases the GAD-7 scores, while the increase in self-distraction decreases it. As for depression, the significant factors associated included venting, self-blame, substance use and behavioral disengagement. In stroke population, increase in emotional support, self-blame and behavioral disengagement significantly increases the anxiety level, while increase in self-blame and behavioral disengagement increase depression level.

Conclusion

Coping strategies is a personal factor, inside International Classification of Functioning Disability and Health (ICF) framework. As coping strategies are modifiable factors, more helpful coping can be instilled via education and training, in hoping for better positive adjustment and psycho-social outcomes among PWD population.

OP67

AN EVIDENCE-BASED TAILORED EHEALTH PATIENT EDUCATION TOOL FOR PATIENTS WITH KNEE OSTEOARTHRITIS: A RANDOMIZED CONTROLLED TRIAL

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Background and aims

An evidence-based eHealth education tool was developed for patients with knee osteoarthritis (KOA). This study aims to evaluate the long-term effectiveness on patient knowledge level and analyze the patient's satisfaction with the proposed tool.

Methods

A 2-armed randomized controlled trial was performed, with 218 KOA patients allocated 1:1 to two groups by balanced block randomization. Both groups received usual care and additionally, the eHealth group used the proposed eHealth tool during the process. The primary outcome measure was the validated osteoarthritis patient knowledge questionnaire (PKQ-OA). The secondary outcome was patients' satisfaction with the eHealth tool. Measurements were taken at baseline, post-intervention (T1), 1-month (T2), 3-month (T3), and 6-month (T4) follow-up. Statistical analyses, including ANOVA and chi-square tests, were employed to compare outcomes between the groups.

Results

The results of the PKQ-OA indicated that patients in the eHealth group ($38.7\% \pm 25\%$, 95% CI, 33.9% to 43.4%) performed significantly better than the usual care group ($28.8\% \pm 21.1\%$, 95% CI, 24.9% to 32.9%) in terms of correct responses to the knowledge assessment in T1 ($P=0.001$). In addition, a higher percentage of patients in the eHealth group (39.4%) achieved a score of at least 50% on the knowledge assessment compared to the usual care group (14.6%). Patients who received eHealth education perceived it as a valuable tool for education. The analysis of follow-up data showed that the knowledge level of the eHealth group was higher than that of the control group at 6 months ($F=0.727$, $P=0.471$), but there was no significant difference.

Conclusion

Patients educated using an evidence-based eHealth education tool showed significant improvements in knowledge and were more likely to achieve an adequately informed status. The evidence-based eHealth tool could offer a low-cost, effective educational device.

OP68

PROJECT “UROQ – THE PLATFORM FOR PEOPLE WITH SPINAL CORD INJURY” GOES WORLDWIDE

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Background and aims

Every day we meet people having had spinal cord injury (SCI) who due to a lack of information are frightened and full of worries about what life with tetra-or paraplegia is like. We have made it to our mission to give information to this patient group including their families about life with paraplegia on an equal footing.

Methods

Our focus is on explaining neuro-urological and SCI medical aspects in an understandable way. Our promise: We understand the language of medicine and speak the language of patients.

Results

With the name “UROQ” we initially focused on neuro-urological topics for people with spinal cord injury but expanded gradually the range to include also other specific SCI topics.

Our innovative and non-profit YouTube platform was launched as part of the annual conference of the German Speaking Medical Society for Paraplegiology (www.dmgp.de) in 2022. Supported by the non-profit support community of the spinal cord injury center Ulm (www.fgqzulm.de) it was a real show event.

In the meantime, UROQ developed remarkably. We increase the accessibility of our target group through colorful content via YOUTUBE, INSTAGRAM and FACEBOOK. Our social media channels enable us to conduct also user interviews and surveys.

Up to now our content was only published in German. Thanks to modern AI support, we can transfer it into different languages.

Our intro video explaining the mission of UROQ and our other videos about for example urodynamics, urinary tract infections and sexuality regarding people with spinal cord injury are meanwhile famous in the SCI community.

Conclusion

Are you ready for UROQ?

We are.

We would like to invite you to join us in our mission to inform about aspects of life with spinal cord injury. Get involved!

OP69

OCCUPATIONAL STATUS AND VOCATIONAL REHABILITATION NEEDS FOLLOWING PROSTHETIC REHABILITATION OF LOWER LIMB AT A TERTIARY CENTER IN SAUDI ARABIA

Jinan AlRashoud

Background

Lower limb amputations predominantly caused by trauma and diabetic vascular disease significantly affect patients' quality of life, impacting their vocational capabilities and daily activities. Despite advancements in prosthetic technology, there is limited research on post-amputation vocational status. This study aims to evaluate the vocational status and limitations of lower limb amputees after prosthetic rehabilitation in Saudi Arabia.

Materials & Methods

This cross-sectional study included 87 adult lower limb amputees who received prosthetic rehabilitation at King Fahad Medical City (KFMC) between 2013 and 2020. Data collection was conducted via telephone interviews, focusing on demographics, type of amputation, vocational status, and employment-related limitations. Statistical analysis involved chi-square tests, Fisher's exact test, and McNemar test for comparing categorical data.

Results

The participants were predominantly male (82.8%), aged 41–65 years (47.1%), and married (73.6%). Trauma (52.9%) and diabetic vascular disease (32.2%) were the leading causes of amputation. Employment rates decreased significantly post-amputation, from 56.3% to 37.9% ($p < 0.001$). Factors associated with higher unemployment included older age (>65 years), female gender, peripheral vascular disease, and physically demanding jobs. Vocational barriers such as physical limitations (28.7%), lack of accessible parking (10.3%), and workload-related issues (12.6%) were significantly associated with unemployment. Despite these challenges, 91.2% of employed participants used prosthetic limbs during work.

Conclusion

Lower limb amputations profoundly affect vocational outcomes. Tailored rehabilitation programs, workplace modifications, and enhanced accessibility are essential for improving employment rates. Future longitudinal studies should assess long-term vocational outcomes and explore psychosocial impacts.

Keywords

Lower limb amputation, Vocational rehabilitation, Prosthetic rehabilitation, Occupational status

OP70

PREDICTING LOWER LIMB FUNCTION IN STROKE PATIENTS: A RANDOM FOREST-BASED FEATURE SELECTION AND DECISION TREE MODEL USING KEY ICF ITEMS

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Background and aims

Stroke is a leading cause of disability globally, with lower limb dysfunction significantly impacting daily activities and quality of life. The International Classification of Functioning, Disability, and Health (ICF) provides a comprehensive functional assessment framework, but its extensive item set limits clinical use. The Fugl-Meyer Assessment-Lower Extremity (FMA-LE) is the gold standard for evaluating lower limb function in patients who had a stroke, yet it is time-consuming. To enhance clinical efficiency, this study aims to identify key ICF items closely related to FMA-LE scores and develop a simplified prediction model using decision tree and random forest methods to streamline lower limb function assessment.

Methods

We conducted this prospective observational study using convenience sampling and collected data of patients who had a stroke with lower limb dysfunction in 10 hospitals in China from May 2023 to November 2024. Chi-square tests, Mann-Whitney U tests, and t-tests were used for baseline analyses, Spearman's Rank Correlation was used to screen ICF items related to lower limb function. Feature variables selection used the Random Forest (RF) algorithm, and cross-validation was used to train decision tree model. Model performance was evaluated using accuracy, sensitivity, specificity, and area under the curve (AUC).

Results

The RF algorithm identified “b730”, “b760”, “d4101”, “d4102”, “d4100”, and “d530” as key features to distinguish the lower limb function of patients who had a stroke. The decision tree was grown to 4 levels with 5 terminal nodes. The accuracy, sensitivity, specificity and AUC were 0.797, 0.890, 0.681 and 0.831, respectively. The model showed strong internal consistency and predictive power.

Conclusion

“b730”, “b760”, “d4101”, “d4102”, “d4100”, and “d530” can accurately predict the lower limb function of patients who had a stroke. The model demonstrates strong predictive power, enabling faster assessments of lower limb dysfunction and guiding rehabilitation strategies.

OP71

EFFECT OF TELE-PREHABILITATION GROUP EXERCISE ON FUNCTIONAL RECOVERY IN ELDERLY PATIENTS UNDERGOING OPEN ABDOMINAL SURGERY: A RANDOMIZED CONTROLLED TRIAL

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Background and aims

Open abdominal surgery imposes significant physiological stress on the body. A prehabilitation exercise program aims to improve physical fitness before surgery, potentially reducing postoperative complications. This study examined the effects of a telehome-based group exercise preoperative prehabilitation (PREHAB) program compared to a postoperative rehabilitation (REHAB) program in elderly patients at moderate to high risk undergoing open abdominal surgery.

Methods

In this single-center, single-blind randomized controlled trial, 109 patients scheduled for elective open abdominal surgery were enrolled. The intervention group participated in a moderate-intensity, multicomponent, home-based tele-prehabilitation program for 2 to 4 weeks prior to surgery, followed by a 3-month postoperative rehabilitation program. The control group received only the 3-month postoperative rehabilitation. Preoperative optimization of nutritional status and psychosocial management was also provided. Outcome measures included the 6-minute walk distance (6-MWD), postoperative complications, physical function, and psychosocial assessments. A subgroup analysis of the 6-MWD was conducted for frail participants with >80% exercise adherence in both groups.

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Results

A total of 109 patients, with a mean age of 68.9 ± 5.8 years (PREHAB group, $n=55$; REHAB group, $n=54$), predominantly classified as ASA class II, were included. The mean duration of prehabilitation was 12.2 ± 8.6 days. No significant differences in 6-MWD or other outcomes were found between the PREHAB and REHAB groups. However, frail participants in the PREHAB group demonstrated greater improvement in 6-MWD from baseline to 3 and 6 months post-surgery compared to those in the REHAB group.

Conclusions

A 2-week moderate-intensity home-based tele-prehabilitation program, followed by a 3-month postoperative rehabilitation program, did not significantly improve functional or postoperative outcomes compared to the REHAB program. However, frail participants with higher exercise adherence may benefit from short-term prehabilitation.

Keywords

Abdominal Surgery, Preoperative Care, Rehabilitation, Telemedicine, Exercise Therapy, Frail Elderly, Physical function

Disclosures

The authors declared no conflict of interest.

OP72

PRELIMINARY EFFICACY ANALYSIS OF MODIFIED REFLEX ARC RECONSTRUCTION SURGERY FOR SPASTIC BLADDER DYSFUNCTION AFTER SPINAL CORD INJURY

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Background and aims

Spinal cord injury (SCI) is a severe condition with increasing incidence, often leading to bladder dysfunction that significantly impacts quality of life. Restoring bladder function post-SCI has important clinical and social value. Despite extensive research, treatment outcomes remain suboptimal. This study evaluates the preliminary efficacy of modified reflex arc reconstruction for spastic bladder dysfunction after SCI.

Methods

Twenty-two patients underwent modified reflex arc reconstruction. The S1 anterior root was transected epidurally and anastomosed with the ipsilateral S2 and S3 anterior roots on one side, while on the other, the S1 anterior root was connected to the ipsilateral S2, preserving S3. Postoperative follow-up assessed urinary function, urodynamics, lower limb movement, autonomic hyperreflexia, and bowel function.

Results

One-year follow-up showed significant urodynamic improvement: maximum bladder capacity increased by 1.22 times, intravesical pressure decreased by 66.3%, and bladder compliance improved by 3.56 times. Unexpected findings included reduced muscle spasticity, partial recovery of walking ability, improved autonomic hyperreflexia, and some bowel function restoration.

Conclusion

Modified reflex arc reconstruction effectively improves bladder compliance, alleviates spasticity, and enhances autonomic function early postoperatively. It may also aid in walking and bowel function recovery. Long-term efficacy requires further study. This approach offers a simple, safe, and cost-effective treatment option for SCI patients.

OP73

CLINICAL STUDY ON THE IMPROVEMENT OF COGNITIVE DYSFUNCTION IN STROKE PATIENTS BY BRAIN REGULATION TECHNOLOGY FOR MATERIAL CIRCULATION (BRT-SC)

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Objective

This study aims the improvement of cognitive dysfunction by the brain regulation technology for material circulation (The combination of drug nasal atomization inhalation with manual lymphatic drainage of the head and neck), and to provide a new treatment method for patients with cognitive impairment.

Methods

A total of 80 patients with cognitive impairment who were rehabilitated in the First Affiliated Hospital of Xi'an Jiaotong University from October 2023 to December 2024 were selected. They were divided into an experimental group and a control group according to the random number table method, with 40 patients in each group. The control group ($n = 40$) received conventional cognitive training, while the experimental group ($n = 40$) received a comprehensive treatment of conventional cognitive training and the brain regulation technology for material circulation. The intervention lasted for 8 weeks. The Montreal Cognitive Assessment scale (MoCA) and the Mini - mental State Examination (MMSE) were used to evaluate the cognitive function of the patients before the intervention, at 4 weeks and 8 weeks of the intervention, and 1 month after follow - up.

Results

There was no significant difference in the baseline levels of each group before the intervention ($P > 0.05$). The intervention effect of the experimental group was significantly higher than that of the control group at all evaluation time points ($P < 0.05$).

Conclusion

The comprehensive treatment of conventional cognitive training and the brain regulation technology for material circulation (BRT - SC) has a definite curative effect on the improvement of cognitive dysfunction. Moreover, the brain regulation technology for material circulation (BRT - SC) provides a new method for improving cognitive dysfunction.

OP74

THE APPLICATION AND EFFICACY OF A NEW MANUAL LYMPHATIC DRAINAGE MODE AFTER LYMPHATICOVENOUS ANASTOMOSIS FOR LYMPHEDEMA

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Objective

Aiming at the recovery problems after lymphaticovenous anastomosis for lymphedema, this study explores a more effective drainage mode to enhance the treatment effect, alleviate patients' symptoms, and improve their postoperative quality of life.

Methods

Based on the characteristics of the surgery and the properties of lymphedema, a new manual drainage mode is proposed, which divides the drainage area centered on the anastomosis site. The treatment is carried out using methods such as segmented, layered, multi - cycle, multi - area drainage, and gradual pressurization. A group - controlled experiment is conducted on 50 patients who have undergone this surgery. The experimental group adopts the new manual lymphatic drainage mode, while the control group uses the traditional drainage method. The treatment effects of the two groups of patients are compared.

Results

After a period of follow-up observation, the patients in the experimental group are significantly superior to those in the control group in terms of the degree of lymphedema reduction, wound healing speed, and patients' self - perceived comfort. Imaging examinations show that in the experimental group, the patency of lymphatic vessels is enhanced, lymphatic fluid reflux is improved, limb swelling is significantly reduced, the extracellular water ratio decreases significantly, bioelectrical impedance increases significantly, and the incidence of postoperative complications is reduced.

Conclusion

The new manual lymphatic drainage mode has significant clinical application value after lymphaticovenous anastomosis for lymphedema. Through methods such as segmented, layered, multi - cycle, multi - area drainage, and gradual pressurization, this mode effectively promotes lymphatic fluid reflux, alleviates edema symptoms, accelerates wound healing, and improves the quality of life of patients. The research results indicate that this mode has important value for promotion and application in clinical practice.

OP75

EFFECTS OF SHORT WAVE DIATHERMY (SWD) AND INTERFERENTIAL CURRENT THERAPY (IFT) IN LUMBER SPONDYLOSIS

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Background and aims

Lumbar spondylosis is a common degenerative condition that frequently leads to chronic low back pain and functional impairment. While short wave diathermy (SWD) and interferential current therapy (IFT) are widely used adjuncts to conventional treatment, few studies have directly compared their clinical effectiveness. To compare the effectiveness of SWD versus IFT in reducing pain and disability in patients with lumbar spondylosis when combined with conventional therapy.

Methods

A randomized clinical trial was conducted at Dhaka Medical College Hospital (July 2019–June 2020) with 59 patients (aged 40–60 years) having lumbar spondylosis (pain duration 6–12 weeks, VAS >3 and ≤8). Sample size ensured 80% power ($\alpha=0.05$) with a 10% dropout allowance. Group A (n=30) received conventional treatment (NSAIDs, muscle relaxants, exercises, lumbar corset, ADL instructions) plus SWD (27.12 mhz, 15 min, 3×/week, 6 weeks). Group B (n=29) received the same treatment with IFT (4000 Hz & 3900 Hz, 100 Hz beat frequency, identical schedule). One dropout in Group B; compliance >95%. Data were analyzed using t-tests and chi-square tests with 95% confidence intervals.

Results

Both groups showed significant improvements. In Group A, mean VAS decreased from 6.60 ± 1.03 (95% CI: 6.1–7.1) to 1.30 ± 1.45 (95% CI: 0.7–1.9) and the Oswestry Disability Index (ODI) declined from $29.13 \pm 6.58\%$ to $3.53 \pm 4.45\%$ at six weeks. In Group B, VAS decreased from 6.63 ± 0.96 to 2.50 ± 1.19 (95% CI: 2.1–2.9) and ODI from $26.93 \pm 4.51\%$ to $7.00 \pm 4.65\%$. From week 2 on, there were statistically significant differences between the groups ($p < 0.001$ for VAS; $p < 0.005$ for ODI), with Group A demonstrating a roughly 40% higher reduction in pain and impairment. There were no significant adverse effects noted. Although generalizability is limited by the single-center approach, improvements persisted over the six-week follow-up period.

Conclusion

SWD is significantly more effective than IFT in reducing pain and disability in lumbar spondylosis, with Group A achieving a 40% greater improvement. Further multicenter studies with larger samples and extended follow-up are warranted.

OP76

STUDY ON THE SHORT-TERM REHABILITATION EFFECTS OF A FUNCTIONAL REHABILITATION PROGRAM IN HIGH SPORTS-DEMAND INDIVIDUALS AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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Background and aims

To address the gap in tailored rehabilitation protocols for high sports-demanding individuals (HSDs) following anterior cruciate ligament reconstruction (ACLR), this study compares it with traditional protocols to assess its impact on functional recovery, return to sports (RTP), and re-injury risk, aiming to provide a targeted rehabilitation approach for HSDs.

Methods

Sixty-four HSD individuals undergoing ACLR were randomly assigned to conventional rehabilitation (n=32) or functional rehabilitation (n=32). The functional rehabilitation model consisted of five progressive phases, including kinetic chain exercises, balance and core stability training, speed agility, knee twisting, and coordination training. Progression to the next phase required meeting specific performance criteria. The conventional rehabilitation followed the biological healing timeline. ACL-RSI and IKDC scores were assessed pre-treatment, at 12 and 24 weeks, while isokinetic muscle strength was measured at 12 and 24 weeks. Repeated measures ANOVA, multivariate ANOVA, and t-tests were used for statistical analysis.

Results

Isokinetic muscle strength within-group comparisons showed a 30.21% increase in the functional group at 24 weeks ($P<0.05$, $T=4.14$) and 16.56% in the conventional group, though not significant ($P=0.47$, $T=0.37$). At 24 weeks, the functional group had significantly higher strength than the conventional group ($P<0.05$, $T=3.19$). IKDC scores significantly improved over time ($P<0.01$), with the functional group showing higher scores at 6 months ($P=0.002$). ACL-RSI scores showed significant main and interaction effects ($P<0.01$), with the functional group improving significantly at 3 months ($P<0.001$).

Conclusion

Functional rehabilitation demonstrated superior short-term outcomes, significantly improving muscle strength and shorter time for RTP, making it a more effective recovery strategy for HSD individuals post-ACLR.

OP77

PROTOCOL OF A MULTICENTER PROSPECTIVE SEQUENTIAL INTERVENTION COHORT STUDY: EVALUATING EFFECT OF THE GUSU CONSTRAINT STANDING TRAINING ON HEMIPARETIC GAIT IN POST-STROKE PATIENTS

Liping Zhou

Background

Stroke is a leading global health challenge, frequently resulting in hemiparetic gait as a sequela. The Gusu Constraint Standing Training (GCST) is an innovative muscle-oriented postural relearning therapy that promotes active muscle activation of the pelvis and lower extremity in hemiparetic patients by applying controlled external perturbations to the bilaterally innervated pelvic muscle groups during standing. Preliminary research suggests the GCST benefits gait in children with cerebral palsy and hemiparetic patients, yet its efficacy and mechanisms require further investigation. This study aims to assess the effect of the GCST on multi-muscle coordinated activation and gait in post-stroke patients and discuss its clinical applicability.

Methods and analysis

This multicenter, prospective, sequential intervention cohort study is scheduled to commence in January 2025 and will run for two years, recruiting 60 stroke-induced hemiparetic patients and 30 healthy adult controls each center. The study involves five intervention steps of the GCST, progressing from single muscle activation to multi-muscle synergy and segmental separation movements. Primary outcome measures include muscle architecture, surface electromyography indicators, postural and gait parameters, lower extremity motor function, and quality of life. Statistical analysis will utilize repeated measures ANOVA.

Ethics and dissemination

This study was approved by the Ethics Committee of Gusu School, Nanjing Medical University (K-2024-132-K01). Informed consent will be obtained, ensuring participant confidentiality is maintained. The results of this study will be disseminated via presentations at academic conferences and publications in peer-reviewed journals.

Trial registration number

ChiCTR2400094903 1.0 Version – 2024.06.02.

Keywords

Gait, Hemiplegia, Lower Extremity, Exercise Therapy, Electromyography

OP78

OPTIMIZING POST-STROKE DYSPHAGIA REHABILITATION: A CONSENSUS-DRIVEN CERVICAL ACUPUNCTURE PROTOCOL FOR SAFETY AND EFFICACY

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Background and aims

Post-stroke dysphagia (PSD), affecting 45%–65% of stroke survivors, leads to severe complications such as aspiration pneumonia and malnutrition. While cervical acupuncture shows clinical efficacy in PSD management, the lack of standardized protocols hinders its widespread application. This study aims to establish an evidence-based technical specification for cervical acupuncture in PSD, integrating meridian theory, neuro-muscular mechanisms, and anatomical precision to enhance clinical efficacy, safety, and reproducibility.

Methods

The protocol was developed through systematic analysis of cervical meridian pathways, swallowing physiology, and pathological mechanisms. Key acupoints included Fengchi (GB20), Gongxue, Juanshe, Tiyan, Lianquan (CV23), and specialized points (e.g., Zhifanliu, Tunyan). Needling techniques followed anatomical guidelines (GB/T 12346-2021) and safety standards (GB 15982-2012). Central acupoints (e.g., Fengchi) targeted cerebral circulation, while peripheral points (e.g., Juanshe) stimulated pharyngeal muscles and neural pathways. Needle insertion depths (5–50 mm), angles (30°–60°), and retention times (0–30 min) were standardized. A 2- to 4-week regimen (5 sessions/week) was recommended, with individualized adjustments based on syndrome differentiation (e.g., Fengtan Zuluo: + Fenglong, Hegu).

Results

The protocol demonstrated improved swallowing coordination via stimulation of the hypoglossal nerve, pharyngeal constrictors, and laryngeal muscles. Clinical trials indicated reduced aspiration risk (Penetration-Aspiration Scale), enhanced oral intake (FOIS), and functional recovery (SSA). Adverse events (e.g., hematoma, vagus nerve irritation) were minimized through strict anatomical adherence and real-time monitoring.

Conclusion

This standardized protocol bridges the gap between traditional acupuncture and evidence-based rehabilitation for PSD. By harmonizing neuroanatomical precision with meridian theory, it offers a reproducible framework to optimize clinical outcomes, reduce complications, and support multicenter research. Implementation of this specification may advance acupuncture's role in neurorehabilitation and promote global acceptance through methodological transparency.

OP79

MOBILITY TRAINING BENEFITS BURN PATIENTS EFFECTIVELY

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Background and aims

Severe post-burn scar contracture of the hand dorsum often leads to functional impairments, including joint stiffness and claw hand deformity. Traditional immediate skin grafting after scar excision necessitates prolonged immobilization, resulting in persistent joint stiffness and suboptimal functional recovery. This case report introduces a staged approach combining scar excision, early rehabilitation, and delayed skin grafting to optimize functional outcomes.

Methods

The adult patient presented with severe left dorsal hand scar contracture following a burn injury. Clinical examination revealed rigid scar tissue, restricted metacarpophalangeal and interphalangeal joint mobility, and a claw hand deformity. The treatment protocol involved complete excision of the dorsal scar, followed by temporary coverage with a biological dressing to prevent infection. Instead of immediate skin grafting, early rehabilitation—including active and passive range-of-motion exercises, tendon gliding, and dynamic splinting—was initiated postoperatively. After 12 days of intensive rehabilitation, joint mobility and thumb abduction/adduction were restored to near-normal ranges. Split-thickness skin grafting was then performed, followed by continued postoperative rehabilitation.

Results

Postoperative assessments demonstrated significant functional improvement, including metacarpophalangeal joint flexion, interphalangeal joint flexion, and thumb opposition was fully restored. The delayed grafting approach allowed unrestricted rehabilitation during the critical early phase, preventing joint stiffness. Final follow-up revealed excellent graft survival, pliable skin, and near-complete restoration of hand function without recurrence of contracture.

Conclusion

This staged approach—scar excision, interim biological dressing coverage, early rehabilitation, and delayed grafting—offers a superior alternative to traditional immediate grafting. By prioritizing functional recovery before definitive wound closure, it avoids prolonged immobilization, mitigates joint stiffness, and maximizes tendon and capsular mobility. The delayed grafting phase enables aggressive rehabilitation during the pliable post-excision period, facilitating faster functional restoration. This strategy highlights the importance of integrating rehabilitation into the surgical timeline to optimize outcomes in complex hand burn contractures.

EPP1

CHANGES IN GLYPHATIC FUNCTION AFTER MILD TRAUMATIC BRAIN INJURY: FINDINGS FROM ONE AND THREE-MONTH ASSESSMENTS

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Background and aims

Mild traumatic brain injury (mTBI) may alter glymphatic function, but its progression and variability remain obscure. This study examined glymphatic function following mTBI within one month and after three-month post-injury, and to determine whether variations in glymphatic function are associated with differences in post-traumatic symptoms.

Methods

Glymphatic function was estimated using diffusion tensor image analysis along the perivascular space (DTI-ALPS). The ALPS index was measured in 39 individuals with mTBI (47.21 ± 14.88 years) at both initial and follow-up assessments, and in 35 age-matched controls (44.62 ± 13.12 years) using manually defined regions of interest at the level of the lateral ventricles. The Wilcoxon rank-sum test and Wilcoxon signed-rank test were used to compare the ALPS index. Based on ALPS index changes between time points, patients were divided into good and poor prognosis subgroups. Their ALPS indices were compared with controls, and clinical features such as the Rivermead Post-Concussion Symptoms questionnaire (RPCSQ) were compared between subgroups.

Results

At baseline, the ALPS index did not differ between mTBI patients and controls; at follow-up, it was significantly lower in patients. The good prognosis group had a low initial ALPS index that recovered at follow-up, while the poor prognosis group showed the reverse. The poor prognosis group consistently reported higher RPCSQ scores, with notable sensory and cognitive disturbances at baseline.

Conclusion

Variability in the ALPS index and glymphatic dysfunction may underlie persistent post-traumatic symptoms in mTBI, suggesting its potential role as a prognostic biomarker.

EPP2

CONSTRUCTION OF A PREDICTIVE MODEL FOR POST-STROKE SHOULDER-HAND SYNDROME BASED ON MACHINE LEARNING

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Background and aims

To explore the construction of a predictive model for Post-Stroke Shoulder-Hand Syndrome (SHS) using machine learning algorithms.

Methods

A total of 208 stroke patients hospitalized in our institution from January 2021 to June 2023 were selected. Clinical data were recorded, and patients were followed up for six months. Based on the occurrence of SHS, patients were divided into the SHS group and the non-SHS group. Univariate and multivariate logistic regression analyses were performed on the variables in the dataset to identify independent predictive factors for SHS. Support Vector Machine (SVM) and Random Forest (RF) machine learning models were then constructed.

Results

Among the 208 patients, 48 developed SHS (23.07%). Multivariate analysis revealed that age (OR=6.946, 95% CI 2.372-16.347, $P=0.024$), concurrent shoulder subluxation (OR=2.163, 95% CI 1.042-4.256, $P=0.005$), and motor dysfunction (OR=3.035, 95% CI 1.605-11.386, $P=0.004$) were independent risk factors for SHS. The area under the curve (AUC) of the SVM and RF models were 0.795 (95% CI 0.697-0.898) and 0.836 (95% CI 0.728-0.910), respectively. The RF model exhibited a higher AUC, with better specificity (80.5%) and accuracy (79.6%), indicating superior overall predictive performance.

Conclusion

The predictive models constructed based on machine learning have significant value in identifying high-risk SHS patients, with the RF model demonstrating higher overall predictive capability.

EPP3

PILOT STUDY OF MY SCOLI PHYSIO TREATMENT FOR ADOLESCENT IDIOPATHIC SCOLIOSIS IN THE MALAYSIAN POPULATION

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Background and aims

Adolescent Idiopathic Scoliosis (AIS) has a world prevalence of 1-3% (Weinsten et al., 2008), 2.55% in Malaysia (Deepak et al., 2017), compared to the previous method of “wait and see” (Negrini, S. 2008) approach the conservative treatment available for AIS has evolved for the past few years. This study aims to present the possibility to embrace changes on how AIS is treated conservatively.

Methods

Fifteen children with AIS (mean age: 13.13 ± 1.96 years, range: 9–17; mean disease duration: 1.27 ± 0.59 years; Type: Lumbar = 8, Thoracic = 6, Double = 1) underwent customized scoliosis treatment developed by *My Scoli Physio*. The treatment, involved a combination of Physiotherapeutic Scoliosis- Specific Exercise (PSSE), Pilates for scoliosis, and scoliosis-specific manual therapy (45–50 minutes per session, once or twice weekly, for 24 – 48 weeks). Cobb angles were used as the outcome measure for disease severity (°). A paired-sample t-test was used to determine the difference between pre- and post-intervention Cobb angles. Bonett’s delta was used to determine the effect size of the group differences, with 0.2, 0.5, and 0.8 indicate small, medium, and large effect sizes, respectively.

Results

Cobb angles pre- and post-interventions were $40.87^\circ \pm 10.89$ (range = 21° – 55°) and $27.87^\circ \pm 11.53$ (range: 5° – 43°), respectively. Treatment intervention by *My Scoli Physio* significantly improved the Cobbs angles with a large effect size [$t(14) = 9.23$, $p < .001$, Bonett’s delta = 1.16]. A pre- and post- intervention X-ray of a participant is shown in Figure 1.

Conclusion

Our pilot study showed scoliosis therapy by *My Scoli Physio* effectively improved Cobb angles ranged 21° – 55° in children with AIS. Future studies necessitate a randomised controlled trial to confirm the effect of the treatment protocol.

EPP4

PARIETAL RTMS INDUCED CHANGES IN CORTICAL EXCITABILITY IN PATIENTS WITH MINIMALLY CONSCIOUS STATE USING TMS-EEG

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Objective

Behavioural and electrophysiological evidence supporting the therapeutic efficacy of high-frequency repetitive transcranial magnetic stimulation (rTMS) on the parietal cortex on consciousness improvement in patients with minimally conscious states (MCS) has not been firmly established. The aim of this study is to verify the effectiveness of the parietal rTMS and take advantage of TMS-EEG to assess cortical excitability induced by high-frequency rTMS on the parietal cortex in patients with MCS.

Methods

We enrolled 10 patients with MCS, who received 10 sessions of 10 Hz rTMS on the parietal cortex for 10 consecutive days and then 10 days of sham stimulation after a 14-day wash-out period. The Coma Recovery Scale-Revised (CRS-R) and TMS-EEG were used to assess the levels of the consciousness and cortical excitability before and after active and sham stimulation, respectively.

Results

Compared to sham stimulation, the CRS-R analysis revealed a clinically significant improvement in MCS patients after receiving active rTMS ($p = 0.004$). The amplitude of components of TMS-evoked potential (TEP) after active stimulation got significantly increased at 30ms ($p=0.005$), 60ms ($p = 0.012$) and 180ms ($p = 0.001$) respectively; global brain power increased significantly ($p = 0.024$) especially during the time window from 1 to 100 ms ($p = 0.004$) and 201 to 300 ms ($p = 0.030$). The PClst values had a significant difference ($p < 0.05$) after active rTMS stimulation, and the CRS-R scores showed significant correlation with PClst values before ($r = 0.82$, $p = 0.004$) and after ($r = 0.89$, $p < 0.001$) active stimulation.

Conclusion

High-frequency rTMS on the parietal cortex has therapeutic efficacy for behavioural improvement and can improve the cortical excitability in patients with MCS. Our results provide preliminary evidence to support the use of the parietal as a potential therapeutic target for MCS patients in clinical practice.

EPP5

STRUCTURAL AND FUNCTIONAL BRAIN NETWORK ABNORMALITIES IN POST-STROKE APHASIA

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Background and aims

This study investigates structural and functional abnormalities in ventral and dorsal brain networks of post-stroke aphasia (PSA) patients, aiming to elucidate the neural mechanisms underlying language impairments.

Methods

35 PSA patients and 35 age-, gender-, and education-matched healthy controls were recruited. Participants underwent language assessments using the Western Aphasia Battery (WAB) and Communication Activities of Daily Living (CADL) scale, as well as resting-state functional MRI (rs-fMRI) and diffusion tensor imaging (DTI) scans. Graph theory analysis was applied to evaluate brain network properties, and specific white matter tracts were measured using diffusion tensor reconstruction and fiber tractography. Correlations between imaging metrics and behavioral assessments were explored.

Results

PSA patients showed significantly reduced language abilities, with lower WAB and CADL scores ($P=0.001$). Structural abnormalities included reduced fractional anisotropy (FA) in the ventral network's bilateral IFOF ($P<0.001$), bilateral ILF ($P<0.001$), and left UF ($P<0.001$), and the dorsal network's bilateral SLF ($P<0.001$, $P=0.002$). Axial diffusivity (AD) was higher in the left IFOF ($P=0.003$), right UF ($P=0.004$), and left SLF ($P<0.001$). Radial diffusivity (RD) and mean diffusivity (MD) were also elevated. Functionally, PSA patients exhibited increased small-worldness ($P=0.003$) and local clustering coefficient (LCC, $P=0.001$) in both networks, but decreased degree centrality (DC) in certain regions. FA in the left IFOF correlated positively with auditory comprehension ($P=0.005$), while FA in the right IFOF correlated negatively with repetition ($P=0.002$).

Conclusion

PSA patients exhibit significant structural and functional abnormalities in ventral and dorsal brain networks, particularly in white matter integrity, which affects overall network function. These findings provide insights into the neural mechanisms of language impairments after stroke.

EPP6

DEVELOPMENT AND RELIABILITY ASSESSMENT OF THE JAPANESE VERSION OF THE VISUAL VERTIGO ANALOG SCALE (VVAS-J)

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Background and aims

Visual vertigo is a type of dizziness triggered by visual stimuli. There is no Japanese evaluation scale for visual vertigo. Therefore, this study aimed to develop a Japanese version of the Visual Vertigo Analog Scale (VVAS-J) and examine its reliability.

Methods

The VVAS-J was developed with the permission of the original author and following cross-cultural translation guidelines. The VVAS-J assesses dizziness severity in nine different situations. The study included 150 adult patients (50 males; mean age: 59.3 ± 18.7 years) who visited a clinic with dizziness as their chief complaint. The test-retest method was used to evaluate the reliability of the VVAS-J. VVAS severity was calculated by dividing the total score by the number of responses and multiplying by ten, with values ranging from 0 to 100.

Results

The test-retest reliability of the VVAS-J was assessed using Spearman's correlation coefficients, which ranged from 0.698 to 0.897 across all nine situations, demonstrating statistically significant reliability ($p < 0.01$). Notably, high reliability was observed in scenarios such as "being in shopping centers" ($r = 0.897$), "at movies at the theatre" ($r = 0.835$), and VVAS severity ($r = 0.886$).

Conclusion

The results indicate that the VVAS-J is a reliable assessment tool for visual vertigo. The strong test-retest correlations suggest that the VVAS-J provides consistent measurements for evaluating dizziness induced by visual stimuli. Particularly, situations commonly encountered in daily life showed high reliability. Future studies should investigate the validity and clinical applicability of the VVAS-J to support its use in diagnosing and managing visual vertigo.

EPP7

THE EFFECT OF SEGMENTAL HYPER-MOBILITY ON DEVELOPMENT OF CERVICAL DISC DEGENERATION

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Background and aims

Cervical degenerative joint disease (DJD) commonly affects the middle segments (C3-C6) of the spine, but the mechanism behind this pattern remains unclear. While factors such as age, BMI, and lifestyle have been identified as contributing elements to DJD development, repetitive movements and mechanical stress have been demonstrated to play a crucial role. The middle segment may experience hypermobility during neck movements as upper and lower segments are relatively fixed. This study aims to assess segmental movement ratios and their correlation with DJD prevalence.

Methods

This retrospective study analysed cervical spine motion in patients who underwent cervical MRI. Exclusion criteria included prior cervical surgery, congenital spinal anomalies, movement disorders, and severe disc degeneration (Grade 4). Cervical mobility was assessed using lateral radiographs taken in neutral, flexion, and extension positions. The segmental angles from C2-3 to C6-7 were measured, and the difference between flexion and extension angles was calculated.

Results

Out of 182 patient charts reviewed, 88 were included in the final analysis after exclusions. The largest extension-flexion difference was observed at C4-5 ($12.77^\circ \pm 5.41^\circ$) and C3-4 ($11.96^\circ \pm 5.32^\circ$). Using C2-3 as reference, movement ratios showed highest variability at C3-4 ($9.89 \pm 46.38\%$) and C6-7 ($5.01 \pm 21.74\%$). Logistic regression analysis revealed that BMI ($p = .005$), middle cervical mobility ($p = .021$), and middle segment movement ratio ($p = .020$) were significant etiologic factors of DJD. A stepwise multiple regression model estimated the equation: This model explained 16.4% of the variance ($p < .001$).

Conclusion

The middle segment of the cervical spine exhibited signs of hypermobility in the middle-aged group. The most significant factors contributing to DJD were found to be BMI, followed by middle segment mobility and middle segment movement ratio. The joint effect of these factors on the prevalence of cervical DJD was modestly explained.

EPP8

A CASE OF REHABILITATION TREATMENT FOR YOUNG PATIENTS WITH NEPHROTIC SYNDROME COMPLICATED BY CEREBRAL INFARCTION UNDER THE MULTIDISCIPLINARY DIAGNOSIS AND TREATMENT MODEL

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Objective

This study aims to explore the application effect of the multidisciplinary team (MDT) model combined with advanced rehabilitation technologies such as brain-computer interface (BCI) and intermittent theta burst stimulation (iTBS) in the treatment of young patients with nephrotic syndrome (NS) complicated by cerebral infarction, to provide a reference for the rehabilitation treatment of similar complex cases.

Methods

The diagnosis and treatment process of a 25-year-old male patient with NS complicated by cerebral infarction was reported. A closed-loop rehabilitation model was adopted, with dynamic adjustment of the treatment plan through evaluations at three stages: initial admission, mid-term, and discharge. MDT was carried out, bringing together the strengths of multiple departments including the Department of Neurorehabilitation, Nephrology, Nutrition, Psychology, and Endocrinology. Meanwhile, intelligent rehabilitation technologies were applied, including iTBS under precise positioning via 3D magnetic resonance navigation, and a BCI based on motor imagery and steady-state visual evoked potentials to establish real-time "central-peripheral" closed-loop feedback training.

Results

After treatment, the patient's motor function, activities of daily living, and mental state were significantly improved. Specifically, the Fugl-Meyer Assessment (FMA) score increased from 45 to 57, and the Modified Barthel Index (MBI) score rose from 49 to 82. The classification of hemiplegic hand function recovered from disused hand to assistant hand B. The modified Ashworth scale (MAS) grade of the upper limb flexors decreased, and laboratory indicators such as 24-hour urine protein quantification also showed a tendency to improve.

Conclusion

For young patients with NS complicated by cerebral infarction who have multiple comorbidities and complex conditions, the implementation of a closed-loop rehabilitation model combined with MDT can effectively solve various problems in the rehabilitation process. Advanced technologies such as iTBS and hybrid BCI further enhance the rehabilitation effect by strengthening brain-muscle signal interaction and promoting neuroplasticity, providing valuable clinical reference for the rehabilitation treatment of similar complex cases.

EPP9

CLINICAL EFFICACY OF 3D-PRINTED PROSTHETIC HANDS IN UPPER LIMB AMPUTEES: FUNCTIONAL AND BIOMECHANICAL OUTCOMES

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Background and aims

Burn injuries often lead to severe functional impairments, including joint contractures and peripheral nerve damage, necessitating comprehensive rehabilitation interventions. Upper limb burns, particularly affecting the hand, can significantly reduce grip strength and dexterity. While conventional rehabilitation approaches are widely used, they have shown limited effectiveness in severe nerve-damaged cases. This study aims to assess the clinical utility of 3D-printed prostheses for upper limb amputees in improving hand function and quality of life.

Methods

A total of 11 patients with upper limb amputations due to severe burns (third- and fourth-degree) were included. 3D scanning technology was used to customize prostheses based on each patient's residual limb structure. Functional assessments were conducted before and 8 weeks after prosthesis application. The evaluations included Grip & Pinch Power Test, Jebsen-Taylor Hand Function Test (JTHFT), Modified Barthel Index (MBI), Michigan Hand Outcomes Questionnaire (MHQ), Trinity Amputation and Prosthesis Experience Scales-Revised (TAPES-R), OPUS Upper Limb Functional Status, and Skin Biomechanical Property Assessment.

Results

After 8 weeks of prosthesis use, grip strength and lateral pinch improved. JTHFT performance showed enhanced dexterity, with increased completion rates in writing, stacking, and object manipulation tasks. MBI and OPUS scores indicated improved independence in daily activities. MHQ revealed a reduction in pain and increased satisfaction with hand aesthetics. TAPES-R demonstrated positive psychosocial adaptation, with reduced activity restrictions. No significant skin complications were observed.

Conclusion

3D-printed prostheses significantly improved upper limb function and quality of life in burn-related amputees. The technology offers an affordable, customizable, and functionally beneficial alternative to conventional prostheses, supporting greater independence and social reintegration. Further long-term studies are needed to optimize design and assess durability.

EPP10

**THE IMPACT OF STRUCTURED PATIENT EDUCATION MATERIAL
IN IMPROVING CLINICAL AND BEHAVIORAL OUTCOMES
IN HOME-BASED CARDIAC REHABILITATION PROGRAMME
PARTICIPANTS: A RANDOMIZED CONTROLLED TRIAL STUDY**

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Background and aims

Cardiac Rehabilitation Programmes (CRPs) are crucial for ischemic heart disease (IHD) survivors, but barriers like distance, time constraints, and the COVID-19 pandemic limit participation. Home-Based Cardiac Rehabilitation (HBCR) offers flexibility but lacks the supervision of Centre-Based Cardiac Rehabilitation (CBCR), potentially reducing effectiveness. A newly developed printable Structured Patient Education Material (SPEM), created in an earlier study, was proposed to enhance patient knowledge and engagement in HBCR.

Methods

A two-arm, double-blind randomized controlled trial (RCT) was conducted at a single-centre Cardiac Rehabilitation Clinic from February to November 2024. Eligible participants were randomized into two groups: the intervention group received new interface, audio-visual SPEM, while the control group received standard educational material via an instant messaging app at the start of Phase 2 CRP (CRP-2). Both groups were followed for 12 weeks, with monthly follow-ups as part of standard HBCR care.

Results

Of 25 recruited participants, 21 (84%) completed the study. The intervention group showed greater improvement in the primary outcome, Metabolic Equivalent (METs), with a moderate effect size, though statistically insignificant. Secondary outcomes revealed higher Patient Education Materials Assessment Tool (PEMAT) scores, greater improvements in weight-to-height ratio (WHtR) with small-to-moderate effect sizes, better exercise adherence in the intervention group. LDL and HbA1c levels showed better improvements in the intervention group, though with small effect sizes. Both groups had similar improvements in The Attitudes and Beliefs about Cardiovascular Disease (ABCD) Risk scores, with no meaningful difference. Apart from PEMAT scores, which showed near-significant differences, all other secondary outcomes were statistically insignificant. All participants were non-smokers and reported full medication adherence. Main limitation factor for this study is small sample size.

Conclusion

SPEM demonstrated practical improvements in HBCR outcomes, although statistically insignificant. Larger studies are needed to confirm its impact and to optimize its implementation in HBCR programmes.

EPP11

VALIDATION OF A FALL RISK SCREENING TOOL IN HOSPITALIZED PATIENTS

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Background and aims

Fall risk screening is essential for an effective fall prevention program. The purpose of this study was to validate the Japanese Association of Rehabilitation Medicine (JARM) fall risk screening tool in hospitalized patients. The tool consists of six items: history of falls, walking ability, mental function, visual disturbance, urinary disturbance and medications. The score ranges from 0 to 10, with a higher score indicating a higher risk of fall.

Methods

The subjects were consecutive patients admitted to our hospital from April 2023 to March 2024. The inclusion criteria were patients aged 20 years or older. Our hospital is an acute care community hospital with 865 beds. All patients were assessed using the JARM fall risk screening tool on admission. Receiver operating characteristic (ROC) curve analysis was used to evaluate the relationship between fall incidence and the fall risk screening tool. Additionally, logistic regression analysis was conducted to identify important predictive factors.

Results

The study population consisted of 19420 patients with a mean age of 67.1 years and mean length of hospital stay of 14.5 days. Of those enrolled, 527 (2.7%) patients experienced a fall during hospitalization. The ROC curve showed an area under the curve (AUC) of 0.717 (95% CI: 0.696-0.739). The optimal cutoff point determined by the ROC curve was a score of 2/10, which resulted in a sensitivity of 80.1% and a specificity of 54.2%. In the logistic regression analysis, the following factors were found to have higher odds ratios (OR): walking ability, (OR 1.687, 95%CI 1.519-1.874), medications (OR 1.404, 95%CI 1.066-1.849), history of falls (OR 1.289, 95%CI 1.162-1.430).

Conclusion

The sensitivity of the fall risk screening was considered acceptable. The most important predictive factor was walking ability. To improve the accuracy of the fall screening tool, its reproducibility should be validated in each hospital.

EPP12

INCIDENCE AND RISK FACTORS OF URINARY TRACT INFECTIONS AMONG PATIENTS IN A REHABILITATION WARD

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Background and aims

Urinary tract infections (UTIs) are common complications in rehabilitation settings, leading to prolonged hospital stays and poorer outcomes. While UTI risk in spinal cord injury (SCI) patients is well-documented, data on broader rehabilitation populations remain limited. This study aims to determine the incidence of UTIs in a rehabilitation ward and identify associated risk factors, including demographics, medical conditions, functional status, and bladder management. Additionally, we will assess antimicrobial resistance patterns among UTI-causing organisms.

Methods

A prospective observational study will be conducted from January 2024 to February 2025, enrolling over 160 patients admitted to the rehabilitation ward of Hospital Kuala Lumpur. Data collected will include demographics, comorbidities, bladder and bowel management, mobility status, functional scores, length of stay and other clinical parameters. UTI diagnosis will be based on clinical and laboratory criteria. Urine culture results will classify organisms as resistant or non-resistant. Statistical analyses will determine associations between risk factors and UTI occurrence.

Results

Data collection and analysis are ongoing. We anticipate identifying key risk factors contributing to UTI incidence, particularly modifiable factors such as bladder management techniques, hydration status, and antibiotic exposure. The study will also determine the prevalence of antibiotic-resistant pathogens among UTI cases.

Conclusion

Findings from this study will provide insights into UTI epidemiology in rehabilitation populations, guiding evidence-based infection prevention strategies and optimizing patient outcomes in post-acute care settings.

EPP13

PRELIMINARY EXPLORATION OF AN INTEGRATED TRADITIONAL CHINESE AND WESTERN MEDICINE “COMPREHENSIVE REHABILITATION” MODEL

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Background and aims

The globalization of rehabilitation technologies drives the integration of traditional and modern approaches, sparking locally adapted explorations of integrated Traditional Chinese Medicine (TCM) rehabilitation models.

Methods

The hospital's TCM department and rehabilitation medicine department were integrated to form a big rehabilitation center, with a director appointed to manage and plan the center as a whole. The “one rehabilitation prescription for the entire hospital” and “one TCM prescription for the entire hospital” were implemented. A comprehensive set of measures, including traditional Chinese medicine and modern rehabilitation techniques, were used to provide systematic, personalized rehabilitation medical services to all patients in the hospital.

Results

A comprehensive rehabilitation medical center with distinct features of integrated Chinese and Western medicine rehabilitation was established. This truly reflected the “comprehensive rehabilitation” concept centered on patients, achieving full coverage of rehabilitation in all clinical disciplines and throughout the entire disease cycle. Since the reform, the early rehabilitation intervention rates in orthopedics and neurology have reached 91- 97%, and the average length of hospital stay has been significantly reduced, with a 2-day reduction in orthopedics. The Activities of Daily Living (ADL) improvement rate of stroke patients has been increasing year by year. The influence of the rehabilitation medicine department has been significantly enhanced, with a complete rehabilitation education system covering undergraduate, master's, doctoral, and postdoctoral programs. The hospital has become the vice-presidency unit of the Hunan Rehabilitation Medical Society, the chairmanship unit of the Pain Rehabilitation and Rehabilitation Education Committees of the Hunan Rehabilitation Medical Society, and has been approved as a flagship hospital of integrated Chinese and Western medicine in Hunan.

Conclusion

Developing a “comprehensive rehabilitation” theory and technology system with Chinese characteristics, integrating TCM and Western medicine advantages, is the inevitable path for advancing China's rehabilitation medicine.

EPP14

THE PREDICTORS OF EFFECTIVENESS OF SPEECH THERAPY IN PRESCHOOL CHILDREN INCLUDE THE DURATION AND THE TIME STARTED TO RECEIVE THERAPY

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Background and aims

It is known that male gender and premature birth are risk factors of speech delay. However, there are few studies in the past explored on the factors influencing the effectiveness of speech-language therapy. The present study aimed to determine whether gender, birth history, age at which speech-language therapy was started, and treatment duration can influence the result of therapy.

Methods

Sixty children aged between three and six years old with language delay were included. They received evaluation using the Preschool Language Scale twice, one at the time of inclusion, the other at around six years old. Between these evaluations, they received individualized speech-language therapy. Factors including gender, premature birth, age at the time speech therapy started, and the duration of speech therapy were recorded.

Results

The scores of Preschool Language Scale significantly improved in nearly all subgroups, except expressive scores in boys, premature birth, age of starting speech therapy < 4 years old, and duration of intervention < 14 months. Receptive scores in those received speech therapy < 14 months also did not improve significantly. Regarding the amount of improvement, girls showed significantly greater improvement compared with boys in expressive ability, and those that received therapy for more than 14 months showed significantly greater improvement in receptive ability.

Conclusion

Speech-language therapy brought significant improvement in preschool children, especially in girls, full-term birth, receiving therapy after four years old, and a duration of therapy more than 14 months.

EPP15

DEVELOPMENT OF A STANDARDISED PULMONARY REHABILITATION (PURE) PATIENT EDUCATION PACK ACROSS MULTIPLE CENTRES IN ASIA: A COLLABORATIVE APPROACH TO ENHANCE RESPIRATORY CARE

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Background and aims

Chronic respiratory diseases (CRDs) significantly impact patients' quality of life. Pulmonary rehabilitation (PR) helps mitigate these effects through exercise, education, and support. PuRe trial is a randomised controlled Hybrid-1 implementation trial aiming to determine the clinical and cost effectiveness of Centre-PR vs Home-PR vs Usual Care for patients with CRDs in four low-resource Asian centres (Bangladesh, India and Malaysia). As a part of this trial, we aim to develop standardised action-focused patient-centred PR education resources (PuRe Pack) to empower and guide patients to understand and adapt PR.

Methods

We adopted a participatory and iterative approach, engaging our multidisciplinary PuRe research team to develop the PuRe Pack. We followed evidence-based guidelines and adapted them to fit the local context, creating standardised educational materials tailored for use in the diverse settings across the four centres. The PuRe pack was developed with largely pictorial content and easy-to-read print, keeping in mind low health literacy and "breathing" literacy and language barriers in the diverse cultural settings.

Results

The PuRe Pack includes tailored modules on basic physical and breathing exercises, their safety, symptom management particularly breathlessness, medication adherence, stress reduction which may often contribute to or be worsened by breathlessness, coping with activities-of-daily-living to support a healthy lifestyle. This comprehensive educational package aims to enhance PR adherence and it is easy to adapt. The format enables therapists to customise content to patients' needs while empowering patients to decide on their 'action plans' for exercise, smoking cessation, and self-management. It is adapted to local cultural contexts, and provides reliable, evidence-based information and links to relevant audio-visual resources including IPCRG resources (COPD Magazine and inhaler videos) and community contacts. It is available in both print and digital formats.

Lessons Learned

The development phase has underscored the importance of co-creation with multidisciplinary stakeholders, fostering cross-country partnerships, and addressing cultural and resource-specific needs.

Conclusion

Our next step is to translate the English version of the PuRe Pack into local languages and conduct pilot testing before using it in the trial.

EPP16

ANALYSIS OF THE CONSISTENCY OF FOREHAND BACKCOURT HITTING ACTIONS IN BADMINTON CHAMPION ATHLETES

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Background and aims

In badminton, the consistency of a player's movements significantly influences the pace and effectiveness of the game. This study aims to analyze the consistency of the hitting actions of Viktor Axelsen, the men's singles champion at the 2024 Paris Olympics. By utilizing AI vision techniques, the study examines the angles of the major body joints during forehand backcourt shots across 14 matches. The aim is to assess how consistent Axelsen's movements are during these key moments in the game.

Methods

The MMPose library was employed to recognize and calculate joint angles. The hitting actions of Axelsen were categorized into eight types: straight smash, left smash, right smash, straight drop, left drop, right drop, flat high, and long high. The study analyzed six primary joint angles: the right shoulder, right elbow, left/right hips, and left/right knees. It calculated the average values and standard deviations for each hitting type.

Results

The results showed that the average joint angles for smashes and drop shots demonstrated high consistency, with minimal differences between different directions of smashes and drops. However, significant differences in joint angles were found for flat high and long high shots compared to the other hitting types, indicating lower consistency in these actions.

Conclusion

The study provides insights into the consistency of Viktor Axelsen's hitting actions, with high consistency observed in smashes and drop shots. These findings can inform training methods and technique optimization for badminton players, and the approach can be expanded to analyze other types of badminton movements in future studies.

EPP17

ENHANCING QUALITY OF LIFE IN GERIATRIC PATIENTS WITH VERTEBRAL COMPRESSION FRACTURES: THE ROLE OF HOME EXERCISE PROGRAMS

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Background and aims

Vertebral compression fractures (VCFs) in geriatric patients often lead to significant pain, reduced mobility, and diminished quality of life (QoL), thus making it difficult to receive regular therapy at the Rehabilitation Center. The Home Exercise Program (HEP) is a solution that allows patients to continue their exercise at home. This case report demonstrates that the implementation of HEP in geriatric patients with vertebral compression fractures can effectively improve QoL.

Case report

The patient, a 67-year-old female with severe compression fractures at T9 and collapse of T10-11, complained of a 3-year history of worsening back pain exacerbated by movement. Physical examination revealed kyphotic posture, tenderness over T8-10, and paraspinal muscle spasms. Initial Comprehensive Geriatric Assessment showed mild frailty and mild ADL dependency. Radiographs confirmed severe compression fractures and kyphotic deformity. Thoracolumbosacral Orthoses (TLSO) was prescribed for spinal stabilization. Due to the patient's clinical condition including pain, mobility impairment, ADL limitations, and frailty, as well as logistical constraints such as distance, time, and financial considerations, the HEP was implemented. The HEP was designed to include multicomponent exercises: resistance training, balance exercises, postural correction, and modified trunk and lower extremity strengthening. The patient performed these exercises daily, with periodic telehealth consultations for monitoring and program adjustments.

Results

After 16 weeks, the patient reported reduced back pain, improved mobility, and better postural alignment. Muscle strength increased, enhancing balance and reducing fall risk. The Frailty Index Score improved, transitioning from mild frailty to non-frail. ADL independence was fully restored, demonstrating HEP's effectiveness in functional recovery. These improvements led to an overall enhancement in the patient's QoL.

Conclusion

This case highlights the benefits of structured HEP use in geriatric patients with VCFs. HEP can help reduce pain, reverse frailty, and restore ADL independence, ultimately improving QoL.

EPP18

EFFICACY OBSERVATION OF THE EARLY COMBINED APPLICATION OF RESPIRATORY CENTER REGULATION TECHNOLOGY (RCRT) IN REDUCING UPPER LIMB SPASM

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Objective

To explore the effectiveness and practicality of the early combined application of respiratory center regulation technology (RCRT) in reducing upper limb spasm, and to propose better treatment ideas for the early intervention of increased upper limb muscle tone.

Methods

A total of 50 stroke patients with increased muscle tone who were diagnosed and treated in the Department of Traditional Chinese Medicine Rehabilitation of the First Affiliated Hospital of Xi'an Jiaotong University from October 2023 to October 2024 were selected. According to the random number table method, they were divided into a control group and a research group, with 25 patients in each group. The patients in the research group received RCRT training combined with conventional rehabilitation exercises, while the control group only received conventional rehabilitation exercises. Both groups were treated 6 days a week, once a day, 40 minutes each time, for 5 consecutive weeks. The modified Ashworth scale, Fugl - Meyer score, and Barthel index of upper limb function were used to score the muscle tone, upper limb motor function, and activities of daily living of the two groups of patients before and after treatment, and the curative effects of the two groups were compared.

Results

After 5 weeks of treatment, the Barthel index scores, Fugl - Meyer score scales, and modified Ashworth scores of the two groups of patients were improved to varying degrees compared with those before treatment ($P < 0.05$).

Conclusion

The early intervention of respiratory center regulation technology (RCRT) can inhibit the upper limb muscle tone of stroke patients, then enhance the activity ability of the affected upper limb, improve the patients' daily living ability, and help patients return to their families and society as soon as possible.

EPP19

EFFECT OF BILATERAL CEREBELLAR RTMS ON SWALLOWING FUNCTION AND SWALLOWING PHASE IN PATIENTS WITH DYSPHAGIA AFTER STROKE

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Background and aims

To observe the effect of bilateral cerebellar high-frequency repetitive transcranial magnetic stimulation (rTMS) on swallowing function and swallowing phase in patients post-stroke dysphagia (PSD).

Methods

42 patients with PSD were randomly divided into bilateral cerebellar stimulation group and sham group (stimulating coil and scalp at a 90° angle). The resting movement threshold (RMT) stimulation parameters are 10 Hz, 120% RMT, with 9 second intervals and 1 second stimulus, totaling 500 pulses. Before and after 3-week treatment, the motor evoked potential (MEP) amplitude of the mylohyoid muscle of the bilateral cerebral cortex was recorded as an index to quantify the excitability of the cerebral swallowing cortex. The videofluoroscopic swallowing study (VFSS) was carried out for all patients before and after 3-week treatment, assessing the severity of dysphagia with functional dysphagia scale (FDS), assessing the risk of leakage and aspiration with Rosenbek penetration aspiration scale (PAS), and recording the swallowing phase.

Results

40 patients were finally included for statistical analysis. After three weeks treatment, PAS and FDS scores improved, and oral transit time (OTT) and swallow response time (SRT) were shorter in both groups. These indexes changed more significantly in the cerebellar stimulation group than the sham group. The MEP amplitudes of the cerebral swallowing cortex increased bilaterally, and the MEP amplitude of the contralateral cerebral swallowing cortex increased more significantly in the cerebellar stimulation group than that in the sham group.

Conclusion

To patients with PSD, bilateral cerebellar high-frequency rTMS can improve the swallowing function, increased the excitability of the contralesional cerebral swallowing cortex and shorten OTT and SRT. Cerebellar rTMS may improve swallowing performance by regulating motor control.

EPP20

ENHANCED UPPER LIMB REHABILITATION IN STROKE PATIENTS WITH BCI-DRIVEN PNEUMATIC EXOSKELETON TRAINING

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Background and aims

Conventional therapies (CT) for post-stroke upper limb rehabilitation often result in limited clinically significant improvements. Brain-computer interface (BCI)-based pneumatic hand exoskeleton training, which enhances motor intention decoding and activates central-peripheral neural pathways, presents a novel approach to functional reorganization. This study aimed to compare the efficacy of BCI-driven exoskeleton training with CT, assessing clinical significance through minimal clinically important difference (MCID) analysis.

Methods

A total of 127 stroke patients (BCI: n=60, CT: n=67) participated in 10 intervention sessions. The primary outcome measures included the Fugl-Meyer Assessment for Upper Extremity (FMA-UE total, proximal, and distal), the Action Research Arm Test (ARAT total, fine, and gross motor), the Wolf Motor Function Test (WMFT total, simple, and composite), and the Modified Barthel Index (MBI).

Results

Both groups showed significant post-intervention functional improvements ($p < 0.05$). However, the BCI group demonstrated superior outcomes across all measures, except for ARAT gross motor ($\Delta 1.5 \pm 1.97$ vs. $\Delta 1.55 \pm 3.86$, $p = 0.92$). Key results included: FMA-UE total ($\Delta 11.57 \pm 7.98$ vs. $\Delta 5.94 \pm 6.13$, $p < 0.01$), proximal ($\Delta 6.13 \pm 4.01$ vs. $\Delta 3.18 \pm 4.03$, $p < 0.01$), WMFT total ($\Delta 11.67 \pm 8.26$ vs. $\Delta 5.72 \pm 5.29$, $p < 0.01$), and MBI ($\Delta 18.03 \pm 13.58$ vs. $\Delta 7.52 \pm 10.24$, $p < 0.01$). MCID analysis revealed superior efficacy in the BCI group, with more patients achieving clinically meaningful improvements in FMA-UE (11/17 vs. 4/16, OR=5.52).

Conclusion

BCI-driven pneumatic training, through high-repetition precision assistance and neural pathway activation, offers significant improvements in both proximal and distal upper limb function. This approach shows promising potential for advancing post-stroke neurorehabilitation.

EP1

EFFECT OF TRANSCUTANEOUS VAGUS NERVE STIMULATION IN PROMOTING STROKE RECOVERY BY REGULATING GUT MICROBIOTA AND ITS METABOLITES

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Background and aims

Stroke, with high incidence and disability rates, is a leading cause of death worldwide, and effective treatments are limited. Improving rehabilitation and promoting neuroplasticity are urgent global challenges. Transcutaneous vagus nerve stimulation (taVNS) shows promise in stroke recovery, but its mechanisms remain unclear. This study investigates the neuroprotective effects of taVNS in a ischemic stroke mouse model and explores its underlying neural mechanisms.

Methods

In the MCAO model, taVNS was applied to stroke mice to assess its effects on brain injury, neurological recovery, neuroinflammation, and neuron survival using MRI, behavioral tests, and molecular analyses. 16S rRNA sequencing and metabolomics were used to evaluate taVNS's impact on gut microbiota, metabolites, and functional recovery. Additionally, using a BV2 microglia cell model, the effects of differential metabolites on LPS-induced neuroinflammation and potential signaling pathways were explored.

Results

The results showed that taVNS significantly reduced brain edema, decreased infarct volume, and improved motor and cognitive functions in MCAO mice. Furthermore, taVNS increased the number of neurons surrounding the infarct area, enhanced white matter integrity, suppressed neuroinflammation, and upregulated $\alpha 7$ nAChR expression. taVNS also significantly increased the species diversity of the gut microbiota in stroke mice and modulated the abundance of key metabolites, particularly N-acetyl-L-leucine (NALL). The increase in NALL significantly inhibited the inflammatory response in BV2 cells, including reducing the expression of pro-inflammatory factors IL-1 β , IL-6, and TNF- α , and modulated the polarization state of BV2 cells. Additionally, NALL alleviated neuroinflammation by inhibiting the activation of the MAPK pathway.

Conclusion

This study shows that taVNS offers significant neuroprotection in both acute and recovery phases of stroke by regulating gut microbiota, metabolites, reducing neuroinflammation, and promoting recovery. These findings highlight taVNS as a promising stroke therapy, revealing its potential in regulating the microbiota-gut-brain axis for neuroprotection. Future research should explore its clinical efficacy and long-term mechanisms.

EP2

HARNESSING EXTRACELLULAR VESICLES DERIVED FROM MESENCHYMAL STROMAL CELLS PREVENTS NECROPTOSIS OF OSTEOBLASTS IN OSTEONECROSIS OF THE FEMORAL HEAD RATS

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Background and aims

Osteonecrosis of the femoral head (ONFH) is recognized as a common refractory orthopedic disease in which steroids induce bone cell programmed deaths, such as necroptosis. Extracellular vesicles derived from bone marrow mesenchymal stromal cells (BMSC-EVs) are recognized as a novel therapy to improve ONFH. Pulsed electromagnetic fields (PEMFs) enhanced the biofunction of EVs and paracrine activity of MSCs. Nonetheless, the effect and mechanism of PEMFs preconditioning BMSC-EVs for treating ONFH are unclear.

Methods

The effects of PEMFs preconditioned BMSC-EVs were testified in desmosome-induced conditions in MC3T3-E1 cells *in vitro*. RNA sequencing was conducted to find potential mechanisms and necroptosis involving RIPK1, RIPK3, and MLKL signaling pathway was investigated. Micro-CT scan, histological, and immunohistochemical analysis were used to evaluate the therapeutic effects of PEMFs preconditioned BMSC-EVs in animal experiment.

Results

PEMFs preconditioning BMSC-EVs possessed similar characteristics, including nanoparticle shape, size, and typical markers. Results of RNA-sequencing indicated Ripk3 was one of the significantly different genes. *In vitro*, PEMFs with 3 milli Tesla amplitude preconditioning BMSC-EVs significantly reduced necroptosis and typical signaling (RIPK1, RIPK3, and MLKL) and osteogenesis. *In vivo*, results have shown that PEMFs preconditioned BMSC-EVs regulate the expression of necroptosis and osteogenic factors.

Conclusion

These results highlight that PEMFs with 3 milli Tesla amplitude preconditioning BMSC-EVs could modulate osteoblasts necroptosis via Ripk1–Ripk3–Mkl signaling in ONFH.

EP3

ADVANCES IN MECHANISM AND MANAGEMENT OF BONE HOMEOSTASIS IN OSTEONECROSIS

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Background and aims

Osteonecrosis is characterized by the death of bone cells, leaving affected bones hard to recover. Bone homeostasis is a challenge for this disease, which depends on the precise balance between osteoclasts and mesenchymal lineage osteoblasts, and involves a series of complex and highly regulated biofunctions. So far, there are limited strategies to treat osteonecrosis, the effects are unsatisfactory and the mechanisms are still unclear.

Methods

We searched Web of Science, PubMed, and Scopus Database from 2013 to December 2023, using the Mesh terms, keywords, and combinations, such as risk factor and (osteonecrosis or ONJ or ONFH), (pathology or molecular mechanism) and (osteonecrosis or ONJ or ONFH) and (bone homeostasis or osteoblast or osteoclast or MSC), (treatment or therapy or surgery or biomaterials) and (osteonecrosis or ONJ or ONFH) and clinical trials.

Results

We summarized risk factors, such as pregnancy, autoimmune and malignancy metastatic diseases, trauma, alcohol intake, especially the use of bisphosphonates and glucocorticoids, and novel mechanisms involved in the pathological process, including the roles of apoptosis, dysfunction of osteoclasts, immune and inflammation factors, adipogenic differentiation, cell senescence, hematology impairment, and fibrosis. Based on various regulatory mechanisms of bone homeostasis and the risk factors, we have attempted to logically connect current pathways to these mechanisms and summarize the current treatments hierarchically. Based on the above pathological mechanism and current roadblocks, including complex pathways, impervious targets, progenitor inadequacy, and few therapeutic strategies for anti-inflammation and fibrosis. Furthermore, we figured that future research should be directed at elucidating pathophysiology and identifying new targets, searching for an optimal cell origin, optimizing synthetic biomaterials, developing strategies about chimeric antigen receptor-T cells, engineered cell-based and relevant produce, and considering pragmatic trials within to ascertain the optimal treatment options.

Conclusion

This study may provide an important basis for elucidating the complex pathological mechanisms of osteonecrosis and provide promising novel strategies for current and future clinical treatment.

EP4

PERIPHERAL NERVE MICROCURRENT STIMULATION: A NOVEL APPROACH TO NEUROPROTECTION IN A RAT MCAO MODEL

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Background and aims

Our previous studies indicate that applying microcurrent electrical stimulation therapy (less than 1000 μ A, imperceptible to the patient) to peripheral nerves may mitigate cognitive decline and neuroinflammation in Alzheimer's disease. This study aims to investigate the neuroprotective benefits of peripheral nerve microcurrent stimulation therapy in a rat model of middle cerebral artery occlusion (MCAO).

Methods

This experiment involved twenty male Sprague-Dawley rats, aged eight weeks and weighing between 300 and 330 grams, categorized into four groups: Group-A (Control) remained untreated as the healthy baseline. Group-B (Disease) underwent MCAO without further intervention. Group-C (Treatment Post-MCAO) was administered microcurrent therapy immediately following MCAO for one week. Group-D (Prevention and Recovery) was treated with microcurrent therapy for a week before and after MCAO. Comprehensive assessments included gross morphological inspections, motion behaviour analytics, histological analyses, immunohistochemical evaluations, and protein expression analysis via Western blot.

Results

The application of microcurrent therapy markedly diminished ischemic injury and preserved pyramidal cells in the hippocampal CA1 area. H&E staining revealed no infarction and a pyramidal cell count of 261.78 ± 3.82 in Group-A, $28.55\% \pm 1.05\% / 94.51 \pm 6.35$ in Group-B, $17.35\% \pm 0.83\% / 184.13 \pm 4.66$ in Group-C, and $5.40\% \pm 0.50\% / 237.80 \pm 3.65$ in Group-D ($*p < 0.05$). Behavioural tests indicated that total movement distances and average speeds were significantly higher in Groups C and D compared to Group B ($*p < 0.05$), suggesting improved mobility. Levels of inflammatory markers such as CD68, IL-6, and TNF- α were significantly reduced in the treatment groups ($*p < 0.01$). Western blot results indicated a decrease in proteins associated with inflammation, oxidative stress, and apoptosis, and an increase in angiogenesis markers and MAPK pathway activity in groups receiving therapy.

Conclusion

Peripheral nerve microcurrent stimulation therapy is a potent intervention that significantly reduces ischemic injury, enhances recovery, lowers inflammation, and alters protein expressions, demonstrating significant promise as a treatment modality for ischemic stroke.

EP5

A NOVEL MECHANISM OF XUEBIJING INJECTION AGAINST ACUTE LUNG INJURY: INHIBITING MERTK LACTYLATION TO ENHANCE EFFEROCYTOSIS OF ALVEOLAR MACROPHAGES AND SUPPRESS INFLAMMATORY RESPONSE

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Background and aims

Acute lung injury (ALI), characterized by high mortality, lacks effective therapeutic strategies. Xuebijing Injection (XBJ) has demonstrated clinical efficacy against ALI, but its mechanisms remain incompletely understood. Efferocytosis, the process by which macrophages phagocytose and clear apoptotic cells, plays a critical role in inflammation resolution. Impaired efferocytosis in alveolar macrophages (AMs) contributes to exacerbated inflammatory responses in ALI. MerTK interacts with its ligand ProS1 to regulate macrophage efferocytosis and inflammation resolution. However, the role of MerTK lactylation in ALI pathogenesis has not been fully characterized. This study aimed to investigate whether XBJ alleviates ALI-associated inflammatory injury by inhibiting MerTK lactylation and enhancing AM efferocytosis.

Methods

LPS-induced ALI mouse and in vitro AM inflammatory models were established. Lung injury severity was assessed using wet/dry weight ratios and histopathological staining. Efferocytosis in AMs was analyzed by flow cytometry and immunofluorescence. Apoptotic cells were quantified via TUNEL staining. Serum inflammatory cytokines (IL-1 β , TNF- α , IL-6) were measured by ELISA. Gene expression of efferocytosis-related markers (ProS1, MerTK) and lactate metabolism regulators (PKM2, HK2, LDHA) was analyzed by RT-PCR. Lactate levels were determined with a lactate assay kit. Pan-lactylation (PanKla) and lactylation transferase (AARS1) were assessed by Western blot. MerTK interactions with PanKla and AARS1 were confirmed using Co-IP.

Results

XBJ significantly ameliorated pulmonary inflammation and edema in ALI mice, decreased serum inflammatory cytokines, and enhanced AM efferocytosis. XBJ upregulated ProS1 and MerTK expression while downregulating PKM2, HK2, and LDHA. Additionally, XBJ reduced lactate levels in lung tissues and AMs, suppressed PanKla and AARS1 expression, and attenuated MerTK-PanKla and MerTK-AARS1 interactions.

Conclusion

XBJ mitigates ALI-associated inflammation by inhibiting MerTK lactylation and AARS1-mediated enzymatic activity, thereby enhancing AM efferocytosis. This is the first study to identify MerTK lactylation as a regulatory mechanism in ALI, providing novel mechanistic insights into XBJ's therapeutic effects.

EP6

METABOLOMICS AND 16S RDNA REVEAL THE MECHANISM OF XUEBIJING INJECTION IN ALLEVIATING ACUTE LUNG INJURY THROUGH MODULATION OF THE “MICROBIOTA-GUT-LUNG” AXIS TO SUPPRESS INFLAMMATORY RESPONSES

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Background and aims

Acute Lung Injury (ALI) is associated with high mortality rates and lacks specific therapeutic interventions. Traditional Chinese Medicine (TCM) demonstrates significant potential in ALI management, exemplified by Xuebijing Injection (XBJI), though its mechanisms remain incompletely elucidated. Emerging evidence implicates gut microbiota dysbiosis in ALI pathogenesis via the “gut-lung” axis, aligning with the TCM theory of “the lung and large intestine being interior-exteriorly related.” Balancing pulmonary-intestinal interactions is thus critical in ALI treatment under TCM principles. Consequently, investigating ALI pathogenesis through the “microbiota-gut-lung” axis and proposing novel therapeutic strategies targeting gut microbial homeostasis under the “dual regulation of lung and intestine” paradigm holds substantial clinical relevance. This study aims to elucidate the anti-inflammatory mechanisms of XBJI against ALI through the “microbiota-gut-lung” axis.

Methods

An ALI rat model was established via intratracheal LPS instillation (5 mg/kg). Rats were randomized into: normal group, ALI model group, low-/high-dose XBJI groups, and dexamethasone control group. Post-intervention, pulmonary damage was assessed through lung wet/dry weight ratio and histopathological analysis. Serum inflammatory cytokines (IL-1 β , TNF- α , IL-6) were quantified by ELISA. Metabolomic profiling and 16S rDNA sequencing were employed to investigate XBJI's mechanistic pathways.

Results

XBJI significantly attenuated pulmonary inflammation/edema and reduced serum proinflammatory cytokines in ALI rats. Metabolomics identified 301 XBJI-modulated metabolites, including biomarkers like Nonadecanoic acid, Pristanic acid, and Guanidoacetic acid, primarily associated with sphingolipid and tyrosine metabolic pathways. 16S rDNA analysis revealed reduced alpha-diversity indices (Ace, Chao, Shannon) in the model group, ameliorated by XBJI through enriching beneficial taxa (Firmicutes, Bacteroidota, Actinobacteriota) while suppressing pathogenic genera (Proteobacteria, Desulfobacterota, Verrucomicrobiota, Campylobacterota). Integrated analysis demonstrated correlations between differentially abundant metabolites and microbiota.

Conclusion

XBJI alleviates ALI-associated inflammation and pulmonary injury, potentially via restoring gut microbiota-metabolite homeostasis. This multitarget modulation through the “microbiota-gut-lung” axis underscores XBJI's therapeutic potential as a holistic ALI treatment agent.

EP7

EXPLORING THE MECHANISM OF ERZHI PILL IN INHIBITING OSTEOCLAST ACTIVATION FOR THE TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS THROUGH THE MICROBIOTA-GUT-BONE AXIS

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Background and aims

Postmenopausal osteoporosis (PMOP), characterized by decreased bone mass and microstructural deterioration, is critically associated with estrogen deficiency-induced excessive osteoclast activation. Emerging evidence suggests that gut microbiota participates in bone metabolism homeostasis through microbial metabolites and immunomodulatory effects, establishing a “Microbiota-Gut-Bone” axis. Erzhi Pill (E郑), a classic traditional Chinese medicine formula for nourishing the liver and kidney, has demonstrated potential therapeutic effects against PMOP clinically. However, its mechanism of action related to this axis remains unclear. This study aimed to elucidate the therapeutic mechanism of E郑 in suppressing osteoclast activation for PMOP treatment from the perspective of the Microbiota-Gut-Bone axis.

Methods

Ovariectomized (OVX) rats were established as PMOP models and randomized into sham, OVX model, E郑 low/medium/high-dose, and estrogen-treated control groups. After 12-week intervention, bone histopathology was assessed via H&E staining, osteoclast quantity via TRAP staining, and serum osteoclast markers (CTX-I, TRACP-5b, CTSK, MMP-9) via ELISA. OPG-RANK-RANKL pathway and NFATC1, c-fos were analyzed using RT-qPCR and Western blotting. Gut microbiota composition and metabolites were profiled through 16S rDNA sequencing and metabolomics.

Results

E郑 significantly attenuated bone loss and restored trabecular microstructure in OVX rats. TRAP staining revealed reduced osteoclast numbers, accompanied by increased serum estrogen and decreased CTX-I, TRACP-5b, CTSK, and MMP-9 levels. Molecular assays demonstrated downregulated RANKL/OPG ratio and suppressed NFATC1/c-fos expression. 16S rDNA analysis indicated E郑 rectified OVX-induced dysbiosis by enriching Short-chain fatty acids (SCFAs)-producing genera (Firmicutes, Bacteroidota, Proteobacteria, Actinobacteriota, Verrucomicrobiota) while suppressing pro-inflammatory taxa (Campylobacterota, Desulfobacterota). Metabolomics revealed E郑-modulated metabolic pathways including nicotinate/nicotinamide metabolism and tyrosine metabolism.

Conclusion

This study first clarifies that E郑 alleviates PMOP through gut microbiota remodeling, SCFAs promotion, metabolic normalization, and subsequent inhibition of osteoclastogenesis via OPG/RANK/RANKL pathway regulation. These findings experimentally validate the gut-microbiota-bone axis in PMOP management and provide novel insights into traditional herbal formulas for metabolic bone disorders.

EP8

THE ROLE OF AEROBIC EXERCISE IN ENHANCING SENSITIVITY TO CHEMOTHERAPY TREATMENT FOR COLORECTAL CANCER

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Background and aims

Colorectal cancer (CRC) is one of the malignant tumors with high incidence and mortality rates worldwide. Currently, the overall treatment outcomes for colorectal cancer patients are not ideal, and issues such as drug resistance and chemotherapy side effects remain significant. Aerobic exercise can improve and reduce the incidence and recurrence risks of various cancers through multiple mechanisms. Investigating the sensitization effect of aerobic exercise on chemotherapeutic agents in colorectal cancer, and exploring its influence on tumor lactate metabolism and transport, as well as the metabolic reprogramming of the tumor microenvironment, are important areas of research.

Methods

BALB/c mice were divided into the following groups: control, exercise, oxaliplatin, oxaliplatin combined with exercise. The control group were administered physiological saline. The exercise group was subjected to exercise at an intensity of 15 m/min for 45 min/day, 6 consecutive days per week. The oxaliplatin at a concentration of 8 mg/kg. After 3 weeks, mice from all groups were euthanized. Tumor volume and body weight were measured. Tumor lactate concentration was determined using a lactate assay kit. The expression levels of proteins related to lactylation in the tumors were detected using Western blotting. Immunohistochemistry was performed to stain tumors with Ki-67 for each group.

Results

The tumor volume of the exercise-chemotherapy combined group showed statistically significant differences compared with the other groups ($p < 0.05$). The lactate content in the tumors of mice in the exercise-chemotherapy combined group was significantly lower than that of the other groups ($p < 0.05$). The Ki-67 expression in exercise-chemotherapy combined group was lower than that of the other groups ($p < 0.05$).

Conclusion

Moderate-intensity aerobic exercise can enhance the tumor-killing effect of chemotherapy drugs on colorectal cancer, and the mechanism may involve exercise influencing lactate levels within tumors, which may be associated with tumor metabolic reprogramming.

EP9

INVESTIGATION OF RESPIRATORY MOVEMENTS IN PATIENTS WITH PARKINSON'S DISEASE USING A THREE-DIMENSIONAL MOTION ANALYSIS

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Background and aims

Parkinson's disease is associated with breathing problems as the disease progresses. Aspiration pneumonia is known as a major cause of death. OEP (Opto-Electronic Plethysmography) can noninvasively assess human respiratory movements by analysing the movement of infrared reflective markers placed on the chest and abdomen. The aim of this study was to investigate the effect of posture on breathing in patients with Parkinson's disease.

Methods

The subjects were 5 patients with Parkinson's disease, 52-77 years, 2 women, 1 Hoehn and Yahr stage I, 4 stage III. Forty-five reflective markers were placed in predetermined positions on the chest wall of patients lying supine on a moulded bed. To determine the reference plane on the bed, four markers were placed in positions not covered by the subject's body on the backrest; the movement of all markers was recorded using eight infrared cameras (VERO, Vicon Motion Systems Ltd., Oxford, UK). Patients took several quiet breaths followed by a deep breath. The movements of each marker during the protocol were analysed with dedicated movement analysis software (NEXUS2, Vicon Motion Systems Ltd, Oxford, UK). The data were recorded in the supine and 60° head elevated position. The chest wall was divided into three compartments: upper thorax, lower thorax and abdomen, and the respective volume changes were calculated.

Results

There was a trend towards a decrease in % vital capacity as UPDRS scores increased, and restrictive impairment was observed in the 3 cases that progressed. A trend towards abdominal dominance in the Konno Mead diagram was observed as the patient progressed in the prone position, but was not evident in the 60° head elevation.

Conclusion

Lung capacity decreased with the progression of symptoms in Parkinson's disease, but it was thought that muscle weakness and abnormal muscle tone affected breathing more than the effect of posture.

EP10

AUTOPHAGY AND INFLAMMATORY MECHANISMS IN PARKINSON'S DISEASE COMPLICATED WITH PERIPHERAL NEUROPATHY

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Background and aims

Parkinson's disease (PD) is an age-related neurodegenerative disorder characterized by loss of dopaminergic neurons in substantia nigra pars compacta and formation of Lewy bodies composed of aggregated phosphorylated α -synuclein (p- α -syn). Besides motor symptoms, PD patients often exhibit non-motor symptoms such as limb paresthesia. Due to the early onset, severity, and lack of effective treatment options, investigations on these symptoms are of great significance. We hypothesize that p- α -syn deposition also occurs in peripheral nerves and is involved in autophagic dysfunction. This study aims to explore the autophagic and inflammatory mechanisms of p- α -syn accumulation in peripheral nerves during the courses of PD disease based on a PD animal model.

Methods

C57BL/6J male mice aged 4 months were randomly selected. The chronic PD model respectively induced by Saline and 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) was prepared. Immunofluorescence staining of p- α -syn, autophagy indexes (LC3, p62) and inflammatory markers (NLRP3, IL-1 β) were detected in sciatic nerves of Saline and MPTP mice. The expression levels of p- α -syn, LC3II/I, p62, NLRP3, and Caspase 1 were confirmed using Western Blotting analysis in sciatic nerves of two mice groups.

Results

Compared with the Saline group, the MPTP group mice showed an increase in p- α -syn deposition, a significant decrease in LC3, an increase in p62, and an increase in NLRP3, IL-1 β , and Caspase 1 expression.

Conclusion

In addition to the central nervous system, peripheral nerves in the pathology of PD also exhibit p- α -syn deposition, inflammatory activation, and autophagic dysfunction. It is speculated that dysfunction of autophagy may be one of the probable causes of pathological protein deposition, and inflammatory activation accompanying may further exacerbate PD lesions. Autophagic pathway disorder is likely a potential molecular marker for the treatment of PD peripheral neuropathy, and may become a reliable predictor of rehabilitation efficacy for PD patients in the future.

EP11

THE EFFECT OF PLATELET-RICH PLASMA ON SYNOVIAL FIBROSIS AND CARTILAGE DEGENERATION IN KNEE OSTEOARTHRITIS

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Background and aims

Synovial fibrosis is a prevalent pathological feature of osteoarthritis (OA) and a primary contributor to joint pain and stiffness. Studies indicate that platelet-rich plasma (PRP) is rich in growth factors and cytokines, exhibiting anti-inflammatory, anti-apoptotic, chemotactic, and proliferative properties that can facilitate tissue repair. However, little is known about its effect on synovial fibrosis and cartilage degeneration in knee osteoarthritis (KOA).

Methods

Anterior cruciate ligament transection was performed to induce KOA in male Sprague-Dawley rats, and then rats were randomly assigned to four different groups: sham operation, KOA only, KOA treated with phosphate-buffered saline (PBS), and KOA treated with PRP. Synovial collagen fiber deposition was observed using Masson and Sirius red staining and synovial inflammation was assessed by hematoxylin-eosin (H&E) staining. Moreover, immunohistochemistry (IHC) was conducted to analyze the expression of synovial fibrosis-related factors including PLOD2, COL1A1, TIMP1, TGF- β 1, and α -SMA. KOA severity and articular cartilage degradation were assessed through micro-computed tomography (micro-CT), safranin O-fast green staining, H&E staining, IHC and the Osteoarthritis Research Society International (OARSI) criteria.

Results

Compared with KOA and PBS group, Masson staining and Sirius red staining results showed that PRP aggravated the degree of synovial fibrosis which was consisted with the results of IHC analysis. IHC analysis showed that PRP promoted the protein expression of PLOD2, COL1A1, TIMP1, TGF- β 1 and α -SMA, indicating that the degree of fibrosis was aggravated. However, the PRP group showed lower OARSI and synovitis scores, as well as attenuated abnormal tibial subchondral bone remodeling, suggesting that PRP inhibited further cartilage degeneration and synovial inflammation, and improved the subchondral bone microarchitecture.

Conclusion

PRP may aggravate KOA synovial fibrosis, but it still has an inhibitory effect on cartilage degeneration and abnormal subchondral bone remodeling.

EP12

LOW-INTENSITY PULSED ULTRASOUND REGULATES BONE MARROW MESENCHYMAL STROMAL CELLS DIFFERENTIATION AND INHIBITS BONE LOSS BY ACTIVATING THE IL-11-WNT/ β -CATENIN SIGNALING PATHWAY

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Background and aims

Osteoporosis (OP) is a prevalent metabolic bone disorder characterized by reduced bone density and compromised bone strength. Low-intensity pulsed ultrasound (LIPUS) has demonstrated significant efficacy in enhancing bone formation and accelerating fracture healing. The Wnt/ β -catenin signaling pathway plays a pivotal role in maintaining bone homeostasis and is frequently dysregulated in osteoporosis. Interleukin-11 (IL-11), a cytokine regulated by mechanical stress, is a key player in bone remodeling. This study investigates the optimal intervention parameters for LIPUS, the interplay between LIPUS, IL-11, and the Wnt/ β -catenin signaling pathway, and the effects of LIPUS on bone loss and potential molecular mechanisms in ovariectomized (OVX) mice.

Methods

Bone marrow mesenchymal stromal cells (BMSCs) were exposed to LIPUS for 0, 10, or 20 minutes to determine the optimal intervention duration. The role of IL-11 in mediating LIPUS effects was examined through IL-11 knockdown and overexpression. Subsequently, animal experiments were conducted to evaluate the in vivo therapeutic effects of LIPUS.

Results

The optimal intervention time for LIPUS was identified as 20 minutes. LIPUS significantly increased IL-11 expression and upregulated the Wnt/ β -catenin signaling pathway, thereby promoting osteogenic differentiation and inhibiting adipogenic differentiation of BMSCs. IL-11 was shown to mediate the regulation of the Wnt/ β -catenin signaling pathway by LIPUS. Furthermore, LIPUS effectively improved bone microstructure in OVX mice, inhibited bone loss, increased IL-11 expression in bone tissue, and activated the Wnt/ β -catenin signaling pathway in the femur.

Conclusion

Low-intensity pulsed ultrasound can regulate BMSCs differentiation and inhibit bone loss by promoting IL-11 expression and activating the Wnt/ β -catenin signaling pathway.

EP13

ROLES OF IL-11 IN THE REGULATION OF BONE METABOLISM

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Background and aims

Bone metabolism is the basis for maintaining the normal physiological state of bone, and imbalance of bone metabolism can lead to a series of metabolic bone diseases. As a member of the IL-6 family, IL-11 acts primarily through the classical signaling pathway IL-11/Receptors, IL-11 (IL-11R)/Glycoprotein 130 (gp130). The regulatory role of IL-11 in bone metabolism has been found earlier but mainly focuses on the effects on osteogenesis and osteoclasts. In recent years, more studies have focused on IL-11's roles and related mechanisms in different bone metabolism activities. IL-11 regulates osteoblasts, osteoclasts, bone marrow (BM) stromal cells, adipose tissue-derived mesenchymal stem cells, and chondrocytes. It's involved in bone homeostasis, including osteogenesis, osteolysis, BM hematopoiesis, BM adipogenesis, and bone metastasis.

Methods

From January 1992 to January 2023, use the keywords (Interleukin-11 OR Receptors, Interleukin-11), (Bone) AND (Interleukin-11 OR Receptors, Interleukin-11), (Bone Marrow) AND (Interleukin-11 OR Receptors, Interleukin-11), (Bone OR Bone Marrow) AND (Interleukin-11 OR Receptors, Interleukin-11) AND (Adipocytes OR Fat). The databases of Medline, PubMed, Cochrane, Web of Science, Embase and Google Scholar were searched.

Results

This article will briefly summarize the role of IL-11 in inflammatory diseases, detail the regulatory role and related mechanisms of IL-11 in bone metabolism, and provide new ideas for the studies and treatment of metabolic bone diseases.

Conclusion

Understanding the regulatory role of IL-11 in bone metabolism and its interplay with other pathways, such as the Wnt/ β -catenin signaling pathway, is crucial for developing new therapeutic strategies for bone diseases. Future research should focus on elucidating the detailed mechanisms by which IL-11 and LIPUS interact to modulate bone metabolism and exploring their potential clinical applications.

EP14

EFFECTS OF ULTRASHORT WAVES ON INFLAMMATORY RESPONSE AND ALVEOLAR EPITHELIAL CELL APOPTOSIS IN RATS WITH ACUTE LUNG INJURY

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Background and aims

To investigate the effects of ultrashort wave therapy on inflammatory responses and alveolar epithelial cell apoptosis in rats with acute lung injury (ALI).

Methods

Thirty male SD rats were randomly divided into control, LPS-induced injury, and ultrashort wave therapy groups (n=10 each). The ALI model was established via lipopolysaccharide (LPS) injection through the tail vein. The therapy group received 15-minute ultrashort wave interventions immediately, 24h, and 48h post-modeling, while control and LPS groups were placed under non-activated electrodes. Rats were euthanized post-intervention. Serum IL-1 β and IL-10 levels were measured by ELISA, lung injury was assessed via HE staining, alveolar epithelial cell apoptosis was quantified using TUNEL assay, and caspase-3/caspase-8 mRNA/protein expression was analyzed by PCR and Western blot.

Results

Compared with controls, the LPS group exhibited significantly elevated serum IL-1 β , reduced IL-10 ($P<0.01$), severe lung structural damage, increased lung injury scores, higher alveolar epithelial cell apoptosis rates ($P<0.01$), and upregulated caspase-3/caspase-8 mRNA/protein expression ($P<0.01$). Ultrashort wave intervention significantly reduced IL-1 β , increased IL-10 ($P<0.01$), mitigated lung injury scores and apoptosis rates ($P<0.01$), and downregulated caspase-3/caspase-8 expression ($P<0.01$).

Conclusion

Ultrashort wave therapy may alleviate LPS-induced ALI by suppressing alveolar epithelial cell apoptosis and exerting anti-inflammatory effects via downregulating the caspase-8/caspase-3/IL-1 β signaling pathway, thereby reducing pulmonary tissue damage.

EP15

EFFECTS OF VISUAL STIMULI ON STATIC BALANCE: A FREQUENCY ANALYSIS COMPARING OLDER ADULTS AND PATIENTS WITH STROKE

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Background and aims

Balance control relies on the integration of visual, somatosensory, and vestibular inputs. Patients with stroke exhibit deviations in the center of pressure (COP) during static standing under rotational visual stimulation (RVS), but it remains unclear whether this phenomenon is stroke-specific. This study aimed to investigate the effects of RVS on static standing in older adults and patients with stroke.

Methods

This retrospective study included 30 older adults and 30 patients with stroke. Static standing balance was assessed using stabilometry under open-eye and RVS conditions (clockwise, counter-clockwise) with a head-mounted display. Measured parameters included sway path (cm), amplitude (cm), and sway velocity (cm/s). Frequency analysis of COP data was conducted using power spectral density estimation with the Welch method, categorizing frequency bands (%) as follows: 0.01–0.1 Hz (low), 0.11–0.5 Hz (low-to-medium), 0.51–1 Hz (medium-to-high), and >1.1 Hz (high). Condition comparisons were conducted using repeated measures two-way analysis of variance (ANOVA) with a significance level of $p < 0.05$.

Results

The groups had similar ages (73.0 ± 5.5 vs. 74.2 ± 6.2 years, $p = 0.538$). The mean NIHSS score was 1.0 ± 1.8 . A significant interaction between group and condition was found for the amplitude in the medio-lateral direction ($F = 10.16$, $\eta^2 = 0.15$, $p < 0.01$) and sway velocity ($F = 9.19$, $\eta^2 = 0.14$, $p < 0.01$). Frequency analysis revealed a significant interaction in the proportion of medium-to-high frequency bands in the medio-lateral ($F = 3.27$, $\eta^2 = 0.05$, $p < 0.05$) and anterior-posterior ($F = 4.20$, $\eta^2 = 0.07$, $p < 0.05$) directions. These values were significantly higher in patients with stroke.

Conclusion

These findings suggest that patients with stroke are more susceptible to RVS and may compensate by relying more on vestibular and somatosensory systems for balance control.

EP16

NEUROMUSCULAR ELECTRICAL STIMULATION UPREGULATES MDK TO ENHANCE MACROPHAGE EFFEROCYTOSIS VIA LRP1 IN WOUND HEALING

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Background and aims

Neuromuscular electrical stimulation (NMES), a well-established therapeutic approach for chronic wounds, has inherent limitations, including wound exposure and potential discomfort. Our preliminary study revealed an innovative application where electrical stimulation (ES) of the distal skeletal muscle-demonstrated the potential to accelerate remote wound healing. The mechanisms remain unclear, necessitating further investigation.

Methods

TUNEL staining quantified apoptotic cells. Live cell imaging and confocal microscopy were utilized to investigate the effects of ES, recombinant midkine (rMDK), and LDL receptor-related protein 1 (LRP1) inhibitor LRPAP on apoptotic neutrophil phagocytosis. rMDK helped elucidate the interplay between MDK, ES, and LRP1. Inhibitors of AMPK and ERK were employed to discern the pathway of MDK production.

Results

Improved wound healing and decreased levels of cf-DNA and MMP9 in plasma were observed after ES. ES reduced apoptotic cells in wounds and promoted M2 macrophage polarization. ES failed to improve phagocytosis of apoptotic neutrophils, whereas MDK significantly enhanced it depending on LRP1. LRP1 decreased gradually after LPS treatment, but prolonged increased without affecting mRNA levels after rMDK application. Additionally, rMDK reduced phosphor- α disintegrin and metalloproteinase domain 17 (p-ADAM17) and increased protein disulfide isomerase (PDI). ES induced p-AMPK in skeletal muscle, which was inhibited by Compound C and SCH772984, resulting in the suppression of MDK upregulation in C2C12 cells.

Conclusion

ES enhances MDK production in skeletal muscles via AMPK-ERK axis, facilitating its delivery to wounds through the circulatory system. This mechanism amplifies LRP1-mediated efferocytosis, expediting wound healing.

Keywords

Wound healing, NMES, efferocytosis, MDK, LRP1

EP17

BODY WEIGHT-SUPPORTED TREADMILL TRAINING REDUCES GLIAL SCAR OVERGROWTH IN SCI RATS BY DECREASING THE REACTIVITY OF ASTROCYTES DURING THE SUBACUTE PHASE

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Background and aims

Spinal cord injury is followed by glial scar formation, which was long seen mainly as a physical barrier preventing axonal regeneration. Glial scar astrocytes lead to glial scar formation and produce inhibitory factors to prevent axons from growing through the scar, while inhibiting the conversion of reactive astrocytes into glial scar-forming astrocytes may represent an ideal treatment for CNS injury. Exercise is a non-invasive and effective therapeutic intervention for clinical rehabilitation of spinal cord injury. However, its precise therapeutic mechanisms still need to be continuously explored. This study aimed to elucidate the therapeutic effects and the underlying mechanisms of exercise intervention during the subacute phase following spinal cord injury.

Methods

30 rats were randomly assigned to three groups (Sham, SCI, SCI+BWSTT; n=10 rats per group). In this study, we employed the BBB scales and gait analysis system to examine the behavioral functions of the rats in each group. Furthermore, we utilized immunoblotting of spinal cord tissue at the injury site, in addition to histological staining and immunofluorescence staining, to explore glial scar aggregation and axonal regeneration in each group of rats.

Results

Our results revealed that hindlimb motor function was significantly improved in SCI rats after a sustained subacute period of BWSTT, accompanied by the promotion of histological repair and nerve regeneration. Subsequent immunofluorescence staining and immunoblotting showed diminished astrocyte reactivity in the region surrounding the spinal cord injury as well as reduced expression and distribution of collagen fibers near the lesion after BWSTT. Additionally, a significant decrease in the expression of MMP-2/9, which is closely related to astrocyte migration, was observed in the vicinity of spinal cord tissue lesions.

Conclusion

Our study demonstrates that a sustained BWSTT intervention during the subacute phase of spinal cord injury can effectively reduce astrocyte reactivity and glial scarring overgrowth, thereby facilitating functional recovery after SCI.

EP18

RESEARCH ON CORTICAL PLASTICITY IN THE RECOVERY OF MOTOR FUNCTION IN PARALYZED UPPER LIMBS AFTER PERIPHERAL NERVE TRANSFER IN BRAIN INJURY

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Background and aims

To investigate the efficacy of peripheral nerve transfer in improving motor function in the paralyzed upper limb following traumatic brain injury (TBI) and to observe cortical plasticity changes using molecular biology and functional imaging.

Methods

Controlled cortical impact devices were used to establish TBI models in rats and mice, targeting the left motor cortex corresponding to the right upper limb. One month post-injury, peripheral C7 nerve transfer was performed. Rats were divided into sham operation (Sham), TBI, and C7 transfer (CC7) groups. Motor function recovery was assessed using the cylinder test, grasping test, and gait analysis pre-operation and at 1, 3, 7, 9, and 11 months post-operation. Structural plasticity in the contralateral motor cortex was examined via immunofluorescence, Golgi staining, and transmission electron microscopy (TEM). Functional MRI (fMRI) was used to explore cortical plasticity changes.

Results

Left hemisphere TBI caused motor dysfunction in the right upper limb. Histological staining revealed disrupted brain structure, pyknotic nuclei, and vacuolated cytoplasm. TEM showed irregular myelin regeneration in the transferred nerve, with reduced thickness and density. Electrophysiological experiments demonstrated compound muscle action potentials in the affected triceps upon nerve stimulation. In the CC7 group, stimulation of the affected limb resulted in prolonged latency and reduced amplitude of somatosensory evoked potentials in the contralateral hemisphere. Behavioral tests indicated lower slip and error rates ($P=0.001$) and higher success rates ($P<0.001$) in the CC7 group compared to TBI. Immunofluorescence revealed increased synaptophysin expression in the contralateral motor cortex, while Golgi staining and TEM confirmed dendritic spine and synaptic plasticity. MRI showed widespread involvement of gray and white matter in both hemispheres, with compensatory changes. Task-based fMRI revealed dynamic cortical plasticity, with the response area gradually focusing on the contralateral primary motor cortex in the CC7 group.

Conclusion

Peripheral nerve transfer effectively improves upper limb motor function post-brain injury and promotes functional reorganization of the cerebral cortex.

EP19

ROS-RESPONSIVE PROTAC NANOPARTICLES AS A DRUG DELIVERY SYSTEM FOR TARGETING COX2 INHIBITION IN THE ATTENUATION OF OSTEOARTHRITIS

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Background and aims

Knee osteoarthritis (KOA), a degenerative joint disease, involves chronic inflammation and cartilage destruction. COX-2, overexpressed in inflammation, exacerbates oxidative stress, causing pain and swelling. NSAIDs like indomethacin inhibit COX-2 but have long-term side effects. This study introduces a novel strategy using PROTACs and ROS-responsive nanotechnology to target COX-2, reduce inflammation, and minimize adverse effects, offering a safer, more effective KOA treatment.

Methods

This study developed a COX-2-targeting PROTAC molecule (Ind-Pam) using indomethacin and pomalidomide, encapsulated within a ROS-responsive polymer (PBAP-NPs) to form Ind-Pam-PBAP nanoparticles. The system's physicochemical properties, including size, stability, and ROS-triggered drug release, were characterized. In vitro studies assessed cytotoxicity, COX-2 degradation, and anti-inflammatory effects on chondrocytes and macrophages. In vivo, C57BL/6 mice with DMM-induced KOA were treated with IPP-PBAP-NPs, evaluating inflammation, cartilage repair, and pain relief through histopathology, immunohistochemistry, imaging, and behavioral assays.

Results

The nanostructure and characterization of the nanoparticles were confirmed, with size and TEM analyses demonstrating ROS-triggered structural disruption and drug release. In vitro, cellular uptake occurred via endocytosis. The nanoparticles inhibited M2 macrophage polarization and suppressed COX-2 expression in chondrocytes and macrophages, as confirmed by PCR and WB. In inflammatory chondrocyte models, the nanoparticles upregulated SOX9 and collagen II while downregulating MMP13. In vivo, immunohistochemistry revealed reduced COX-2 expression, and DMM model mice exhibited improved gait symmetry and cartilage integrity following intravenous administration, demonstrating the therapeutic potential of this ROS-responsive nanodelivery system for KOA treatment.

Conclusion

The ROS-responsive Ind-Pam-PBAP system effectively targets and degrades COX-2, reducing inflammation and promoting cartilage repair in KOA. This innovative approach demonstrates significant therapeutic potential, offering a precise, safe, and efficient strategy for KOA treatment by enhancing drug delivery and minimizing systemic side effects.

EP20

ISK FACTORS FOR ANTERIOR CRUCIATE LIGAMENT INJURY IN SPORTS: A PROSPECTIVE STUDY

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Background and aims

ACL injury has been very common, but there is still no good method to reduce the incidence of ACL injury in the world. To study how to reduce ACL injury rate.

Methods

The research progress of risk factors for anterior cruciate ligament injury was summarized based on relevant literatures.

Results

Through a large number of literature search, we found that the possible factors leading to the increase of ACL injuries in the population include extrinsic factors (physical exercise, psychology, sports environment, muscle strength, vamp interface, skill level, gender, age, different groups) and intrinsic factors (joint laxity, limb balance, [femoral] notch size, ligament size, gene). Numerous studies have shown that the lateral tibial slope Angle is statistically higher in patients with ACL rupture than in patients without ACL rupture. This study searched and reviewed the case-control studies of eight candidate genes, COL5A1, COL12A1, COL1A1, COL3A1, ACAN-DCN, VEGFA-KDR, matrix metalloproteinase 12, matrix metalloproteinase 3, which are related to the susceptibility of anterior cruciate ligament rupture. It was found that none of the above genetic risk factors independently caused anterior cruciate ligament rupture. These genes play a key role in the morphological development of ligaments and tendons. Some studies have shown that the dominant hand also affects the factors of ipsilateral lower limb ligament injury, which is related to frequent stress.

Conclusion

However, for the prevention and evaluation of ACL, although scholars all over the world have done a lot of scientific research and found many factors that can affect ACL injury, the occurrence of injury caused by many factors is not a single cause. With the increasing number of ACL injuries in sports. In the future, we will carry out education and equipment, full-life cycle and intelligent rehabilitation intervention from the perspectives of internal and external factors to reduce the injury rate, so as to better promote the development of national health movement.

EP21

THE MOTOR CORTEX EEG CHARACTERISTICS ANALYSIS FOR APPLYING DIFFERENT FREQUENCY FROM TRANSCRANIAL MAGNETIC STIMULATION

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Background and aims

Stroke rehabilitation, beyond traditional rehabilitation and pharmacological treatments, now includes a novel approach using transcranial magnetic stimulation (TMS). TMS is a non-invasive method with advantages such as being painless. However, there is no consensus on the optimal stimulation parameters for TMS treatment. This study aims to investigate whether using individual alpha frequency (IAF) as a personalized stimulation parameter can enhance TMS efficacy and improve therapeutic outcomes.

Methods

EEG data were recorded during a resting state with eyes closed, and individual alpha frequency (IAF) was determined. Three different stimulation frequencies were applied to the C3 electrode using TMS:

1. Standard frequency (10Hz)
2. Individual Alpha Frequency (IAF)
3. Theta Burst Stimulation (50Hz)

EEG data were collected before, during, and after two rounds of TMS stimulation. The analysis included power spectral density, sample entropy, and coherence to examine the effects of different stimulation parameters on cortical activity.

Results

Power spectral density and coherence analyses showed that, after two rounds of stimulation, TMS at IAF frequency resulted in greater frontal region activation in the alpha band at C3 compared to the standard 10Hz frequency. Sample entropy analysis indicated a decrease in entropy across cortical electrodes during TMS stimulation, along with increased coherence between different cortical regions.

Conclusion

This study demonstrates that TMS, combined with real-time EEG recording and feature extraction, provides valuable insights into the effects of TMS on the C3 motor cortex. The findings suggest that using IAF as a stimulation parameter may enhance TMS efficacy, offering a potential reference for developing stroke rehabilitation protocols.

EP22

EFFICACY OF LOW-INTENSITY PULSED ULTRASOUND COMBINED WITH COX-2 INHIBITION NANOTECHNOLOGY FOR OSTEOARTHRITIS REPAIR: A PRECLINICAL STUDY

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Background and aims

Osteoarthritis (OA) is a prevalent degenerative joint disease that causes pain, stiffness, and loss of function. Current treatments primarily focus on symptom management rather than disease modification. Recent studies suggest that low-intensity pulsed ultrasound (LIPUS) and COX-2 inhibition via nanotechnology may offer synergistic effects in cartilage repair and inflammation control. This preclinical study investigates the combined effect of LIPUS and COX-2 nanotechnology in OA repair using an animal model.

Methods

A total of 24 rats with induced OA were randomly divided into four groups: (1) control, (2) LIPUS treatment, (3) COX-2 nanoparticle treatment, and (4) combined LIPUS and COX-2 nanoparticles. LIPUS treatment was applied for 15 minutes daily, and COX-2 nanoparticles were administered locally at the joint site. Treatment was carried out for 4 weeks. The outcomes were assessed using histological analysis (cartilage regeneration), immunohistochemistry (COX-2 expression), and biochemical assays (inflammatory cytokines and matrix degradation markers).

Results

The combined therapy group showed the most significant improvement in cartilage regeneration, with higher cartilage thickness and reduced degeneration observed in histological sections. Immunohistochemistry revealed a marked reduction in COX-2 expression in the combined therapy group compared to individual treatments. Biochemical assays indicated a significant reduction in inflammatory cytokines (TNF- α , IL-1 β) and matrix degradation markers (MMP-3, MMP-13) in the combined group.

Conclusion

The combination of LIPUS and COX-2 nanotechnology demonstrates superior therapeutic effects in cartilage repair and inflammation reduction in an animal model of osteoarthritis. This dual approach offers a promising strategy for OA treatment, providing a foundation for further clinical studies.

EP23

EFFECTS OF AEROBIC EXERCISE ON HIPPOCAMPAL CELL TYPES AND GALNTL6-MEDIATED SYNAPTIC PLASTICITY IN AGING MICE

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Background and aims

Memory decline is one of the most common cognitive issues among the elderly, significantly affecting their daily living abilities and quality of life. Aerobic exercise has been shown to enhance hippocampus-dependent learning and memory as well as neuroplasticity, but the underlying molecular mechanisms are not fully understood. Here, we analyzed the effects of aerobic treadmill exercise on the single-nucleus RNA sequencing (snRNA-seq) dataset of the hippocampus in naturally aging mice to identify key cellular and transcriptional changes in the hippocampus after exercise.

Methods

Male C57BL/6 mice of different ages were divided into adult, aged, and exercise groups. The exercise group underwent 6 weeks of aerobic treadmill training. Then, extract cells from the hippocampus of mice, followed by flow cytometry sorting and the preparation of single-cell expression libraries. molecular biology experiments will be conducted for subsequent molecular validation and mechanism exploration.

Results

This study found that aerobic exercise can modulate changes in the abundance of hippocampal cell populations in aging mice, reduce the expression level of Galnt16 in neurons, and regulate the level of O-glycosylation modifications.

Conclusion

Aerobic treadmill exercise can ameliorate the decline in learning and memory functions in aging mice by reducing the expression of Galnt16 in the hippocampus, increasing the expression of CaMKIV and its phosphorylation, promoting CREB transcriptional activity, and modulating O-glycosylation.

EP24

APPLICATION OF FUNCTIONAL NEAR-INFRARED SPECTROSCOPY IN REHABILITATION OF STROKE PATIENTS

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Background and aims

Stroke is the leading cause of disability in adults in China. In the early stages of stroke, over 70% of patients have upper limb motor dysfunction, which affects their independence of life. Rehabilitation is the most effective way to reduce disability rates. Despite receiving clinical rehabilitation interventions, over 50% of patients still suffer from upper limb dysfunction after 6 months, causing a heavy burden on families and society. Stroke rehabilitation faces several challenges, such as lack of dynamic quantitative evaluation methods, and multi technology collaboration lacks optimization. The objective of this study is to assess the task induced brain functional features based on functional near-infrared spectroscopy (fNIRS) brain imaging technology.

Methods

This study measured multiple tasks such as rehabilitation robot and transcranial magnetic stimulation induced brain functional features based on fNIRS brain imaging technology, and performed longitudinal tracking in stroke patients with different focal locations.

Results

The results showed that the bilateral hemisphere compensatory activation shifted to contralateral activation mode dominated by the affected side in the well recovered patients. The functional gain was associated with cortical reorganization in the affected hemisphere.

Conclusion

The fNIRS provide a reliable method for dynamic assessment of rehabilitation interventions. The intervention strategies based on fNIRS assessment achieve personalized rehabilitation for patients and effectively improve rehabilitation efficiency.

EP25

ENABLING THE DISABLED: DEVELOPMENT AND UTILIZATION OF A SUPPOSITORY INSERTER FOR BOWEL MANAGEMENT IN A PATIENT WITH BROWN-SÉQUARD SYNDROME: A CASE REPORT

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Background and aims

Brown-Séquard syndrome is a rare neurological condition resulting from damage to one half of the spinal cord. This condition leads to a distinctive pattern of neurological deficits. On the ipsilateral side, the individual experiences hemiparesis and a loss of proprioception and touch. On the contralateral side, there is a loss of pain and temperature sensation. This may also be accompanied with the presence of neurogenic bladder and neurogenic bowel (Brown-Séquard-plus syndrome). This is usually remedied with the use of Bisacodyl suppository to medically regulate the bowel. This case report involves a retrospective analysis of a person experiencing Brown-Séquard-plus syndrome who incorporated on-site fabrication of a suppository inserter with readily available items and successfully independently managed his neurogenic bowel.

Methods

Introducing a 25 year old male who was diagnosed with Brown-Séquard syndrome (C3 AIS D) following a gunshot injury. He exhibited motor weakness over his right upper and lower limbs and loss of sensation over his left upper and lower limbs. Due to his neurological deficits, he experienced difficulties in managing his neurogenic bowel independently as he was unable to feel and position the suppository despite having the power to pinch with his left hand. After multidisciplinary discussion with the occupational therapy team, a prototype of a suppository inserter with readily available materials using low temperature thermoplastic and syringe was fabricated. Multiple improvements were made to the design and with the latest design, the patient was able to successfully introduce the suppository into his rectum independently

Results

The Spinal Cord Independence Measure (SCIM) score improved due to his independence in sphincter management.

Conclusion

This case highlights the importance of recognizing the individualized challenges faced by each person and how incorporating interdisciplinary collaboration can further improve functional outcomes and enhance quality of life. Low cost fabrication of adaptive devices is possible to aid in independent bowel management with customized suppository inserter.

EP26

PERCUTANEOUS ELECTRICAL STIMULATION COMBINED WITH CONDUCTIVE NERVE GUIDANCE CONDUITS FOR PERIPHERAL NERVE REGENERATION

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Background and aims

The repair, regeneration, and functional recovery of peripheral nerve defects have always been the focus and difficulty of clinical treatment. Among them, the slow speed of nerve regeneration, the long-term loss of electrical signal control, and the degeneration and atrophy of target organs are key issues that need to be solved urgently.

Methods

Here, we designed and constructed nerve guidance conduits (NGCs) that can mimic the conductivity of natural nerves to deliver exogenous electrical stimulation and endogenous electrophysiological signals in a targeted and efficient manner. The inner layer of the conductive NGCs was an oriented fiber formed by coprocessing the conductive polymers poly(3,4-ethylenedioxythiophene)/poly(styrene sulfonic acid) (PEDOT: PSS) and chitosan (CS) by electrospinning technology. The outer layer was a pluronic F127 diacrylate (F127DA) hydrogel with good mechanical properties.

Results

We used a rat sciatic nerve defect model to evaluate the ability of conductive NGCs to promote peripheral nerve repair. Compared with NGCs without added conductive polymers, the conductive NGCs in this study can significantly promote the recovery of the shape and function of peripheral nerves, achieving the repair effect of autografts.

Conclusion

This work combined regenerative technology with rehabilitation medicine, providing a promising new strategy for repairing peripheral nerve defects.

EP27

STUDY OF THE BRAIN FUNCTION CHARACTERISTICS IN CHILDREN WITH CEREBRAL PALSY DURING WALKING USING FNIRS

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Background and aims

Abnormal gait of children with cerebral palsy (CP) is caused by brain damage or developmental defects, exploring the brain functional characteristics and regulatory mechanisms are essential for rehabilitation. The aim of this study is to research the brain function characteristics in children with CP during walking.

Methods

The cortical activation, functional connectivity, information flow and dynamic state transitions of 17 children with CP and 13 healthy children (HC) were analyzed in the resting and walking states using functional near infrared spectroscopy (fNIRS) technology.

Results

The motor cortex (MC) of HC significantly activated in the walking state, while both the prefrontal cortex (PFC) and MC of children with CP significantly activated. The resting brain functional connectivity of children with CP decreased, and showed higher GE and modularity, and lower CC and LE. During walking, the brain network of children with CP was difficult to maintain a stable global high-connectivity state, so the local high-connectivity state became the main connectivity state. For children with CP, more brain resources were allocated to the non-dominant MC during walking, while more brain resources were allocated to the dominant MC in HC.

Conclusion

These indicators reflect the characteristics of brain activation, network connectivity, and information regulation in children with CP, which can provide theoretical guidance for targeted rehabilitation treatment.

EP28

INSTANT GAIT CLASSIFICATION FOR HIP OSTEOARTHRITIS PATIENTS: A NON-WEARABLE SENSOR APPROACH UTILIZING PEARSON CORRELATION, SMAPE, AND GMM

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Background and aims

This study aims to establish a methodology for classifying gait patterns in patients with hip osteoarthritis without the use of wearable sensors. Although patients with the same pathological condition may exhibit significantly different gait patterns, an accurate and efficient classification system is needed: one that reduces the effort and preparation time for both patients and clinicians, allowing gait analysis and classification without the need for cumbersome sensors like EMG or camera-based systems.

Methods

The proposed methodology follows three key steps. First, ground reaction forces are measured in three directions-anterior-posterior, medial-lateral, and vertical-using a force plate during gait analysis. These force data are then evaluated through two approaches: trend similarity is assessed using the Pearson correlation coefficient, while scale similarity is measured with the Symmetric Mean Absolute Percentage Error (SMAPE), comparing results with healthy controls. Finally, Gaussian Mixture Models (GMM) are applied to cluster both healthy controls and patients, grouping the patients into distinct categories based on six quantified metrics derived from the correlation and SMAPE. using the proposed methodology, 16 patients with hip osteoarthritis were successfully categorized into two distinct gait groups (Group 1 and Group 2). The gait patterns of these groups were further analyzed by comparing joint moments and angles in the lower limbs among healthy individuals and the classified patient groups.

Results

This study demonstrates that gait pattern classification can be reliably achieved using only force-plate data, offering a practical tool for personalized rehabilitation in hip osteoarthritis patients. By incorporating quantitative variables that capture both gait trends and scale, the methodology efficiently classifies patients with just 2–3 ms of natural walking.

Conclusion

This minimizes the burden on patients while delivering a more accurate and realistic assessment. The proposed approach maintains a level of accuracy comparable to more complex methods, while being easier to implement and more accessible in clinical settings.

EP29

PRELIMINARY ANALYSIS OF HINDLIMB COORDINATION USING FOOTPRINT BASED DEEPLABCUT IN SCI RODENT

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Background and aims

In the study of animal behavior, especially gait analysis, expensive equipment and complicated software are required for analysis, which limits popularity of this analysis. We aim to develop a cost-efficient software DeepLabCut Analysis (DCLA) with a certain degree of accuracy on rodent animal gait analysis.

Methods

The footprints of normal rats and mice walking on the treadmill were videoed by a high-speed camera, which were then input into DeepLabCut™ (DLC) to build a standardized model of footprints trajectories. Subsequently, we conducted Basso-Beattie-Bresnahan (BBB) and Basso Mouse Scale (BMS) locomotor functional evaluation on rats and mice with moderate T10 thoracic contusive spinal cord injury (T10-cSCI) respectively. Those rats with BBB score between 10-21 and mice with BMS score between 5-9 were videoed for their footprints during walking on the treadmill. By inputting the processed videos of injured animals into the standardized model, we obtained coordinates data for further analysis. Finally, we analyzed the distance between footprints and angles between trajectories using DLCA software.

Results

There was significantly difference in the coefficient of variation (CV) of distance between left and right hindlimb footprints comparing SCI rats and sham rats. There was significantly difference in the CV of stride length between left forelimb and hindlimb when comparing SCI rats and sham rats. There was also significant difference in the CV of length between the footprints of diagonal forelimb and hindlimb when comparing SCI rats and the sham rats. In our paw angle heatmap analysis, we found differences in the footprint of rats in the injured group compared with that of rats in the sham group.

Conclusion

DCLA provided another dimension of evaluation on hindlimb coordination after rodent SCI which can be used as a cost-efficient and accurate and objective supplemental method for classic BBB and BMS method evaluating limb coordination.

EP30

ACCEPTANCE AND EFFECTIVENESS OF SELF-MONITORING HOME NEUROMUSCULAR ELECTRICAL STIMULATION (NMES) AMONG ELDERLY: A PRE-PILOT STUDY

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Background and aims

Aging populations face increasing challenges in maintaining muscle strength and mobility, leading to reduced quality of life and heightened fall risk. In clinical settings, Neuromuscular Electrical Stimulation (NMES) has emerged as a non-invasive intervention to mitigate muscle decline by enhancing muscle activation and strength. However, little is known on the effectiveness of self-monitoring home NMES systems. Thus, this study explores the behavioral acceptance and physiological effects of NMES among elderly participants, aiming to identify target users and optimize NMES parameters for different subgroups.

Methods

A pre-pilot study was conducted on four participants aged 55 years and above. Participants alternated between NMES and exercise sessions, with one day dedicated to NMES and the following day to exercise, over the course of four weeks. Physiological measurements, including hand grip strength and mechanomyogram (MMG) readings from key muscle groups, were collected at three time points: pre-intervention, mid-intervention (after 2 weeks), and post-intervention. MMG data processing involved high-pass filtering and Fast Fourier Transform (FFT) analysis. Following that, statistical comparisons were conducted using the Shapiro-Wilk test and paired t-test to compare the difference between the three time points.

Results

Participants showed a mean increase in right-hand grip strength (3.575 kg), though not statistically significant ($p = 0.1054$). MMG analysis in vastus medialis, revealed significant increase in muscle activation intensity, as indicated by increase in peak amplitude and RMS voltage (both $p < 0.05$) across participants, alongside a decrease in peak frequencies, suggesting improved neuromuscular efficiency. Nevertheless, inconsistent trends were observed for rectus femoris and vastus lateralis.

Conclusion

This pre-pilot study supports NMES as a feasible and well-tolerated intervention for elderly muscle maintenance. While sample size constraints limited statistical significance, observed trends indicate potential improvements in muscle activation and neuromuscular coordination. The observed variability may be attributed to factors such as baseline muscle condition, individual physiological differences, and varying adherence to the NMES and exercise interventions. Overall, NMES demonstrated promising muscle activation benefits, particularly in the quadriceps and forearm muscles. Future studies should explore larger cohorts and refine NMES protocols to optimize outcomes for elderly users.

EP31

EFFECT OF INTELLIGENT EXOSKELETON-ASSISTED REHABILITATION ON EARLY FUNCTION IN POSTOPERATIVE ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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Objective

Early function following anterior cruciate ligament reconstruction (ACLR) critically is crucial for patient prognosis and long-term outcomes. Despite advancements in exoskeleton-assisted rehabilitation, the development of precision-engineered, intelligence-driven rehabilitation strategies targeting early function following ACLR remains underexplored. This study pioneers an AI-driven intent-recognition exoskeleton system to address critical gaps in early function postoperative ACLR, aiming to enhance human-machine interaction and personalized biomechanical support.

Methods

In this single-blind randomized controlled trial, 20 ACLR patients (5–12 days post-surgery) were allocated to conventional rehabilitation (physiotherapy, ROM/strength/gait/balance training) or an experimental group utilizing an intelligent lower-limb exoskeleton with real-time motion intent decoding and adaptive torque control. Both groups completed 60-minute sessions, 5 days/week for 4 weeks. Outcomes included Lysholm scores, gait analysis, knee flexion ROM, isometric strength, and balance parameters.

Results

Post-intervention, the exoskeleton group exhibited clinically and statistically superior outcomes: Lysholm scores increased by 32.5% vs. 18.7% in controls ($P = 0.011$), alongside optimized gait kinematics with 15.8% greater stride symmetry ($P = 0.032$) and 28.3% larger knee flexion angles during stance ($P < 0.01$). Robotic training enhanced neuromuscular control, yielding 22.4% greater flexion ROM ($P = 0.015$) and 37.1% higher quadriceps strength ($P < 0.01$). Balance metrics revealed 41.6% reduced postural sway area ($P = 0.012$) and 26.3% expanded stability limits ($P = 0.03$). No adverse events confirmed system safety.

Conclusion

This study demonstrates that intelligent exoskeleton-assisted rehabilitation can significantly enhance early function postoperative ACLR, validating intelligent exoskeletons as a paradigm-shifting modality for ACLR rehabilitation. It provides the dual capacity to deliver precision-guided, data-driven motor re-education unachievable through manual therapy, and alleviate workforce shortages in rehabilitation medicine through scalable robotic solutions. The integration of intent recognition and adaptive control algorithms exemplifies the transformative potential of AI technologies in orthopedic early function recovery.

EP32

PREDICTORS OF RETURN TO SPORT FOLLOWING LATERAL ANKLE LIGAMENT SURGERY: AN EXPLAINABLE PREDICTION MODEL

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Objective

Ankle sprains frequently lead to chronic instability and functional impairment, with 25% of patients failing to return to sport (RTS) even after surgery, highlighting the need to better understand recovery factors. Explainable machine learning models can capture nonlinear relationships and complex interactions among variables and provide interpretable predictions, offering more accurate RTS predictions than traditional logistic regression models. This study aims to develop an explainable machine learning model for predicting the likelihood of RTS in patients following lateral ankle ligament surgery.

Methods

A cross-sectional study was conducted at the Fourth Medical Center of Chinese PLA General Hospital, involving 127 patients aged 18 to 50 years who underwent their first unilateral lateral ankle ligament surgery. The primary outcome was the prediction of RTS within one year post-surgery. A total of 12 machine learning models were employed, with logistic regression (LR) serving as the baseline model. ML techniques were used to analyze the impact of various factors on RTS potential. Additionally, the SHAP method was applied to perform an explainable analysis of the ML models' predictions, helping to identify key factors affecting postoperative recovery.

Results

Data from a total of 127 patients following lateral ankle ligament surgery were included (mean age 27.38 years, 61 [48%] RTS within one year). Twelve machine learning models were evaluated, with Gradient Boosting Machine (GBM) showing the highest performance (AUROC=0.9157 [$P < 0.001$], AUPRC=0.94, Recall=0.9384). Compared with Logistic Regression (AUROC=0.6377), GBM outperformed in accuracy and recall. Recursive Feature Elimination (RFE) identified 16 key features. SHAP analysis revealed that patients exhibiting higher pre-injury activity levels, better functional recovery, and psychological readiness were more likely to RTS.

Conclusions

This study demonstrates that machine learning can effectively predict the RTS potential of patients following lateral ankle ligament surgery, providing valuable personalized guidance for clinical practice. This study has important implications for young people with sport needs. By integrating both physiological and psychological factors, clinicians can more comprehensively assess a patient's recovery status and intervene early to optimize rehabilitation plans, thereby increasing the likelihood of successful RTS and reducing healthcare costs and societal burden.

EP33

REHABILITATION ROBOT IN WALKING TRAINING FOR STROKE PATIENT AT HOME

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Background and aims

The purpose of this study is to develop a robot that supports the recovery of walking function at home, for patients with hemiplegia by stroke. The number of cerebrovascular disease patients in Japan is estimated to be 1.75 million. It is the second leading cause of the need for long-term care. On the other hand, due to the pressure on social security costs, the number of hospital days covered by health insurance for stroke patients is limited to 150 days. Therefore, the demand for robots that support training at home is increasing.

Methods

We have developed a training machine for the preliminary walking pattern. The robot provides assistive motions with a sliding mechanism, according to the recovery level of the patient's lower extremities: passive reciprocal motions and assistive motions in lifting motions. The mechanism is simple and lightweight with the expectation of home such as small, lightweight, easy to use, and low-cost. Additionally, it incorporates pressure sensors and a display to present the state of walking-like movements while shifting the center of gravity. It also has a function to analyse the state of the center of gravity shift and evaluate the degree of shift from side to side based on the information on lower limb movements and plantar pressure.

Results

We have evaluated the exercise strength by the senior normal subjects, which showed the robot training is suitable to elderly. The graph of the rate of the lateral center of gravity shift was shown as the walking speed gradually from low to high.

Conclusion

The device can be used for the training safely, and physical therapist can understand whether the lateral center of gravity shift is being performed correctly.

EP34

FREE-STANDING ANGIOGENESIS PROVOCATION FOR LYMPHANGIO-REGENESIS

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Background and aims

Following lymphangiogenic effect of VEGF-C/D, lymphangio-regenesis is of great interest. To put this into practice, VEGF-mediated angiogenesis should be first manipulated under control. To gain concept- approval, rapid construction of prevascular structure is highly demanded. But, angiogenesis in free- standing has been rarely succeed because growth factor (GF) into scaffold or implementing GF gradient inside scaffold is not easy.

Methods

Angiogenic sprouting in free-standing 2-vasculature-embedded scaffold with additional GFs was investigated. A 2-core laminar flow device continuously extruded one vascular channel with human umbilical vein endothelial cells (HUVECs). This angiogenesis was compared at 3 different culture conditions (obstructing media, soaking in a media and flowing media. F-actin, cluster of differentiation 31 (CD31), shear stress, perfusability, cell viability were evaluated (Fig 1).

Results

The flowed media diffused from the hollow channel to the embedded HUVECs formulated primitive foundation for HUVEC vessels. Different F-actin expression of the embedded HUVECs was observed in the 3 culture conditions; particularly, the cells in the flowing condition presented uniform spindle-like morphology with arrangement in the flow direction, showing the longest perimeter, the highest elongation ratio, and the lowest orientation deviation. Under the GF flowing condition, angiogenic sprouting had started since day 1st and gradually grew toward the hollow channel on until day 10th. The cells in the flowing condition showed the most active angiogenesis during all the time points. Their viability has been over 80% up to day 10. Furthermore, connections among adjacent sprouts were found in the flowing condition (Fig 2, 3):

Conclusion

Aggregation of the HUVECs developed into the vascular structure and then the angiogenic sprouting was induced from the HUVEC vessels to the hollow channel by the gradient of the additional GFs, suggesting potentiality to assist microscopic lymph node or prevascular cell implantation for lymphangio- regenesis and to be glue for lymphatico-venular anastomosis.

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EP35

THE RELATIONSHIP BETWEEN BODY SEGMENT MOVEMENTS AND CENTER OF PRESSURE DISPLACEMENTS DURING TRUNK LEAN MOVEMENTS WHILE SITTING

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Background and aims

Daily activities while sitting, involve trunk leaning that requires precise coordination of multiple body segments of the head, trunk, and pelvis to keep the center of pressure (COP) within the limits of stability. The ability to control COP location during trunk leaning is crucial for preventing falls. However, it remains unclear how movements in each body segment contribute to COP control during trunk leaning. This study investigated the relationship between angular changes in each body segment and COP displacements during trunk leaning while sitting in healthy individuals.

Methods

Twenty-eight healthy young volunteers performed a trunk leaning in four directions (left, right, forward, and backward) while sitting, repeating leaning to each direction twice. COP displacements and angular changes in head, trunk, and pelvic tilt were measured during left-right lean; head, trunk, hip, and pelvic tilt angles were measured during forward-backward lean. To assess the reliability of the measured indices, Bland-Altman analysis was applied to the first and second data sets. The relationship between changes in each body segment angle and COP displacements was then analyzed using mixed-effects models.

Results

Bland-Altman analysis confirmed no fixed or proportional bias in COP displacements and changes in the body segment angles, indicating sufficient reliability of the measured indices. Mixed-effects models revealed that changes in pelvic tilt angle significantly contributed to COP displacement during both left-right and forward-backward leaning ($p < 0.01$). Additionally, changes in head, trunk, and hip angles significantly influenced COP displacements during forward-backward leaning (all: $p < 0.01$).

Conclusion

Pelvic tilt plays a key role in COP displacements during trunk leaning, regardless of direction. This finding highlights the importance of pelvic tilt movements in controlling the COP location during activities while sitting, offering valuable insights into rehabilitation assessments and interventions for improving sitting balance in individuals with impaired sitting balance.

EP36

LOCAL MUSCLE NETWORK OF BICEPS FEMORIS AT DIFFERENT RUNNING SPEEDS

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Background and aims

Muscle coordination patterns are crucial for understanding neuromuscular adaptations during running. This study aims to investigate how the local muscle network of the biceps femoris changes with running speed using mutual information analysis.

Methods

Ten healthy adults (20-30 years) participated in this study. Surface EMG signals were collected from six segments of the biceps femoris at three running speeds (9, 12, and 15 km/h). Mutual information was used to construct a 6×6 matrix and define the local muscle network. Data were processed in MATLAB, with filtering and segmentation to analyze the network characteristics.

Results

At 9 km/h, the mean mutual information was 0.4489, and the average clustering coefficient was 1.6667. At 12 km/h, these values decreased to 0.3422 and 1.3333, respectively. At 15 km/h, the mean mutual information further reduced to 0.1746, with an average clustering coefficient of 0.7778. These results indicate a significant reduction in muscle coordination strength and network connectivity as running speed increases.

Conclusion

The findings suggest that muscle coordination in the biceps femoris diminishes as running speed increases. This insight can guide optimized training programs and rehabilitation protocols for athletes and patients.

EP37

EFFECTS OF VR-BASED OPTOKINETIC STIMULATION ON HEAD AND TRUNK POSTURAL SWAY ON A SINUSOIDAL MOVING PLATFORM

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Background and aims

Virtual reality (VR)-based optokinetic stimulation (OKS) provides an immersive alternative to conventional screen-based OKS, which potentially enhancing vestibular rehabilitation. However, the effect of VR-based OKS on human postural control is not yet fully understood. This study investigated the effects of VR-based OKS on head and trunk postural sway while standing on a sinusoidal moving platform.

Methods

This was a cross-sectional observational study, and 16 healthy adult males (21.3 ± 0.6 years old) participated. The six experimental conditions combined three visual conditions (eyes open, eyes closed, VR-based OKS) and two platform frequencies (0.5 Hz, 1.0 Hz). The VR-based OKS presented alternating black and white vertical stripes in front of the eyes, which moved intermittently from right to left at a speed of $60^\circ/\text{s}$. Head and trunk accelerations were recorded using inertial measurement units, and root mean square values were analyzed. Comparisons between conditions were made by repeated measures two-way analysis of variance, and head and trunk phase relationships were assessed by cross-correlation. This study received ethical approval from the research institution, and all participants provided written informed consent.

Results

VR-based OKS induced significantly greater lateral trunk sway compared to the eyes-open condition ($p = 0.003$). Cross-correlation analysis showed a significant association between lateral head and trunk sway under OKS, with a moderate correlation at 0.5 Hz ($r = 0.540$, $p < 0.05$) and a strong correlation at 1.0 Hz ($r = 0.793$, $p < 0.01$).

Conclusion

VR-based OKS dynamically changes the sensory reweighting and induces synchronized head and trunk movements. These findings highlight the potential usefulness of VR-based OKS in vestibular rehabilitation. Future studies are needed to investigate long-term effects and differences depending on stimulation intensity.

EP38

SOMATOSENSORY EVOKED POTENTIAL-BASED MACHINE LEARNING PREDICTION OF DISABILITY GRADING IN STROKE PATIENTS

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Background and aims

Stroke is a leading cause of disability. Accurate prediction of motor recovery assists rehabilitation planning and supports realistic goal setting by clinicians and patients. The added prognostic value of somatosensory evoked potential (SEP) to clinical modeling for the hemiplegic limb is still unknown poststroke. We aimed to perform a machine learning analysis of SEP to predict disability prognosis

Methods

Clinical information and SEP data of stroke patients were collected. Machine learning (RSF) was used to build the final RSF model. We use random forests (RF) and logistic regression (LR) classifiers to predict disability progression. The statistical significance of the performance increase when adding extra features is checked.

Results

A total of 149 patients were enrolled in the study. The latency and amplitude of P40 were correlated with FMA score and Barthel index score. Stratified clustering showed that patients with better prognosis tended to have better P40 latency. The latency of P40 in SEP obtained a good prognostic value (AUC = 0.81).

Conclusion

Using machine learning methods on SEPs shows promising predictive performance.

EP39

MULTI-LIMB BIOELECTRICAL IMPEDANCE VECTOR ANALYSIS APPLIED TO THE ASSESSMENT OF MUSCLE STRENGTH IN MIDDLE-AGED AND ELDERLY PEOPLE ELDERLY

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Background and aims

This study aims to assess the applicability of bioelectrical impedance vector analysis (BIVA) in sarcopenia screening and to evaluate its effectiveness in risk stratification by integrating handgrip strength (HGS) assessment and clinical parameters.

Methods

A total of 83 participants (20 males and 63 females) were enrolled in this study. Body composition parameters, including height, weight, and BMI, were measured alongside grip strength and impedance parameters (resistance R/H, reactance Xc/H, and phase angle PhA). Participants were stratified into three groups (I, II, III) based on grip strength and the ratio of right-hand grip strength to muscle mass. Group differences were analysed using Hotelling's T^2 test and effect size (Cohen's D).

Results

Grip Strength and Health Stratification: Grip strength increased progressively across the three groups: Group I (18.56 kgf) < Group II (25.46 kgf) < Group III (37.42 kgf). Similarly, phase angle also showed a stepwise increase: Group I (4.20°) < Group II (4.57°) < Group III (5.12°), suggesting an improvement in health status with increasing muscle strength and cellular function. Intergroup Statistical Analysis:

- Group I vs. Group II: The differences in grip strength and phase angle were statistically significant ($P < 0.05$, $D = 0.79$), with a moderate effect size.
- Group II vs. Group III: The differences in grip strength and phase angle were highly significant ($P < 0.0001$, $D = 1.61$), demonstrating both statistical and practical superiority of Group III over Group II.

Conclusion

This study confirms that BIVA, in combination with grip strength assessment, is an effective tool for identifying individuals at high risk for sarcopenia. The integrated analysis of R/H and Xc/H, along with the sensitivity of phase angle (PhA), provides valuable insights into health stratification, particularly in distinguishing cellular health from muscle mass.

EP40

BEYOND THE CLINIC: ARE MHEALTH APPS THE FUTURE OF KNEE OSTEOARTHRITIS REHABILITATION? A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and aims

Osteoarthritis (OA) is a chronic degenerative disease in the cartilage area and involves changes in the structure of the affected joint. The incidence of OA worldwide is estimated to increase therefore cause disability and decreased quality of life. The increased incidence of OA also raises an increase in the need for patient rehabilitation. Digital developments in the world of health, especially in rehabilitation, are currently being developed, one of which is the use of mobile health applications on smartphones (mHealth). This meta-analysis study aims to assess the effectiveness of using mHealth for the rehabilitation process in knee OA patients.

Methods

A systematic review and meta-analysis were conducted by searching the PubMed, Science Direct and Cochrane databases with all articles using English and articles published in 2020-2025. The keywords used were "Knee Osteoarthritis", "Osteoarthritis", "Digitalization", "Mobile Health Application", "Mobile Application", "Rehabilitation".

Results

A total of 7 randomized controlled trials were included in this meta-analysis to assess the use mHealth for the knee OA rehabilitation process. Meta-analysis showed significant improvements in pain scale (SMD = 0.47, 95% CI = 0.16 to 0.77, $p = 0.003$), physical function (SMD = 0.91, 95% CI = 0.26 to 1.56, $p = 0.006$), and activity of daily living (SMD = 0.73, 95% CI = 0.04 to 1.41, $p = 0.04$), but no significant results were found in quality of life (SMD = 0.38, 95% CI = -0.57 to 1.33, $p = 0.43$) and joint range of motion (SMD = 1.20, 95% CI = -0.91 to 3.30, $p = 0.26$).

Conclusion

The use of mHealth on smartphones can support the rehabilitation process of knee OA patients with improvements in pain scale, physical function and activity of daily living compared to patients with conventional therapy.

EP41

THE EARLY USE OF C-MILL FOR GAIT TRAINING IN SUBACUTE STROKE: A CASE REPORT

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Background and aims

C-Mill is a form of gait training intervention that combines Augmented Reality (AR) and Virtual Reality (VR). Current studies (Yang et.al, 2024; Enam et.al, 2020) demonstrate that VR and AR training after stroke can have improvement in gait parameters, balance and quality of life. However, these studies have only recruited outpatients. This is a case report of the early use of C-Mill in inpatient setting. This case report explores how the early use of C-Mill during inpatient physiotherapy rehabilitation impacted the functional outcomes of an inpatient stroke patient.

Method

A 69-year-old Chinese Female was admitted for acute left anterior hemi-medullary infarct and left corpus callosal infarct. She was referred for physiotherapy on the second day of admission. The first two weeks of her physiotherapy sessions comprised of conventional physiotherapy treatment, which included lower limb strengthening/stretching, electrical stimulation, standing balance retraining and gait retraining with orthosis. Prior to the use of C-Mill, patient was able to ambulate with a narrow-based quadstick with supervision. Outcome measures taken pre- and post- C-Mill intervention were the Timed Up and Go test and gait speed.

Results

A total of 15 sessions of physiotherapy were completed during her inpatient stay, including 4 sessions of C-Mill gait training. After completing C-Mill training, the patient's Time-Up-and-Go timing and gait speed demonstrated an improvement from 45.82s and 0.204m/s to 16.29s and 0.77m/s respectively. The changes in gait speed meet the minimal clinical significant difference reported for stroke survivors of 0.16m/s and allowed this patient to transition from a safe household ambulator to that of a limited community ambulator.

Conclusion

Early C-Mill intervention can benefit patients with subacute stroke. This case report shows how early C-Mill gait training can augment conventional physiotherapy treatment. Through careful selection of treatment parameters using VR and AR, it could potentially lead to faster gains in functional recovery.

EP42

RESEARCH ON UPPER LIMB ROBOT FOR PHYSICAL AND MENTAL REHABILITATION OF STROKE PATIENTS

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Background and aims

Stroke constitutes a significant portion of the global burden of neurological diseases. Notably, over 80% of stroke patients suffer from upper limb disabilities, and approximately 60% experience psychological disorders to varying degrees. Despite these challenges, most contemporary rehabilitation robots primarily focus on physical rehabilitation while treating psychological rehabilitation as secondary. Consequently, they fail to effectively balance both physical and psychological rehabilitation needs.

Methods

An upper limb mirror rehabilitation training robot system was developed to integrate emotional factors into the rehabilitation process for stroke patients with upper limb hemiplegia in the recovery phase. The system utilizes computer vision technology to recognize both the movement intention and emotional state of the patient's healthy side. A movement intention recognition approach based on visual labels was designed, alongside an emotion recognition algorithm leveraging the YOLOv11 and ResNet-50 neural network models. Additionally, a stroke rehabilitation strategy incorporating patient emotions was formulated.

Results

A camera captures the movement trajectory of the patient's healthy hand holding the visual label, as well as the patient's facial expressions. Following analysis and processing, the system determines the patient's movement intention and emotional state. The UR5 robotic arm functions as the actuator for rehabilitation training. The label recognition accuracy falls within ± 5 mm, while the robot's average tracking accuracy reaches 0.43 mm. Furthermore, the emotional state recognition model achieves approximately 70% accuracy on the validation set.

Conclusion

This system enables rehabilitation therapists to conduct in-depth analyses of patients' psychological states during training, providing valuable insights for developing more personalized and precise physical and psychological intervention plans.

EP43

ASSESSMENT AND CLASSIFICATION OF COGNITIVE LOAD BASE ON PHYSIOLOGICAL DATA

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Background and aims

Cognitive load was a reliable indicator of changes in psychological stress levels and had an important impact on the cognitive rehabilitation process. However, the existing digital cognitive training ignored the regulatory effect of psychological stress indicators on cognition, and lack personalized psychological stress assessment and intervention elements, resulting in poor training effects. This study proposed a cognitive rehabilitation training method based on virtual reality. It intended to use the eye movement behavior signals and physiological signals collected during the training process to realize real-time assessment and classification of cognitive load status, and then reflect the psychological stress level of the trainees.

Methods

We randomly assigned 106 participants to two experimental conditions: control and dual-task. Participants fulfilled a rest-baseline period, a Stroop task (25 congruent, 25 incongruent words). All continuous change values of eyeball behavior and heart rate were collected by VR headset for data analysis and model training.

Results

After screening, normalization, and denoising steps, 99 eye movement data samples and 64 heart rate data samples were finally obtained. We extracted 30 gaze features, 24 pupil features and 3 heart rate features from these data. Linear SVM models were used to achieve low and high cognitive load classification, and the average classification accuracy reached 75.4%.

Conclusion

This system preliminarily realizes the recognition of cognitive load level based on eye movement and heart rate data, and then realizes the function of adjusting the difficulty and content of cognitive rehabilitation training according to the state of cognitive load, so as to adapt to the cognitive ability and needs of the subjects.

EP44

EFFECTS OF ANKLE PUMP EXERCISE FREQUENCY ON COMMON FEMORAL VEIN FLOW VELOCITY IN HEALTHY ADULTS

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Background and aims

Ankle pump exercises help prevent deep vein thrombosis by enhancing venous return. However, the optimal frequency for maximizing venous flow remains unclear. This study compared peak systolic velocity (PSV) in the common femoral vein across three exercise frequencies in healthy adults. Additionally, resting time-averaged mean velocity (TAMV) was recorded to establish baseline venous flow parameters in healthy Vietnamese adults.

Methods

A cross-sectional study was conducted on 92 healthy adults. Doppler ultrasound measured TAMV at rest and PSV during ankle pump exercises at 30, 60, and 80 repetitions per minute (rpm), each lasting one minute. Ratings of perceived exertion (RPE) scores were collected during each session. Paired t-tests compared PSV, while the Wilcoxon Signed Ranks Test was used for RPE comparisons.

Results

TAMV at rest was 13.7 ± 6.0 cm/s, showing a moderate negative correlation with age ($r = -0.338$, $p < 0.001$). PSV was highest at 60 rpm (60.8 ± 22.2 cm/s), significantly exceeding values at 30 and 80 rpm ($p < 0.001$). RPE increased with exercise frequency, with median scores of 7 (30 rpm), 9 (60 rpm), and 12 (80 rpm) ($p < 0.001$).

Conclusion

Ankle pump exercises at 60 rpm optimize venous flow velocity while maintaining moderate perceived exertion, making this frequency an effective balance between hemodynamic benefit and patient tolerance. These findings support integrating structured ankle pump exercises into thromboprophylaxis protocols to improve lower limb circulation and reduce venous stasis risk.

EP45

EFFECTS OF ANKLE PUMP EXERCISE FREQUENCY ON COMMON FEMORAL VEIN FLOW VELOCITY IN PATIENTS WITH CHRONIC VENOUS INSUFFICIENCY

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Background and aims

Chronic venous insufficiency (CVI) is characterized by impaired venous return, leading to venous stasis and complications. Ankle pump exercises enhance venous circulation, but the optimal frequency remains unclear. This study examined the effects of different exercise frequencies on peak flow velocity (PFV) in the common femoral vein in CVI patients.

Methods

A cross-sectional study was conducted on 85 CVI patients. Doppler ultrasound measured PFV at rest and after ankle pump exercises at 10, 30, and 60 repetitions per minute (rpm), each lasting one minute, with five-minute rest periods. Paired t-tests analyzed PFV differences across frequencies.

Results

Baseline PFV was 25.8 ± 8.2 cm/s. PFV significantly increased post-exercise ($p < 0.05$). PFV at 30 rpm (66.4 ± 30.4 cm/s) was higher than at 10 rpm (58.8 ± 25.0 cm/s) and 60 rpm (59.1 ± 27.2 cm/s) ($p < 0.01$). Greater PFV enhancement was observed in younger participants ($p = 0.02$) and those in earlier CVI stages ($p = 0.03$).

Conclusion

Ankle pump exercises significantly improve PFV in CVI patients, with 30 rpm yielding the highest PFV. These findings support incorporating structured ankle movements into rehabilitation strategies to optimize venous return and reduce CVI-related complications.

EP46

RISK OF FALLS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS AND DIABETIC PERIPHERAL NEUROPATHY

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Background and aims

Falls are a significant health concern in patients with type 2 diabetes mellitus (T2DM), especially those with diabetic peripheral neuropathy (DPN). DPN leads to sensory deficits, impaired balance, and muscle weakness, increasing fall risk. This study aims to (1) determine the prevalence of high fall risk in T2DM patients with DPN and (2) identify associated factors, including demographic characteristics, clinical features and fear of falling.

Methods

A cross-sectional study was conducted on 100 patients diagnosed with T2DM and DPN. Fall risk was assessed using the Berg Balance Scale (BBS) and Timed Up and Go (TUG) test. Potential risk factors analyzed included 1) Demographic factors: age, sex, BMI, 2) Clinical features: diabetes duration, HbA1C, comorbidities, medication use and 3) fear of falling: assessed using the Fall Efficacy Scale-International (FES-I).

Results

Among the 100 participants, 33% were classified as high fall risk based on the BBS (BBS score < 45), while 37% had an increased fall risk according to the TUG test (TUG ≥ 13.5 s). The risk of falls was significantly associated with age and fear of falling (FES-I) through a multivariate regression model.

Conclusion

Patients with T2DM and DPN have a high risk of falls, emphasizing the need for fall screening and preventive interventions, particularly in older patients and those with a high fear of falling. Clinical assessments should incorporate age and FES-I scores to develop targeted fall prevention strategies for this population.

EP47

A COMPARISON OF KINEMATIC PATTERNS BETWEEN A NOVEL GAIT REHABILITATION ROBOT TRAINING AND ACTUAL WALKING

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Background and aims

In this study, the kinematic patterns during gait training with end-effector typed robot, Morning Walk, were compared to the pattern in real environment. It may helpful to understand that Morning Walk reflects the normal gait pattern and provides clinically meaningful therapy.

Methods

Two healthy subjects were participated. Morning Walk[®], a new end-effector typed gait rehabilitation robot, has independently controllable robotic footplates for gait generation and an active saddle for body weight support. It allows personalized gait parameters according to the patient's symptom. To encourage patient's motivation, it provides assist-as-needed training, VR software, and various real-time biofeedback including GRF, foot pressure distribution, BWS, and kinematic data. To collect the kinematic data, OpenCap, a mobile-based motion analysis tool, was applied. After setting up and calibrating the system, the subjects let walk on the overground and climb the stairs with their self-selected speeds. Then, they trained on the Morning Walk[®] with overground and stair up protocols. The training parameters, including cadence, step length, step height, initial contact angle and toe-off angle, were personalized based on subject's feedback. The kinematic patterns on sagittal plane, such as hip, knee and ankle angles, were extracted and averaged based on the gait cycle. To compare the analogy between kinematic patterns, the Pearson's correlation coefficients were analyzed.

Results

The kinematic data of actual walking and patterns during RAGT were compared within subjects. The averaged Pearson's correlation coefficients showed 0.92 and 0.86 in hip and knee joints, respectively.

Conclusion

Morning Walk allows sophisticated control the parameters during gait training which result in correspondence in gait patterns. The gait patterns of Morning Walk[®] may reflect the actual walking on overground and stairs, and it showed that it could be a promising method to provide effective gait training to patients.

EP48

TRANSLATION, ADAPTATION AND VALIDATION OF THE MALAY VERSION OF THE ROLAND-MORRIS DISABILITY QUESTIONNAIRE

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Background and aims

Low back pain (LBP) is a significant global health issue, with more than half a billion prevalent cases reported worldwide in 2020. This number is projected to increase to approximately 800 million cases by 2050, making LBP the leading cause of years lived with disability. One of the self-reported tools to assess disability is the Roland-Morris Disability Questionnaire (RMDQ). Hence the objective of this study was to translate and culturally adapt the original RMDQ into a Malay version and evaluate its validity among Malaysian patients diagnosed with LBP.

Methods

A rigorous translation and cultural adaptation process was conducted following established guidelines to finalized the RMDQ-Malay. The Content Validity Index (CVI) was evaluated by eight experts from various professions. A cross-sectional study involving 142 patients diagnosed with LBP was conducted to evaluate the internal consistency and convergent validity of the RMDQ-Malay. The Numerical Pain Rating Scale (NPRS) and the Malay version of the Oswestry Disability Questionnaire (ODQ-Malay) were used for comparison.

Results

The translated RMDQ-Malay demonstrated understanding and clarity content validity with an average CVI score of 0.98 and an agreement score of 0.83. The relevance score for average and agreement received 0.99 and 0.92 respectively. The internal consistency was strong, with Cronbach's alpha value ranging from 0.86 to 0.87. The RMDQ-Malay showed a moderate correlation with the NPRS ($r = 0.496$, $P < 0.05$) and strong correlation with ODQ-Malay ($r = 0.739$, $P < 0.05$).

Conclusion

The RMDQ-Malay is a valid self-reported tools for evaluating disability in patients diagnosed with low back pain whether in the acute or chronic stage.

EP49

REJECTION OF UPPER LIMB PROSTHESIS IN A CHILD WITH DEFICIENCY: A QUALITATIVE APPROACH AND PROTOTYPE

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Background and aims

The study aims to investigate the reasons for rejection of present upper limb prostheses among experienced children with upper limb deficiencies through qualitative methods, aiming to discover areas for improvement in prosthesis design via iterative prototyping utilising 3D printing.

Methods

Purposive sampling; three participants (aged 7-12 with upper limb deficiency, experienced in using myoelectric prosthesis) contributed to the development of new design through the 3-corner collaborative design (participatory design approach) methodology.

Results

The research team discovered possibilities for enhancing prosthesis from the children's perspective, produced prototypes accordingly, and obtained comments on these prototypes from the children. Future device development has to prioritise usability, sizes, and weight.

Conclusion

Rapid three-dimensional prototyping, when utilised within a three-corner collaborative design (participatory design approach) methodology, can be a helpful tool for facilitating the involvement of children as equal participants in the development of prosthetic design. This study has proved that children are capable of and should be involved in the design process of prostheses.

EP50

MEASURING SPECIFIC UPPER LIMB MUSCLE SPASTICITY USING MECHANOMYOGRAPHY IN STROKE POPULATION

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Background and aims

Spasticity, characterized by hyperexcitability of stretch reflex and hypertonia, often affects individuals post stroke. Approximately 43.2% of stroke survivors experience spasticity within a year, with the incidence rising to 97% in those with severe motor impairments. The upper limbs, particularly the biceps and brachioradialis, are often affected, impairing hand function. The Modified Ashworth Scale (MAS) is common tool for assessing spasticity, but it has limitations in inter-rater reliability and accuracy at the muscle group level. The Mechanomyogram (MMG), which measures muscle contractions through vibrations, offers a more precise and quantifiable assessment of spasticity. This study aim is to detect and quantify the degree of spasticity in biceps, triceps, and brachioradialis by using MMG, during both resting and stretch reflex conditions, and to correlate between MMG readings with MAS scores.

Methods

This is an exploratory study involves patients with hemiplegic stroke (ischemic and hemorrhagic), aged 18 to 70, who are receiving treatment at the University Malaya Medical Centre's outpatient Rehabilitation Department. The study spans one year and will utilize the BIOPAC Systems MP150 MMG device. Participants must have spasticity in the biceps, triceps, or brachioradialis, graded using MAS scores of 1, 1+, or 2, and demonstrate good cognitive function (MOCA score of 26 or higher). Exclusion criteria include any surgery to the affected limb within the past six months and the presence of other concurrent neurological conditions.

Results

The data collection is ongoing. Descriptive and correlation analysis will be used for data evaluation.

Conclusion

This study provides insight into quantitatively measuring spasticity in specific muscles by assessing muscle activity at rest and during active stretch reflex. This method could improve spasticity detection, especially in patients who fear or unable to tolerate exams, such as paediatric patients, individuals with severe cognitive impairments, or unconscious individuals.

EP51

DEVELOPMENT AND EVALUATION OF PUTH-REHAB: A SPECIALIZED LARGE LANGUAGE MODEL FOR REHABILITATION MEDICINE

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Background and aims

Our research team developed and tested PUTH-Rehab v2, a large language model specialized in rehabilitation medicine, to support clinical work, patient education, and telerehabilitation.

Methods

The model was pre-trained and fine-tuned using domain-specific data, including professional textbooks, popular science content, and doctor-patient Q&A from clinical cases.

Results

In benchmark tests (Rouge-1, Rouge-2, Rouge-L, Similarity), PUTH-Rehab outperformed several commercial models (GPT-4o, Qwen2-72B, Ernie 4.0, BenTsao). Additionally, in standardized exams for rehabilitation medicine training and attending physician qualification, the model achieved over 60% accuracy in key areas such as orthopaedic rehabilitation (62.27%), stroke rehabilitation (61.35%), and spinal cord injury (SCI) rehabilitation (65.06%).

Conclusion

PUTH-Rehab demonstrates a knowledge level comparable to human physicians, making it a valuable tool for rehabilitation medicine.

EP52

THE IMPACT OF OVERGROUND EXOSKELETON GAIT TRAINING IN RESTORING MOBILITY AMONG PATIENTS WITH NEUROLOGICAL DISORDERS

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Background and aims

Robot-assisted rehabilitation has shown effectiveness in improving lower limb motor recovery and ambulation among patients with neurological disorders. Various types of robotic devices with different programs are emerging for lower limb rehabilitation. The aim of this case study is to describe the effectiveness of overground gait training with lower limb exoskeleton among patients with neurological disorders.

Methods

This is a case series involving two strokes, one functional neurological disorder and one multiple sclerosis patient who were in subacute phase. All underwent 4 sessions (30 minutes per session) of overground gait training with the exoskeleton. Gait training settings and programs were set based on individuals. Functional Ambulation Category (FAC), Modified Rivermead Mobility Index (MRMI), Berg Balance Scale (BBS), 6 minute walk test (6mwt) and 10 meter walk test (10mwt) were recorded pre and post intervention.

Results

All patients progressed in ambulation after four sessions of robot-assisted gait training. They had improvement by 1 to 3 levels in FAC, and had an increment in walking speed of 0.07m/s-0.15m/s, with all achieving Minimal Clinically Important Difference (MCID) of 0.05m/s in 10mwt. Although all patients had increased in 6mwt, but only one achieved MCID of >44 meters. Three had gained in MRMI by 9 to 18 (MCID 4.5), and BBS by 7 to 30 (MCID 5). One did not have improvements in MRMI and BBS due to ceiling effect, as the initial scores were almost maximum. No adverse events were noted during the usage of the device.

Conclusion

In this case series, overground gait training with lower limb exoskeleton have shown beneficial outcomes among patients with neurological disorders, as improvements were noted in ability of ambulation, and gait balance speed and endurance. Further research with a larger sample size is needed to assess the suitable dosage of robotic gait training.

EP53

ORTHOTICS IN NEUROREHABILITATION

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Background and aims

Neurorehabilitation focuses on restoring movement, function, and independence in individuals with neurological disorders, including stroke, spinal cord injury, cerebral palsy, and multiple sclerosis. Orthotic devices play a vital role in enhancing mobility, stability, and neuromuscular recovery by providing external support, correcting biomechanical abnormalities, and assisting in motor function rehabilitation. Traditional rigid orthoses, such as ankle-foot orthoses (AFOs) and knee-ankle-foot orthoses (KAFOs), have been widely used; however, recent advancements have introduced dynamic, intelligent, and sensor-based orthotic solutions that improve patient's functional outcomes. This aspect is often left or delayed in overall planning and implementation of the rehabilitation planning and strategy. The authors, with the aim to sensitize residents and colleagues in physiatry as well as in neurology, present a review of orthotics in neuro rehabilitation with an overview of newer technologies and materials in this important area of neurorehabilitation.

Methods

In the presentation highlights cutting-edge technologies such as 3D-printed orthoses allow for lightweight, cost-effective, and highly customized solutions, improving comfort and adaptability. Functional electrical stimulation (FES) devices help restore voluntary movement by activating paralyzed or weakened muscles. Soft exosuits and bio-inspired orthoses, made from flexible and elastic materials, enable greater mobility while maintaining natural movement patterns. Additionally, the integration of artificial intelligence (AI) and machine learning has revolutionized neurorehabilitation by analysing real-time movement data, providing adaptive support, and optimizing therapy strategies.

Results/Conclusion

These advancements have significantly enhanced functional recovery, promoted neuroplasticity, and improved the quality of life for individuals with neurological impairments. While challenges such as affordability and accessibility persist, ongoing research and innovation continue to push the boundaries of personalized, effective, and technologically advanced orthotic interventions in neurorehabilitation.

Key Words

Neurorehabilitation, orthotics, smart orthoses, AI in rehabilitation, 3D printing, functional electrical stimulation, exosuits, adaptive support, motor recovery.

EP54

HOME REHABGYM: PRELIMINARY RESULTS OF A FEASIBILITY AND USABILITY EVALUATION OF ADVANCED TECHNOLOGIES FOR MINIMALLY SUPERVISED HOME NEUROREHABILITATION POST-STROKE

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Background and aims

Multi device home-based rehabilitation (RehabGym) can potentially increase therapy dose along the care continuum. We present an interim evaluation of the feasibility and usability of an ongoing clinical trial.

Methods

A single centre pilot trial targeting 30 post-stroke medically-stable ≥ 28 days, with Upper Limb (UL) Fugl-Meyer Motor Assessment (FMA) of 20-60/66. Post in-clinic and in-home (with caregiver) onboarding, participants commenced a 6-week home program with MyoGuide (wrist-finger extension) and 3 weeks each of either HMan[®] (shoulder-elbow motion) or ReHandyBot (forearm and grasping), supported by remote monitoring and 2 conventional occupational therapy sessions. Clinical outcomes at Weeks 0 (pre-program), 3 (mid-program), 6 (post-program), 12 and 24 (follow-up) include FMA, Action Research Arm Test (ARAT), Stroke Specific Quality of Life Scale (SSQOL), with System Usability Scale (SUS) at Weeks 3 and 6.

Results

4 participants completed the home program without any adverse events: 3 males and 1 female of mean $\pm$ SD age 47.75 ± 5.06 years; post-stroke of 58.61 ± 18.17 weeks; baseline FMA (0-66) 38.50 ± 8.43 , ARAT (0-57) 14.25 ± 8.66 and SSQOL (0-245) 174.75 ± 51.71 . Use measures (mean $\pm$ SD) of MyoGuide, HMan[®] and ReHandyBot respectively were: post-training SUS of 68.75 ± 21.65 , 80.63 ± 16.63 and 57.50 ± 26.06 ; % attendance of 68.45 ± 14.47 , 83.33 ± 19.24 ; 78.57 ± 22.50 ; and daily training (mins) of 6.52 ± 2.60 , 50.08 ± 31.16 , 26.55 ± 13.91 . Comparing against baseline, gains at Weeks 6 and 12 respectively were: FMA of 4.50 ± 5.26 ($P=0.186$) and 4.75 ± 2.87 ($P=0.045$); ARAT of 4.75 ± 2.50 ($P=0.032$) and 8.50 ± 5.75 ($P=0.060$); and SSQOL of 5.75 ± 30.25 ($P=0.729$) and 19.25 ± 24.49 ($P=0.214$).

Conclusion

Preliminary findings support the safety and feasibility of home RehabGym for technology-aided UL training as a promising approach to increase therapy dose along the care continuum.

EP55

THE EFFECTS OF VIRTUAL REALITY-BASED TELEREHABILITATION FOR PATIENTS UNDERGOING TOTAL KNEE ARTHROPLASTY: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and aims

Virtual Reality (VR) technology is increasingly being used in rehabilitation to enhance motor, cognitive, and psychological recovery by providing immersive and engaging environments that improve patient outcomes and adherence to therapy. Recently, VR has been increasingly used in postoperative rehabilitation of total knee arthroplasty (TKA). The purpose of this systematic review and meta-analysis was to evaluate the effectiveness of VR-based rehabilitation in TKA compared to conventional rehabilitation.

Methods

Six electronic databases were systematically searched to identify trials comparing the VR-based rehabilitation with conventional interventions for TKA. Studies were selected based on inclusion and exclusion criteria, focusing on outcomes related to pain, function, and range of motion (ROM). Standardized mean differences (SMDs) with 95% confidence intervals (CIs) were calculated to compare outcome measures. Heterogeneity was assessed using the I^2 and χ^2 tests. The methodological quality of selected studies and the quality of evidence were evaluated for included studies.

Results

A total of eight studies with low to moderate risk of bias were included in this meta-analysis. The pooled results showed that VR-based rehabilitation had a superior effect on relieving pain (SMD = -0.17 [95%CI = -0.32, -0.02], $P = 0.04$), increasing function (SMD = -0.67 [95%CI = -0.94, -0.4], $P < 0.01$), and improving ROM (SMD = 0.28 [95%CI = 0.12, 0.44], $P < 0.01$) compared with the conventional intervention group.

Conclusion

The meta-analysis provides moderate-quality evidence that the VR-based rehabilitation programs have a beneficial effect on improving function, pain, and ROM compared with conventional intervention in patients with TKA.

EP56

THE TRANSIENT EFFECTS OF PRIMING ON QUADRICEPS MUSCLE RESPONSES FOLLOWING TRANSCRANIAL MAGNETIC STIMULATION AMONG STROKE PATIENTS

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Background and aims

Priming is considered a potential method to enhance motor cortex activation; however, its effect on transcranial magnetic stimulation (TMS) evoked quadriceps muscle activity remains unclear. This research used mechanomyography (MMG) to quantify the influence of priming on stroke patients' quadriceps muscle activity.

Methods

Four adult stroke patients participated in the experiment in a sitting position. The level of muscle activation was assessed by MMG sensors placed on the rectus femoris (RF) and vastus lateralis (VL) muscles. Subjects first received TMS stimulation under non-priming conditions, followed by stimulation under priming conditions. Four TMS intensities (50%, 60%, 70%, and 80% of the maximum output) were applied with three trials per intensity. The mean peak amplitude (MPA) of the MMG signals was calculated for each trial and compared between non-priming and priming conditions.

Results

MPA values in the priming conditions were higher than those under the non-priming conditions across all TMS intensities, with an average increase of 27.262% in the RF muscle and 14.372% in the VL muscle.

TMS Intensity, %	MMGMPA, Priming, mV		MMGMPA, Nonpriming, mV	
	RF	VL	RF	VL
50	1.511±0.501	1.589±0.366	1.090±0.412	1.220±0.240
60	2.286±1.363	2.343±1.314	1.978±0.432	1.960±0.382
70	2.926±1.022	2.737±1.595	2.176±0.630	2.564±0.937
80	3.006±1.376	2.942±1.454	2.496±0.818	2.917±1.384

Table1. Comparison of MMG MPA Across Different TMS Intensities and Conditions

Conclusion

The results suggest that priming may enhance TMS-evoked muscle activity in the quadriceps. However, due to the limited sample size and lack of statistical analysis, these findings require further validation in larger studies.

EP57

MAXIMIZING REHABILITATION OUTCOMES WITH INTEGRATION OF ROBOTIC ANKLE THERAPY IN STROKE REHABILITATION

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Background and aims

Lower limb weakness is a common sequel of stroke. Ankle muscle weakness affects the quality of standing and ambulation. Various ankle robotics were developed, mainly exoskeletons and end-effector-based, to assist ankle rehabilitation. Studies have shown robot-assisted ankle rehabilitation improves ankle movement and ambulation. This study demonstrates the effectiveness of incorporating robotic ankle therapy, using end-effector-based ankle robotic devices with interactive games and real-time audio-visual feedback, into conventional inpatient rehabilitation.

Methods

A retrospective study involving ten stroke patients who underwent inpatient rehabilitation. 6 were males, average age of 51.1 years, and ratio of subacute to chronic phase of stroke was 6:4. All received conventional rehabilitation, with extra 4 sessions (20 minutes/session) of robotic ankle therapy. Training mode (passive, assistive, or active) were set based on individuals. Pre- and post-therapy Active Range Of Motion (AROM) and Manual Muscle Testing (MMT) of hemiplegic ankle, admission and discharge Functional Ambulatory Category (FAC), Berg Balance Scale (BBS), and 10 meter walk test (10mwt), were analyzed.

Results

The average ankle dorsiflexors and plantarflexors power improvement were 1.7 ± 1.2 (Mean $\pm$ SD) and 1.8 ± 1.5 . 90% had increased ankle dorsiflexion AROM (16.4 ± 12.5 degrees), while 70% had increased plantarflexion AROM (10.3 ± 8.7 degrees). At discharge, average gain in BBS was 10.9 ± 9.6 , whereby 6 achieved Minimal Clinically Important Difference (MCID). FAC improved from an average of 1.4 ± 1.6 to 4.0 ± 1.3 , and 70% had upgrades in walking aids. Among 6 out of 7 who had recorded 10mwt, achieved MCID with an improvement of 0.29 ± 0.30 m/s. No adverse events were noted.

Conclusion

Integrating robotic ankle therapy into conventional rehabilitation has shown positive outcomes in ankle performance and gait function among stroke patients. Randomized control trials are needed to assess the effectiveness of ankle rehabilitation using this end-effector-based ankle robotic device.

EP58

TRANSCRANIAL MAGNETIC STIMULATION IN LOWER LIMB REHABILITATION FOR STROKE PATIENTS

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Background and aims

Transcranial Magnetic Stimulation (TMS) is a brain stimulation modality mostly to alleviate depression but also with potential in stroke rehabilitation. It is used to train lower limb motor function by the generation of electromagnetic fields that evoke electric currents within certain areas of the brain. This study aims to determine whether different levels of TMS intensity affect the mean peak amplitude (MPA) of mechanomyography (MMG) signals from the quadriceps.

Methodology

Single pulse TMS triggered the rectus femoris (RF) and vastus lateralis (VL) muscles using a double cone coil (Figure 1) with the muscle responses measured using MMG. The TMS intensities ranged from 50% to 80% of the maximum stimulator output, and each subject underwent three trials per intensity level, with a 30s rest period between trials to minimise muscle fatigue. The MMG MPA values were then analysed to assess neuromuscular responses.

Results

TMS stimulation using double cone coil successfully triggered quadriceps muscle response in adult stroke patients. The findings revealed that higher intensity of TMS caused higher quadriceps activation with significantly different effects according to the motor impairment level. Preserved quadriceps strength patients were characterized by higher MPA (4.93 ± 1.63 mV), while hemiparetic and sensory-impaired hemiparetic patients were presented with lower MPA (1.14 ± 0.96 mV).

Conclusion

Patients with better motor recovery demonstrated greater neuromuscular activation, while motor-impaired patients reflected lower and less variable MPA. These findings demonstrate the potential of TMS as a useful rehabilitation intervention, particularly for those patients with residual motor capacity.

EP59

STIMULATING INDEPENDENCE: EXPLORING SELF-ADMINISTERED NMES ADHERENCE IN POST-STROKE NEUROREHABILITATION

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Background and aims

Neuromuscular electrical stimulation (NMES) is one of the modalities used in stroke rehabilitation. Studies shows NMES strengthen muscles, reduce spasticity, prevent muscle atrophy, increase corticospinal excitability and enhance neuroplasticity. Two recent research on home-based NMES reported effectiveness of NMES in pain control, as well as high compliance to NMES usage with no adverse events reported. In this study, we would like to share the self-administered NMES program among stroke patients during inpatient rehabilitation.

Methods

This retrospective study involves 22 stroke patients who perform self-administered NMES during inpatient intensive rehabilitation between October 2024 and January 2025. Patients who were cognitively intact and capable of self-administering NMES, or patients with dedicated caregivers were identified. NMES device were loaned to these patients or caregiver, and they were thought on the NMES device usage and electrode placement over the targeted muscles. NMES diaries were provided for self-reported compliance. Data were extracted from the NMES diaries and analysed.

Results

The average days of NMES loan to these patients was 17 ± 9 (Mean $\pm$ SD) days, with the average number of targeted muscles for stimulation of 7 ± 2 . Patients or caregivers performed 5 ± 4 muscle stimulations per day, whereby only 6 of them performed NMES over all targeted muscles every day. The mean duration of NMES usage each day was 48.9 ± 38.0 minutes, in which 6 of them self-administered NMES more than 60 minutes/day, while 7 self-administered 30-60 minutes/day. No adverse event reported.

Conclusion

Although patients were able to perform self-administered NMES during the rehabilitation stay, the compliance to NMES usage were unsatisfactory. This was probably due to fatigue after intensive exercises, and other numerous ward-based self exercises were given to them. Besides, there is a lack of monitoring from staff to ensure the NMES usage and appropriateness in self-application of NMES. Further strategies are needed to promote adherence to self-administered NMES.

EP60

EFFECTS OF ANKLE-FOOT ORTHOSES ON FORWARD DISPLACEMENT KNEE AND HIP JOINTS AND FOOT ROCKER FUNCTION DURING GAIT IN HEALTHY ADULTS

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Background and aims

Adjusting the range of motion of the ankle joint with an ankle-foot orthosis (AFO) may affect the rocker function during gait. However, this effect has not been fully clarified in previous studies. This study aimed to investigate the impact of AFO use on gait by focusing on the forward displacement knee and hip joints from the perspective of rocker function.

Methods

Twelve healthy adults (mean age 24.7 ± 1.0 years; mean height 164 ± 8.3 cm; mean weight 53.8 ± 6.0 kg) participated in this study. Participants walked on a treadmill at a speed of 2 km/h under three conditions: without an AFO and with an AFO fixed at 0° and 10° left ankle dorsiflexion. Using a three-dimensional motion analysis system, we measured the duration of the rocker function and the forward displacement knee and hip joints. Gait phases were classified into heel, ankle, and forefoot rockers, and comparisons were made across the three conditions.

Results

While walking with an AFO, the heel rocker increased both the duration and forward displacement knee and hip joints, whereas the ankle rocker decreased these parameters. The forefoot rocker significantly reduced the forward displacement knee joints. Furthermore, as the AFO's ankle dorsiflexion angle increased, the heel rocker led to a greater rocker duration and forward displacement knee and hip joints, while the forefoot rocker showed a decrease in these measures.

Conclusion

Forward propulsion was quantitatively assessed by measuring the forward displacement knee joints during the stance phase. Additionally, gait characteristics can be analyzed by classifying movements based on the rocker function. The forward displacement knee joints have the potential to become an evaluation index that directly reflects the effects of changes in conditions, such as wearing an appropriate AFO or adjusting the ankle angle of the AFO.

EP61

AIOT-DRIVEN INTELLIGENT TELE-REHABILITATION SYSTEM FOR SPORTS INJURY RECOVERY: INTEGRATING MULTI-MODAL AI AND CLOSED-LOOP MANAGEMENT IN BIOMEDICAL ENGINEERING

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Background and aims

Current remote rehabilitation systems face challenges in clinical integration, including low adherence to home-based protocols, unmonitored exercise quality, and delayed efficacy assessments. This study aims to develop an AIoT-enabled tele-rehabilitation system to address these gaps by enabling intelligent interaction between clinicians and patients, ensuring compliance with clinical pathways and personalized rehabilitation.

Methods

The system integrates multi-modal AI technologies: (1) A smart prescription module generates standardized exercise models using BlazePose to extract 33 skeletal keypoints from clinician-uploaded videos. (2) Real-time biofeedback via MediaPipe captures 3D joint kinematics (e.g., ROM, force timing) to detect deviations. (3) A dynamic evaluation framework digitizes pain (VAS) and functional (Lysholm) scores, producing automated progress reports. The system aligns with China's clinical guidelines for post-ACL reconstruction rehabilitation.

Results

The system achieved 95% accuracy in motion tracking and reduced exercise errors by 35% in pilot trials. It supports 10+ clinical scenarios and lowers costs by 85% compared to imported solutions. A clinical exercise database are under development, with planned regulatory approval as a Class II medical device.

Conclusion

This AIoT-driven system bridges hospital-home rehabilitation gaps through adaptive AI and closed-loop management, demonstrating significant potential to enhance rehabilitation accessibility, safety, and efficacy in resource-limited settings.

EP62

ELECTRIFYING RECOVERY: A CASE REPORT ON THE POSITIVE IMPACT OF NEUROMUSCULAR ELECTRICAL STIMULATION FOR FACIAL NERVE PALSY IN GUILLAIN-BARRÉ SYNDROME

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Background and aims

Facial nerve palsy (FNP) is a common manifestation of Guillain-Barré Syndrome (GBS), leading to functional deficits in speech, eating, and facial expression¹. Neuromuscular Electrical Stimulation (NMES) aids in muscular retraining for individuals with FNP². Evidence on NMES in GBS-related FNP is scarce, prompting this case report.

Case Report

Madam A is a 38-year-old lady, who presented with gradual onset of numbness over bilateral hands, feet, and face; preceded by an upper respiratory tract infection. Her condition worsened with the development of concurrent weakness, ataxia and areflexia and was treated for GBS-Miller-Fisher Overlap Syndrome by the neurology team. Post five cycles of intravenous immunoglobulin and physical rehabilitation, she demonstrated clinical improvement with Hughes GBS Disability Scale (HGDS) of 4 to 2. However, she experienced persistent facial nerve paralysis with poor oromotor function. She was referred to our rehabilitation facility at seven weeks post-GBS onset. At presentation, her bilateral FNP was graded as House-Brackmann Grade VI (total paralysis). This was associated with lagophthalmos and a history of exposure keratitis. She had poor oromotor function with difficulty in mastication, resulting in oral phase dysphagia, drooling (Drooling Frequency and Severity Scale (DFSS) 4,3) and severe dysarthria. 10 sessions of bilateral facial NMES were administered specifically targeting bilateral frontalis, zygomaticus, orbicularis oris, and mentalis muscles (50Hz, 400µs, 4mA, 10 min/point, in work rest mode). Post-treatment, her facial function improved to House-Brackmann Grade II (left) and III (right), with complete resolution of lagophthalmos. Her mastication ability and swallowing improved, with resolved drooling (DFSS 1,1). Dysarthria improved and communication was effective.

Conclusion

NMES demonstrates promising potential in enhancing facial nerve recovery in patients with GBS-related FNP, offering an avenue to improve clinical and functional outcomes.

EP63

IMPROVING ELBOW RECOVERY WITH SOFT ROBOTIC ASSISTANCE

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Background and aims

Repeated elbow movements during daily tasks or work activities can cause significant stress, leading to elbow injuries. Traditional rehabilitation tools, like rigid braces or exoskeletons, often lack comfort, portability, safety, and affordability. Also, traditional rehabilitation usually depends heavily on therapists, causing potential delays in treatment. This paper describes a soft robotic device powered by Pneumatic Artificial Muscles (PAM), designed to help with elbow rehabilitation, focusing on bending and straightening the elbow.

Methods

The study included five healthy young men aged 20-24 with no history of elbow injuries. We evaluated the effectiveness of the device using muscle activity measurements (EMG) and elbow movement tests, both with and without the device. The soft robotic device has two modes: Active Mode, which senses when the user wants to move and provides assistance, and Passive Mode, which moves the elbow repeatedly without the user needing to actively engage their muscles.

Results

Using the PAM-based device greatly lowered the muscle activity in the triceps by about 40% and in the biceps by about 60%. When the device's assistance was activated, muscle activity was further reduced by 30% in the triceps and 50% in the biceps. The elbow moved smoothly within a comfortable range of 70 to 90 degrees.

Conclusion

The soft robotic device using PAM technology offers an easy-to-use and effective solution for elbow rehabilitation. It reduces strain on the muscles, lowers unwanted muscle tension, and helps users move their elbows more efficiently. Its portable and user-friendly design makes it valuable for people recovering from elbow injuries.

EP64

ACCURACY AND RELIABILITY OF A SPATIOTEMPORAL FACTORS MEASURED BY A SIMPLE REAL-TIME GAIT ANALYSIS SYSTEM

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Background and aims

Three-dimensional motion analysis systems provide highly accurate gait analysis; however, their high cost, complex operation, and lengthy analysis time limit their use in clinical practice. Therefore, we developed a gait analysis system using the OptiTrack: V120 Trio, a compact device with three cameras integrated into a single unit. This system enables real-time analysis of spatiotemporal parameters and toe clearance. This study aimed to evaluate the relative and absolute reliability of spatiotemporal parameters measured using this system.

Methods

Thirty-four healthy participants walked on a treadmill at speeds ranging from 1.0 to 5.0 km/h. Gait measurements were obtained by synchronizing the OptiTrack: V120 Trio (NaturalPoint, Inc.) with KinemaTracer® (KISSEI COMTEC, Co., Ltd.), a conventional three-dimensional motion analysis system. The analysis focused on gait cycle time and distance parameters (stride length and left and right step length) recorded by each system. Relative reliability was assessed using intraclass correlation coefficients (ICC) with 95% confidence intervals (CI), whereas absolute reliability was evaluated by Bland-Altman analysis.

Results

Relative reliability was high, with an ICC (1,1) of 1.00 for gait cycle and stride length, 0.96–0.99 (95% CI: 0.93–0.99) for right step length, and 0.96–0.98 (95% CI: 0.92–0.99) for left step length. Bland-Altman analysis indicated fixed errors for stride length at treadmill speeds of 2.0 km/h and 4.0 km/h, but no fixed or proportional errors for other parameters.

Conclusion

Our system captures gait events by tracking the toes and medial malleolus using a camera embedded in a bar-shaped frame positioned in front of the treadmill. Measurements obtained using our gait-analysis system are comparable with those from conventional three-dimensional motion analysis, demonstrating high reliability and potential for clinical application.

EP65

ROLE OF IOWA ORAL PERFORMANCE INSTRUMENT (IOPI) IN DYSPHAGIA MANAGEMENT: A CASE REPORT

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Background and aims

The Iowa Oral Performance Instrument (IOPI) plays a critical role in assessing and treating speech and swallowing disorders by providing quantifiable data on muscle strength and endurance, guiding therapeutic decisions, and tracking progress. It helps differentiate between muscle weakness and central motor control issues and provides biofeedback during oral motor exercise programs.

Methods (Case report)

This case report presents a 19-year-old male diagnosed with Bickerstaff encephalitis, complicated by impaired Glasgow Coma Scale (GCS) recovery, deconditioning, tracheostomy, dysphagia, ophthalmoplegia, and right facial nerve palsy. The patient commenced rehabilitation in August 2024, with a baseline cognitive assessment (MMSE 28/30). A bedside swallowing assessment revealed the patient has poor tongue strength and patient need for multiple swallows per each bolus mouthful, suggesting the presence of oral and pharyngeal residue and coughing on bolus. The patient was diagnosed with oropharyngeal dysphagia, characterized by poor orolingual control. In response, an intensive regimen of tongue-strengthening exercises using the IOPI was initiated over 10 sessions, alongside oromotor exercises. After completion of these exercises, a flexible endoscopic evaluation of swallowing (FEES) was conducted to further assess swallowing function.

Results

The patient exhibited notable improvement in tongue strength following the 10-day regimen of intensive IOPI exercises, as documented table 1. A subsequent FEES revealed no penetration, no aspiration and minimal residue in the vallecular, allowing the patient to progress to oral feeding with a soft diet, which was gradually advanced to solids as tolerance improved.

Conclusion

This case highlights the effectiveness of intensive tongue exercises using the IOPI in improving dysphagia outcomes. By assessing tongue strength and endurance, the IOPI helps clinicians evaluate a patient's ability to swallow effectively. Hence the IOPI provides objective data that can be used to track improvements over time, helping to monitor the effectiveness of therapeutic interventions.

IOPI Target Pressure kPa (80%)	Baseline (kPa)	1 (kPa)	2 (kPa)	3 (kPa)	4 (kPa)	5 (kPa)	6 (kPa)	7 (kPa)	8 (kPa)	9 (kPa)	10 (kPa)
Tongue front	10	10	10	10	10	14	16	16	20	22	23
Tongue back	6 (below test value)	6 (below test value)	10	10	10	15	14	16	18	20	22
Right lip squeeze	3 (below test value)	3 (below test value)	3 (below test value)	3 (below test value)	3 (below test value)	4 (below test value)	4 (below test value)	4 (below test value)	5 (below test value)	5 (below test value)	5 (below test value)
Left lip squeeze	4 (below test value)	4 (below test value)	4 (below test value)	4 (below test value)	4 (below test value)	4 (below test value)	4 (below test value)	4 (below test value)	4 (below test value)	7 (below test value)	7 (below test value)

Target value aimed 80% which represented by the Target Pressure (minimum 10kPa) stated above.

Each exercise carried out 10 times till achieve target value.

EP66

ARTIFICIAL INTELLIGENCE IN REHABILITATION: TRENDS, CHALLENGES, AND FUTURE DIRECTIONS – A BIBLIOMETRIC ANALYSIS

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Background and aims

Artificial Intelligence (AI) is transforming physical rehabilitation by enabling greater personalization of therapy, providing ongoing monitoring of patients in real time, and increasing accessibility. Considering that this research domain is continually evolving, this paper aims to perform a thorough bibliometric mapping to assist in identifying emerging trends, leading contributors, and strategic research directions.

Methods

A bibliometric analysis was performed on publications indexed in the Scopus database from 2015 to 2024. The data were processed and visualized using Biblioshiny (Bibliometrix R package) and VOSviewer. Key analytical dimensions included annual scientific production, keyword co-occurrence, and thematic evolution.

Results

AI-based rehabilitation research has grown exponentially, with publications increasing from less than 400 in 2019 to nearly 1,500 in 2024, driven by advancements in Machine Learning, Deep Learning, and Artificial Intelligence. AI-based rehabilitation research trends have evolved significantly over time. Between 2015 and 2018, dominant themes included brain-computer interfaces, gesture recognition, and electroencephalography (EEG), reflecting early experimentation with sensor-based interfaces and neural input systems. From 2019 to 2021, the field shifted toward machine learning, deep learning, and wearable sensors, marking a transition to intelligent, data-driven rehabilitation technologies. From 2022 to 2024, trends emphasize real-time AI systems, physiological signal monitoring, and adaptive rehabilitation platforms. Machine Learning remains the central theme, with high network centrality and influence across thematic clusters.

Conclusion

This bibliometric study offers a overview of AI applications in rehabilitation, highlighting substantial research growth and thematic evolution over the past decade. The findings serve as a foundation for future research of AI-based rehabilitation.

EP67

ASSESSING THE FEASIBILITY OF POST-STROKE UPPER LIMB PROPRIOCEPTION TRAINING WITH ROBOTIC THERAPY

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Background and aims

Almost half of stroke patients demonstrate deficits in sensing and perceiving their movements, but sensory retraining focusing on proprioceptive and kinaesthetic senses is often overlooked. Our current work aims to assess the efficacy and feasibility of robot-assisted training which targets upper-limb proprioception in a single-arm pilot interventional study.

Methods

Nine out of 24 screened chronic stroke survivors with affected arm sensory impairments of $\leq 6/8$ on at least 2 categories of the Erasmus MC modifications of the Nottingham Sensory Assessment (EmNSA) and motor power of ≥ 2 at shoulder and elbow were recruited. The thrice weekly fifteen 1-hour sessions training involved gameplay with planar movements on a tabletop-based end-effector arm robotic trainer. Participants' arms were blocked from sight but enhanced sensory cues for trajectory guidance and positive reinforcement with each successful attempt were provided by the system. Robotic and clinical (EmNSA, Fugl Meyer Assessment of Upper Limb Motor Score (FMA-UL), Streamlined Wolf Motor Function Test (SWMFT)) outcomes at immediate post-training and at 1-month follow up were conducted. Post-training questionnaire was administered to assess perception about the intervention.

Results

There were no dropouts and no adverse events reported. Questionnaire scores showed that >50% of the participants found this approach enjoyable, beneficial for rehab and long-term training, and that the performance feedback and haptics guide were helpful. Significant improvement was observed in the robotic movement reproduction test (sensory) [$F(2,16) = 3.61$, $p < 0.01$], and not in the robotic motor test [$F(2,16) = 1.09$, $p = 0.10$]. Improved Em-NSA, FMA-UE and WMFT were found in 4, 3 and 6 participants respectively post training, but overall differences were non-significant.

Conclusion

This study provides preliminary evidence and insights that robotics-based proprioception training of the affected upper limb post-stroke can be safe and potentially be further developed to enhance clinical outcomes.

EP68

PHYSICIANS' PERCEPTIONS TOWARD DRIVING FITNESS ASSESSMENT AND THE DRIVER'S LICENSE SYSTEM FOR HIGH-RISK DRIVERS

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Background and aims

In countries such as the United Kingdom, Canada, and Australia, guidelines for determining driving fitness are well-established, with specific criteria for assessing medical conditions related to driving ability. Accordingly, the aim of this study is to gather opinions from rehabilitation physicians in Korea on the definition of high-risk drivers and identify major considerations for the conditional driver's license system for high-risk drivers.

Methods

The study participants were rehabilitation medicine physicians, and a total of 88 physicians' responses were collected through an online survey. The survey consisted of questions covering general characteristics, clinical experience with high-risk drivers, awareness of policies related to elderly drivers, and opinions on licensing regulations for high-risk drivers.

Results

84.1% of respondents said the number of people questioning driving problems has increased in the past five years. Regarding medical certification for driving licenses, 92.0% of respondents reported difficulties due to the lack of clear assessment criteria. Additionally, beyond basic screening tests, cognitive function test (81.8%) and on-road driving test (70.5%) were additionally required.

Table 1. Difficulties in preparing driving-related medical certificates/disclaimers

Item	N (%)
Lack of ophthalmic examination that can be directly linked to driving hazards	41 (46.6%)
Evaluation cannot be conducted due to medical hours or working facilities	35 (39.7%)
No clear assessment criteria for determining driving hazards	81 (92.0%)
Negative results may result in poor relationship with the patient	33 (37.5%)
Reluctant to write because they do not know where to use the written content.	51 (57.9%)
Since there is a license standard for occasional aptitude test for driver's license, it is unnecessary to express further opinions of medical personnel	24 (27.3%)
Total	88 (100.00%)

Table 2. Tests deemed necessary in addition to screening tests

Assessment	N (%)
Submit a medical certificate	25 (27.3%)
Visual field test	54 (61.4%)
Cognitive function test in hospital	72 (81.8%)
Written test equivalent to the driver's license written test	11 (12.5%)
On-road driving test equivalent to a driver's license practical test	62 (70.5%)

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Institutions conducting driving rehabilitation programs accounted for the highest proportion (45.5%) of those responsible for driving fitness assessments.

Table 3. Responsible institution for developing the driver fitness assessment

Item	N (%)
Clinic-level medical institution(primary care clinic)	3 (3.4%)
Hospital-level medical institution(General hospital)	27 (30.7%)
Certified tertiary hospital	10 (11.4%)
Institutions conducting driving rehabilitation programs	40 (45.5%)
Other opinion	8 (9.1%)
Total	88 (100.00%)

For the final decision on driving eligibility, 54.5% of respondents indicated that both physicians and administrative authorities should be involved. As for the organization responsible for developing driving fitness criteria, the National Police Agency (34.1%) was identified as the most appropriate.

Table 4. Subject to final judgment on drivability

Item	N (%)
Physician	7 (8.0%)
Administrative authorities	31 (35.2%)
Physician and administrative authorities	48 (54.5%)
Other opinion.	2 (2.3%)
Total	88 (100.00%)

Table 5. The institution responsible for developing detailed standards for drivability

Item	N (%)
Related societies of diseases	22 (25.0%)
Korean Academy of Medical Sciences(KAMS)	5 (5.7%)
Korean Medical Association(KMA)	2 (2.3%)
Ministry of Health and Welfare	21 (23.9%)
National Police Agency	30 (34.1%)
Other opinion	8 (9.1%)
Total	88 (100.00%)

Conclusion

This study is significant in that it is the first study in Korea to collect opinions from rehabilitation physicians on the driving fitness assessment and policy of high-risk drivers, and is expected to serve as the basis for developing guidelines for driving fitness assessment for high-risk drivers.

Acknowledgement

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EP69

FROM GUIDELINES TO INTELLIGENCE: OPERATIONALIZING WHO ICOPE VIA AN AI-ENABLED MULTIMODAL ASSESSMENT PLATFORM

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Background

As global aging accelerates, healthcare systems face urgent challenges in identifying and managing functional and cognitive decline in older adults. The World Health Organization's *Integrated Care for Older People (ICOPE)* framework offers a structured approach to assess six essential domains— cognition, mobility, nutrition, vision, hearing, and mood—but its implementation is often manual, time- consuming, and lacks intelligent automation. To address this, we present an AI-driven, privacy- preserving, multimodal digital platform that operationalizes ICOPE assessments using advanced natural language, cognitive, and physical sensing technologies.

Methods

The proposed system integrates several AI and sensing components:

- A **Retrieval-Augmented Generation (RAG)** integrates a large language model (LLM) with structured, ICOPE-aligned external knowledge bases to interpret open-ended responses from a broad range of validated questionnaires, including the AD8 (Dementia Screening Interview), MNA (Mini Nutritional Assessment), GDS-15 (Geriatric Depression Scale), as well as instruments assessing social frailty and quality of life. The framework supports both text and speech input, enabling voice-guided, speech-to-speech interaction. It facilitates real-time semantic classification, adaptive questioning, scoring, and error correction, while also generating personalized health education content and intervention suggestions based on the interpreted data.
- A **Multimodal Motion Capture (MMC)** system automatically analyzes SPPB (Short Physical Performance Battery) performance to assess lower-body physical function without wearables.
- An **Eye-Tracking-Based Trail Making Test (ET-TMT)** provides fine-grained cognitive measurements by capturing fixation durations, saccades, gaze paths, and visual attention strategies. Unlike traditional TMT scoring, ET-TMT offers sub-second resolution of cognitive processes, supporting early detection of Mild Cognitive Impairment (MCI), Alzheimer's disease, and Parkinson's disease.

The platform is secured by a layered architecture that integrates **post-quantum encryption** and **blockchain-based audit trails** to ensure data integrity, privacy, and regulatory compliance. Usability was validated using System Usability Scale (SUS) and heuristic inspection.

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E-Poster Panel

Biomedical Rehabilitation Sciences and Engineering

Results

Pilot deployment in institutional aging-care settings demonstrated high usability and engagement. RAG-enhanced NLP modules enabled accurate, semantically-aware interpretation of user responses and improved screening efficiency. MMC accurately captured SPPB metrics through contactless sensing. ET-TMT generated cognitive biomarkers correlating with clinical risk levels. The system produced real-time personalized reports to guide both self-management and clinician decision-making.

Conclusion

This study presents a scalable, intelligent, and secure AI platform that operationalizes the WHO ICOPE framework through multimodal sensing and conversational AI. By integrating RAG, MMC, and ET-TMT into a unified architecture, the platform advances early detection, personalized health guidance, and the technical infrastructure needed to support aging-in-place. Future work will focus on EHR integration, longitudinal validation, and deployment across diverse care environments.

EP70

VALIDITY AND RELIABILITY OF A DEPTH CAMERA-BASED PHYSICAL FUNCTION AND FALL RISK ASSESSMENT SYSTEM IN COMMUNITY-DWELLING ADULTS

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Background and aims

The prevalence of falls among older adults necessitates accessible, reliable assessment tools. This study aimed to validate an automated physical function and fall-risk assessment system using Azure Kinect (AK) depth camera by evaluating its validity, reliability and diagnostic accuracy against traditional physical therapist-administered assessments in older adults.

Methods

Thirty-nine community-dwelling adults (mean age 59 ± 21 years) underwent AK-based Tandem Stance Test (ATST), Five Times Sit-to-Stand Test (AFTSS), and Timed Up-and-Go Test (ATUG). Concurrent validity was assessed via Spearman's correlation (r_s), intraclass correlation coefficients (ICC), and Bland-Altman analysis against therapist's measurements. Discriminative validity and diagnostic accuracy were evaluated using ROC curves, sensitivity/specificity, and area under the curve (AUC).

Results

The AK-based fall risk assessments showed strong concurrent validity ($r_s = 0.813-0.915$; AUC = 0.867) and moderate-to-strong convergent validity. Discriminative accuracy AUCs ranged from 0.659 to 0.948. Intra-rater reliability was excellent (ICC = 0.858-0.976); inter-rater reliability ranged from moderate to excellent (ICC = 0.579-0.885). Sensitivity and specificity at optimal cut-offs indicated high diagnostic accuracy.

Conclusion

The AK-based system demonstrates strong reliability, validity, and diagnostic accuracy for assessing fall risk and physical function in older adults. Its automated, objective metrics offer feasible integration into clinical rehabilitation workflows for early risk detection and tailored intervention planning.

Measurement	r_s	r^2	ICC _{2,1}	95% CI	
				Lower	Upper
FTSS	0.813*	0.829	0.911	0.874	0.937
TUG	0.915*	0.728	0.804	0.733	0.862

Note. r_s =Spearman's correlation coefficient; r^2 =coefficient of determination; ICC_{2,1}=intraclass correlation coefficient_{2,1}; 95% CI=95% confidence interval; FTSS= Five Timest Sit-to-Stand Test; TUG=Turn Up-and-Go Test.
* $p < 0.001$

Table 1. Concurrent Validity of the Azure Kinect-based Physical Function Assessments (N=39)

Measurement	AUC	SE	95% CI		Sensitivity	Specificity
			Lower	Upper		
ATST	0.867*	0.034	0.792	0.923	76.60%	87.14%

Note. AUC=area under curve; SE=standard error; 95% CI=95% confidence interval; ATST=Azure Kinect-based Tandem Stance Test.
* $p < 0.001$

Table 2. AUC, Standard error, 95% Confidence Interval, Sensitivity, and Specificity of ATST (N=39)

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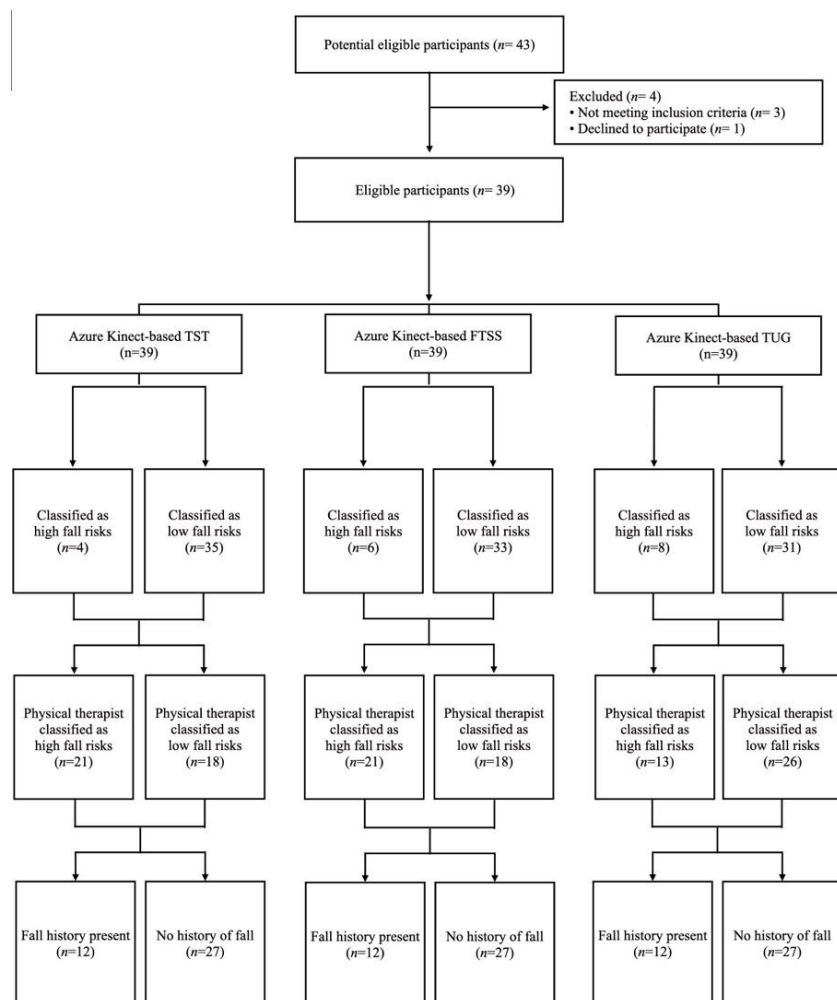


Figure 1. Adapted from the Standard for the Reporting of Diagnostic Accuracy Studies (STARD) Flow Diagram format to Display AK-based Physical Function Assessments as Index Tests compared with Physical Therapist's Measurements of the Same Assessment as Reference Tests

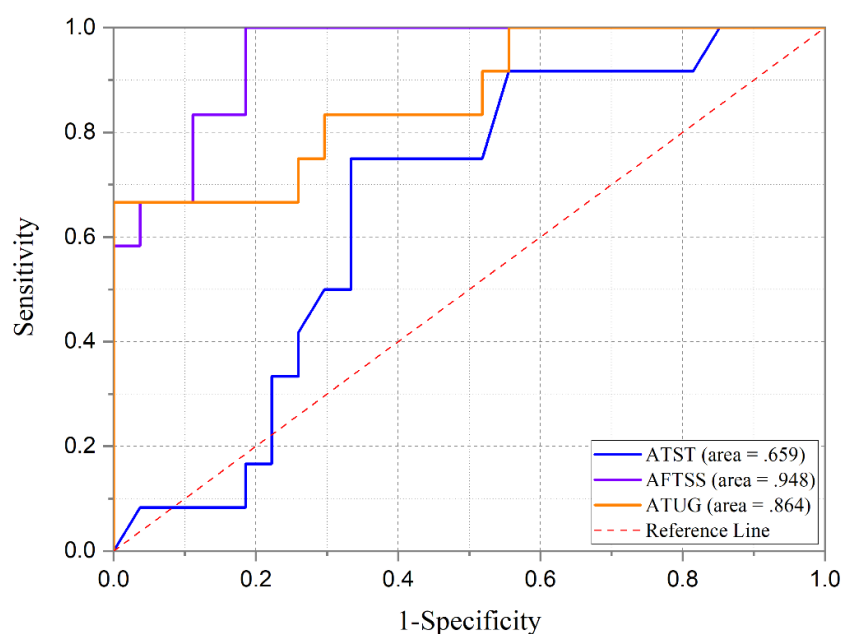


Figure 2. Receiver Operating Characteristic (ROC) Curve of ATST, AFTSS, ATUG to Assess Fall Risk Discrimination.

EP71

STRUCTURAL BIONIC DESIGN AND OPTIMIZATION SIMULATION OF FLEXIBLE PNEUMATIC REHABILITATION GLOVES

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Background and aims

Pneumatic rehabilitation gloves generally have the problems of poor matching of finger joint size and imprecise motion control, etc. In order to further enhance the integration of man-machine and drive flexibility in the process of rehabilitation, this paper designs a flexible pneumatic rehabilitation glove based on the structural bionics.

Methods

Based on the structural bionic design method, the structural design of flexible pneumatic rehabilitation gloves was carried out. For the three different bottom design structure of the soft body driver, the driver structure optimization simulation was carried out. In order to optimize the motion performance of the soft driver, the simulation of pneumatic solid-coupling under 0-60kpa air pressure was carried out to compare the bending performance, output force and stress value of its structural parameters (t : wall thickness of the airbag, u : thickness of the connecting layer between the airbags) at different values. Finally, a prototype of rehabilitation gloves was made and preliminary clinical trials were conducted.

Results

When the pressure load is 60kPa, driver C is selected as the optimal design structure. The parameter u , has a greater impact on the bending performance of the driving tube compared to the parameter t . As t increases, the bending angle of the driver gradually decreases, but its output force increases accordingly. Similarly, when u increases, the bending angle of the driver decreases, while the output force increases. When $t=2\text{mm}$ and $u=2\text{mm}$, the fingertip output force of the driver is maximum and the bending motion stress is minimum, which can improve the service life of the gloves.

Conclusion

The flexible pneumatic rehabilitation gloves designed in this article achieve better matching with human finger joints. It is comfortable to wear and has good flexibility during exercise, which helps improve the effectiveness of hand rehabilitation training.

EP72

DEVELOPMENT OF AN AI-BASED MOBILE APPLICATION TO AUTOMATICALLY ASSESS INFANTILE SPONTANEOUS MOVEMENTS

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Background and aims

The increasing prevalence of high-risk pregnancies has led to a rise in infants vulnerable to developmental delays and cerebral palsy. Early detection and timely intervention are critical to improving neurodevelopmental outcomes. While assessments like the General Movement Assessment have demonstrated clinical value, they are evaluator-dependent and lack objective quantification, which limits their reproducibility and scalability. This study aims to develop and validate an AI-based mobile application for the automatic and quantitative assessment of spontaneous movements in high-risk infants.

Methods

This study enrolls high-risk preterm infants (<32 weeks gestation or <1,500 g) and records standardized videos of spontaneous movements in supine, prone, and sitting postures using mobile devices. Videos are uploaded to a secure server, where joint positions are extracted via a pretrained pose-estimation model. Preprocessing includes handling low-confidence values, smoothing, and calculating joint angles and angular velocities. The developmental risk prediction model is a deep learning model based on structures such as CNN, LSTM, and attention modules that takes the coordinates of each joint in the video as input and classifies high-risk or low-risk infants as output. This model will be trained on a previously acquired high-risk infant cohort dataset, with the goal of improving targeting to over 80%. This predictive model will also be reported, along with an analysis of movement complexity, smoothness, and feature importance, to support interpretability and user understanding.

Results

The mobile software will be evaluated through video quality assessment, usability testing, and reliability checks (inter/intra-rater, inter-device). Validity will be tested via comparison with clinical assessments like Hammersmith Infant Neurological Exam, Motor Optimality Score-Revised, and The Bayley Scales of Infant and Toddler Development.

Conclusion

By automating data processing, movement analysis, and risk prediction, the application enables expert-independent evaluation, enhancing accessibility and supporting early intervention in digital healthcare.

EP73

BIOCHEMICAL AND METABOLIC PROFILE AMONG ADMITTED STROKE PATIENTS WITH RISK OF DEVELOPING PRESSURE INJURY

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Background and aims

The incidence of pressure injury (Prl) is increased significantly following stroke, which leads to unbearable physical and financial miseries not only to the patient but also to his family. Understanding the biochemical and metabolic factors associated with Prl risk could aid in early identification and management. This study aimed to assess the biochemical and metabolic profiles of stroke patients to identify key factors associated with the risk of developing pressure injuries. The goal was to pinpoint potential biomarkers that could guide preventive interventions.

Method

A cross-sectional study was conducted at Manikganj Medical College Hospital from March to August 2024, enrolling 94 stroke patients. The Braden Scale was used to classify patients into three categories: mild (15–16), moderate (12–14), and high risk (<12) for developing pressure injuries. Biochemical tests including serum creatinine, hemoglobin, white blood cell (WBC) count, C-reactive protein (CRP), blood glucose, and lipid profile (total cholesterol, triglycerides, LDL, HDL) were measured and analyzed. P-values were calculated to determine the significance of each parameter.

Results

Among the 94 patients, 43 (45.7%) were at high risk, 22 (23.4%) at moderate risk, and 29 (30.9%) at mild risk for pressure injuries. Significant findings included serum creatinine ≥ 1.3 mg/dL in 51.2% ($p < 0.05$), hemoglobin < 10 g/dL in 56.5% ($p < 0.05$), elevated CRP in 38.1% and WBC count in 45.7% of high-risk patients ($p < 0.05$). Blood glucose ≥ 180 mg/dL was found in 47.6% of high-risk patients ($p < 0.05$), while lipid abnormalities were observed in 60.4% of this groups ($p < 0.05$). These altered biochemical and metabolic profile are also associated with moderate and mild pressure injury risk but less than the high risk groups.

Conclusion

Biochemical and metabolic abnormalities are strongly associated with an increased risk of developing pressure injuries in admitted stroke patients. Early monitoring of these parameters could help to mitigate Prl risk.

EP74

UNVEILING THE IMPACT OF 2024 BANGLADESH REVOLUTIONARY TRAUMA: DEMOGRAPHICS AND LESION CHARACTERISTICS OF PATIENTS WITH SPINAL CORD INJURY

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Background and aims

Spinal cord injuries (SCI) present significant challenges, particularly in ensuring effective rehabilitation at the community level. Various incidents, including natural and man-made disasters, contribute to an increasing number of cases. The 2024 Bangladesh Anti-Discrimination Movement (widely known as the Movement Against Discrimination) led to numerous injuries and fatalities, with many resulting in long-term disabilities such as those associated with SCI.

Methods

A cross-sectional mixed-method study was conducted. Patient data were extracted from hospital admission registers containing demographic and clinical information following July revolution from three tertiary care hospital. A trained SCI rehabilitation physician verified and updated this data through phone interviews with eligible patients, covering details like age, gender, occupation, injury cause, level of SCI and ASIA Classification.

Results

A total of 47 records were initially collected from hospital records but later 33 participants were deemed eligible for final analysis. Geographically, 49% of participants were from the Dhaka division, followed by Chattogram (21%), Barisal (15%), Rangpur (9%), and Rajshahi and Khulna (3% each). Students comprised approximately 67%, followed by businessmen and teachers at 12%, and laborers and others at 21%. Most participants (76%) had a monthly income of predominantly mid-range income group. Incomplete SCI making up 64% of cases, while complete SCI represented 36%. The thoracic region was the most affected spinal level (63.6%), followed by lumbar (31.8%) and cervical (4.6%) injuries. Gunshot wounds were the leading cause of injury at 81.8%, followed by falls (9.1%) and other causes such as cut injury and blunt trauma (4.6% each).

Conclusion

Trauma caused by political and social violence can be a significant contributor to spinal cord injuries, predominantly affecting younger populations. The vandalism and severity of SCI in these cases may vary widely. For reducing the desecration of affected younger age group proper action plan with structured rehabilitation protocol followed by tele-rehabilitation is necessary steps to be taken.

EP75

THE FACTORS AFFECTING THE LENGTH OF HOSPITAL STAY FOR PATIENTS WITH BUTTOCK BURNS

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Background and aims

It is said that buttock burns tend to cause stress to the skin graft and delay epithelialization when the patient's ADL is increased. This is said to result in a delay in getting out of bed and a longer hospitalization period. In recent years, patients have been forced to sit in a sitting position from the next day after skin grafting, and as a result, we will examine and report whether this has an impact on hospital stay and mortality rate.

Methods

The study examined factors affecting the length of hospital stay of patients with buttock burns hospitalised and treated at the department between 2016 and 2023. Factors examined included age, gender, time from injury to initial surgery, time from admission to start of rehabilitation, time from admission to start of sitting, time from admission to start of standing, time from admission to start of nutrition, TBSA, BI, PBI, rBaux score were examined.

Results

There were 14 cases, 6 males and 8 females Duration of hospitalisation ranged from 42 to 184 days. TBSA ranged from 8% to 95% and BI from 5 to 152. Post-operative to rehabilitation. The time between surgery and rehabilitation intervention ranged from 0 to 13 days, and nutritional initiation from 0 to 15 days. In recent years, rehabilitation.

Conclusion

In our department, however, there was no significant difference, but rather a tendency for the patient to be weaned from the sitting position earlier, leading to a shorter hospitalisation period.

EP76

IMPACT OF MUSCULOSKELETAL COMPLICATIONS ON GAIT ABILITY AFTER INTERTROCHANTERIC FEMORAL FRACTURES: A RETROSPECTIVE STUDY

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Background and aims

As the aging society advances, the incidence of proximal femoral fractures accompanied by musculoskeletal complications is increasing. Therefore, this study investigated the impact of musculoskeletal complications on the walking ability of patients with intertrochanteric femoral fractures at the time of discharge from convalescent rehabilitation hospitals.

Methods

A retrospective review of medical records was conducted for patients admitted to the convalescent rehabilitation ward of our hospital between March 2023 and November 2024, who provided consent for the study. The items reviewed included age, gender, side of injury, pre- and post-injury walking ability, Functional Independence Measure (FIM), musculoskeletal pain control, and Berg Balance Scale (BBS) scores. The outcome measure was defined as the change in FIM walking ability before and after the injury.

Results

Statistical analysis was conducted for each parameter by dividing the participants into two groups: those whose walking ability declined before and after the injury and those whose walking ability did not. The results showed a statistically significant difference in the presence or absence of pain ($p < 0.001$) and BBS score at discharge ($p < 0.001$).

Conclusion

Pain management for musculoskeletal complications may affect walking outcomes after intertrochanteric femoral fractures.

EP77

ANKLE EXERCISE CAN IMPROVE BALANCE AFTER TOTAL KNEE ARTHROPLASTY WITH ANKLE VALGUS DEFORMITY

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Background and aims

15.6% of TKA patients who with ankle valgus deformity report having experienced ankle pain and falls in 10 weeks after the surgery. Recent studies have shown that ankle valgus deformity can lead to ankle osteoarthritis, causing balance disorders and ankle pain. Therefore, we conducted a 10-week ankle training program to determine whether this method can improve the balance of these patients.

Methods

A total of 36 knees from 36 patients who underwent TKA with ankle valgus deformity and received rehabilitation therapy in our department from September 2023 to September 2024 were randomly divided into control group (n=18) and intervention group (n=18). Both groups received 10-weeks usual therapy, including quadriceps strength training, weight bearing, balance training. Intervention group received an additional 10-weeks ankle muscle strength training and dynamic balance training by balance instrument (PK254, Tecnobody, Italy). Berg balance scale (BBS), average track error (ATE) of dynamic balance by PK254 was used to evaluate balance and Visual analogue scale (VAS) to evaluate ankle pain at baseline, 5th week and 10th week during the intervention.

Results

There was no significant difference in BBS, ATE and VAS between the two groups at baseline ($P>0.05$). Both groups achieved better BBS and ATE at 5th week and 10th week during intervention compared to baseline. Only intervention group's VAS were significantly better at both 5th and 10th week. At the 5th week, there was no significant difference in the BBS between two group ($P>0.05$), but the intervention group's ATE and VAS was significantly better than the control group ($P<0.05$). At the 10th week, the intervention group's BBS, ATE and VAS were significantly better than the control group ($P<0.05$).

Conclusion

Both therapy methods can improve balance. But Ankle exercise can achieve better balance and reduce ankle pain after TKA with ankle valgus deformity.

EP78

CORRELATION BETWEEN COGNITIVE IMPAIRMENT AND DYSPHAGIA IN SUPRATENTORIAL STROKE

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Background and aims

Cognitive impairment and dysphagia are common complications after stroke. The aim of this study is to investigate the correlation between cognitive function and dysphagia in supratentorial stroke.

Methods

This retrospective cohort study involved 79 patients who experienced the first supratentorial stroke. To assess the severity of dysphagia, Videofluoroscopic swallowing studies (VFSS) was conducted, and videofluoroscopic dysphagia scale (VDS) was employed. Cognitive function was evaluated by the Mini-Mental State Examination (MMSE). The correlation between dysphagia and cognitive function was analyzed using Pearson correlation coefficient. MMSE scores were used to categorize patients into different levels of cognitive impairment: normal (score 27 to 30), mild (score 21 to 26), moderate (score 15 to 20), moderately severe (score 10 to 14), and severe (score 0 to 9). Additionally, VDS total score was utilized to classify patients into low risk (≥ 47) or high risk (<47). The Receiver Operating Characteristic (ROC) curve was used to determine the cutoff-levels cognitive impairment to swallowing difficulty.

Results

Total score of MMSE had negative correlation with subtotal scores of oral phase and total score of VDS (Table 1). Additionally, the total score and 'Command' in MMSE were negatively correlated with the all subscales of oral phase in VDS. 'Attention' in MMSE had negative correlations with 'Bolus formation', 'Mastication', 'Apraxia', 'Oral transit time of bolus' and 'Subtotal score of oral phase' in VDS. 'Construction' in MMSE had negative correlations with 'Bolus formation', 'Apraxia' and 'Subtotal score of oral phase' in VDS (Table 2). The optimal cutoff level of cognitive impairment to severity of swallowing difficulty was 'severe' level.

Conclusion

We could suggest that cognitive impairment is correlated with the oral phase of dysphagia. The total score of MMSE could serve as a criterion for identifying severe dysphagia. The cognitive function in dysphagia patients with stroke should be clinically emphasized.

EP79

EFFICACY OF INSTRUMENT-ASSISTED SOFT TISSUE MOBILIZATION ON NECK PAIN: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED TRIALS

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Background and aims

Neck pain is a common condition characterized by severe pain, neck stiffness, disability, and a gradual decline in range of motion (ROM). Instrument-assisted soft tissue mobilization (IASTM), a noninvasive manual therapy, has been used for the treatment of various musculoskeletal conditions. However, the effects of IASTM on neck pain remain unclear, and no related meta-analysis has been published. This study is the first meta-analysis to investigate the therapeutic effects of IASTM in patients with a specific disorder --- neck pain.

Methods

We performed the literature search in the PubMed, Embase, and Cochrane Library databases in September 2024. Randomized trials comparing the outcomes of IASTM with those of other interventions, including control or other common physiotherapies, in patients with neck pain were included. The standardized mean difference (SMD) was determined as the effect size for continuous outcomes, with outcome accuracy determined using 95% CIs.

Results

In total, 20 studies involving 879 patients were included in a systematic review, and 17 of them were included in a meta-analysis. The meta-analysis revealed that IASTM significantly improved flexion (SMD = 1.24, 95% CI: 0.19 to 2.28), lateral flexion (SMD = 2.17, 95% CI: 0.77 to 3.56), disability (SMD = -1.88, 95% CI: -2.93 to -0.84), and pain pressure threshold (SMD = 0.94, 95% CI: 0.32 to 1.56) and alleviated pain (SMD = -1.40, 95% CI: -2.19 to -0.60) relative to control treatments. However, no significant differences were observed between IASTM and other standard physiotherapy interventions. Overall, IASTM significantly improved flexion, lateral flexion, disability, and pain pressure threshold and alleviated pain compared with non-IASTM treatments.

Conclusion

These findings suggest that IASTM is beneficial for individuals with neck pain in terms of ROM, pain, disability, and pain pressure thresholds.

EP80

CALCULATION OF THE MINIMAL CLINICALLY IMPORTANT DIFFERENCE IN UPPER AND LOWER LIMB MOTOR ASSESSMENT IN SPINAL MUSCULAR ATROPHY

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Background and aims

Physical function assessments in patients with spinal muscular atrophy (SMA) are important indicators for assessing the effectiveness of treatment and changes over time in rehabilitation therapy. However, few reports exist on this indicator. This study calculated the minimal clinically important difference (MCID) for assessing motor function with SMA to estimate the degree of change within a functional score that is considered clinically meaningful.

Methods

This cohort study relied on individual participant measurements. A distribution-based approach was used to calculate the MCID values, incorporating data from 26 patients with SMA for the 6-Minute Walk Test (6MWT), Hammersmith Functional Motor Scale Expanded (HFMSE), Revised Upper Limb Module (RULM), and grip and pinch strength.

Results

The standard errors of measurement for all patients were: 58.38 m for 6MWT; 4.71 points for HFMSE; 3.25 points for RULM; 10.93 N and 9.86 N for right and left grip strength, respectively; 5.42 N and 4.73 N for right and left Palmar pinch; and 11.96 N and 8.66 N for right and left Key pinch. Significant correlations were observed between the physical function assessments.

Conclusion

We calculated MCID values for physical function evaluations of SMA and, as a sub-analysis, determined the SMA type and ambulatory status. These findings are expected to contribute to future SMA treatment and rehabilitation and promote the selection of appropriate physical function assessments.

EP81

THE EFFECTIVENESS OF EARLY REHABILITATION AMONG STROKE PATIENTS IN THE INTENSIVE CARE UNIT: A RETROSPECTIVE REAL-WORLD STUDY USING PROPENSITY SCORE MATCHING ANALYSIS

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Background and aims

There is a significant demand for stroke rehabilitation, necessitating exploration of early rehabilitation's effectiveness. Our real-world study aimed to evaluate the effectiveness of early rehabilitation in stroke patients.

Methods

We retrospectively collected clinical data of stroke patients from electronic medical record (EMR) in West China Hospital, Sichuan University from 2011 to 2019. Based on whether patients received early rehabilitation interventions during their stay in the Intensive Care Unit (ICU), a cohort of 1,211 patients with stroke was divided into an early rehabilitation group (n=474) and a non-early rehabilitation group (n=737). Propensity score matching (PSM) was utilized to mitigate the influence of confounding variables. The measurements of effectiveness analysis were ICU length of stay, Glasgow Coma Scale (GCS) scores, and discharge outcome indicators before and after early rehabilitation.

Results

Following the implementation of PSM, each group included 390 patients. In terms of ICU length of stay, the early rehabilitation group had a mean duration of 16.72 ± 11.34 days, whereas the non-early rehabilitation group was 15.68 ± 12.95 days, with no statistically significant difference between groups (MD=1.04; 95% CI, -0.85–2.93; P=0.32). The GCS scores were 10.15 ± 4.19 in the early rehabilitation group and 9.48 ± 3.66 in the non-early rehabilitation group, with the difference approaching statistical significance (MD=0.66; 95% CI, -0.06–1.40; P=0.075), suggesting that patients in the early rehabilitation group may have better consciousness status before ICU discharge. The rate of favorable outcomes in the early rehabilitation group was 67.4% (263 cases), significantly higher than 49.5% (193 cases) in the non-rehabilitation group (OR=2.11; 95% CI, 1.58–2.83; P<0.001), indicating that early rehabilitation more than doubled the likelihood of achieving favorable outcomes at discharge.

Conclusion

Early rehabilitation significantly increases the likelihood of achieving favorable outcomes at discharge in stroke patients, although it does not have a significant impact on ICU length of stay.

EP82

QUANTIFYING ULNAR NERVE TENSION AROUND THE ELBOW USING SHEARWAVE ELASTOGRAPHY

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Background and aims

Shearwave elastography (SWE) is one of the non-invasive methods for evaluating tissue stiffness using ultrasound. In one study, patients with cubital tunnel syndrome showed greater stiffness of the ulnar nerve with higher SWE values. Also, there have been studies on estimating ulnar nerve elasticity using SWE in patients who have undergone ulnar nerve decompression surgery. However, the relationship between the SWE values and the actually measured tension of the ulnar nerve around the elbow has not yet been studied yet. Therefore, in this pilot study, we aimed to explore the relationship between the mechanical extensibility of the ulnar nerve around the elbow with the SWE values.

Methods

Total 11 fresh cadavers with 22 elbows were used in the study. SWE of the ulnar nerve was evaluated around the elbow in the cross-sectional view with 3 different elbow positions (full extension, elbow flexion 90°, and full flexion). The change in the elasticity of the ulnar nerve was simulated using a pulley system using 7 weights (0g, 20g, 50g, 100g, 200g, 500g, 1000g) with the ulnar nerve exposed by dissection on the palmar side of the wrists. SWE of the ulnar nerve was then measured in each weight in the longitudinal view.

Results

Ulnar nerve tension was the lowest with the elbow fully extended, and SWE gradually increased with elbow flexion. Moreover, SWE of the ulnar nerve showed a positive relationship between tensile load (g) in longitudinally acquired shear wave elastography (kPa) ($p=1.000$, $p\text{-value}<0.01$).

Conclusion

SWE of the ulnar nerve around the elbow increased as the tension of the ulnar nerve increased. SWE may be utilized as a useful tool to evaluate the ulnar nerve tension around the elbow.

EP83

THE EFFECTIVENESS OF AEROBIC EXERCISE IN MAINTENANCE / COMMUNITY-BASED REHABILITATION THROUGH LONG-TERM CARE INSURANCE: A RANDOMIZED CONTROLLED TRIAL

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Background and aims

In maintenance/community-based rehabilitation through long-term care insurance (LTCl), aerobic exercise is conducted infrequently and the effectiveness has not been reported. This study aimed to investigate the effectiveness of aerobic exercise in rehabilitation through LTCl with a randomized controlled trial.

Methods

This study was a single-blind randomized controlled trial. Participants using maintenance/community-based rehabilitation through LTCl were randomly assigned to an aerobic and non-aerobic group and received 3 hours of rehabilitation once a week for 6 months. The non-aerobic groups underwent conventional rehabilitation which did not include aerobic exercise, whereas the aerobic group underwent 2 minutes x 2 sets of seated stepping and handshaking exercise replacing part of the conventional rehabilitation. The number of 2-minutes step test (2MST) was measured as the primary outcome to evaluate aerobic capacity and compared between groups.

Results

308 participants were enrolled and randomized. Finally, 122 participants in the aerobic group and 131 participants in the non-aerobic group were analyzed. Body function and ability tended to be lower in the aerobic group than in the non-aerobic group at the beginning. The number of 2MST was significantly lower in the aerobic group at the beginning (aerobic vs non-aerobic : 75.0 ± 29.0 vs 86.7 ± 26.8 ; $p < 0.001$), but became significantly higher after the intervention (aerobic vs non-aerobic : 100.8 ± 33.7 vs 86.7 ± 26.8 ; $p = 0.003$). A similar trend was observed in a post-hoc analysis adjusting for confounding factors.

Conclusion

Aerobic exercise in maintenance/community-based rehabilitation through LTCl improved aerobic capacity, suggesting aerobic exercise is beneficial in rehabilitation through LTCl.

EP84

A RETROSPECTIVE STUDY OF DIAGNOSTIC ULTRASOUND FINDINGS AND TREATMENTS IN CELLO PLAYERS WITH PLAYING-RELATED MUSCULOSKELETAL DISORDERS

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Background and aims

Playing-related musculoskeletal disorders (PRMDs) are a significant concern for musicians, particularly cellists, due to the physical demands of their instrument. Although PRMD management has been widely studied, there is limited data on ultrasound findings specific to this group. While tissue damage in cellists is yet to be fully reported, ultrasound provides dynamic musculoskeletal assessment, enhancing both diagnosis and treatment. This study explores pathological ultrasound findings in cellists with PRMDs.

Methods

This retrospective study was conducted at a musician's clinic within a tertiary medical center. A total of 51 cellists with PRMDs were included, excluding those with prior accidents, rheumatological conditions, or hereditary neuromuscular diseases. Data collected and analyzed encompassed demographic information, areas and severity of discomfort, physical examination findings, ultrasound imaging, results from additional relevant tests, treatments received, and functional outcomes following intervention.

Results

This study analyzed 51 cellists (21 male, 30 female, mean age 23.69 ± 9.04 years) with Playing-Related Musculoskeletal Disorders (PRMD). Common complaints included the left shoulder (45.1%), right shoulder (27.4%), and left hand (23.5%). Ultrasound revealed frequent lesions in the left serratus anterior (21.5%) and left levator scapula (17.6%), with fibrosis linked to delayed treatment. Stage 5 PRMD patients incurred higher treatment costs ($P < 0.001$) and more frequent fibrosis ($P = 0.061$). Therapies enabled 98% to resume playing within three months.

Conclusion

Ultrasound evaluation of cellists with PRMDs reveals chronic muscle tears and fibrosis, primarily in bilateral shoulders and left wrist. These findings may explain the limited success of manual therapies and postural corrections, highlighting the need for tailored treatments to improve outcomes in this population.

EP85

ASSOCIATION BETWEEN CLINICAL AND NEUROIMAGING FACTORS AND PROGNOSTIC OUTCOMES IN PATIENTS WITH CEREBRAL AMYLOID ANGIOPATHY

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Background and aims

Cerebral amyloid angiopathy (CAA), a small-vessel disease, is a known cause of intracranial hemorrhage (ICH) and related functional impairments. This study investigates clinical and neuroimaging factors associated with prognostic outcomes in CAA patients.

Methods

Conducted as a retrospective cohort study from May 2014 to May 2022, this research included individuals meeting the eligibility criteria of ICH diagnosis in accordance with the modified Boston Criteria for CAA, coupled with the availability of pertinent magnetic resonance imaging (MRI) data. A spectrum of clinical parameters and neuroimaging features from MRI, encompassing lobar cerebral microbleeds (CMBs), cortical superficial siderosis, perivascular spaces of the centrum-semiovale, and white matter hyperintensities, were systematically identified and subjected to analysis.

Prognostic indicators, comprising the modified Rankin Scale (mRS) and Barthel Index at one month post-event, in conjunction with incidences of recurrent stroke within a six-month follow-up window, were evaluated. The data were analyzed with generalized linear models and logistic regression to examine the associations between the identified parameters and the prognostic indicators.

Results

A total of 45 patients met the inclusion criteria for the study. In the univariate analysis, advanced age, lower premorbid functional status, higher initial National Institute of Health Stroke Scale (NIHSS) scores, longer hospitalization duration, increased CMBs count, compromised initial ability to sit up, and diminished sitting balance exhibited correlations with unfavorable outcomes. In the multivariate analysis, predictive factors for higher mRS included advanced age ($p=0.004$), higher initial NIHSS scores ($p<0.001$), compromised initial ability to sit up ($p=0.012$), and increased CMBs count ($p<0.001$). Furthermore, elevated NIHSS scores demonstrated associations with escalated incidences of recurrent ICH and mortality within a six-month follow-up window ($p=0.012$ and 0.022 , respectively).

Conclusion

In patients with CAA, unfavorable prognostic outcomes were associated with advanced age, higher initial NIHSS scores, increased CMBs count, and compromised initial ability to sit up.

EP86

PSEUDOANEURYSM DETECTED DURING THE REHABILITATION PERIOD FOLLOWING PROXIMAL FEMORAL FRACTURE SURGERY: A CASE REPORT

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Background and aims

Proximal femoral fractures are common in the elderly and are a significant concern in rehabilitation. One rare complication of this fracture is the development of a pseudoaneurysm, which is often under-recognized in rehabilitation practice. While pseudoaneurysms typically appear during or immediately after surgery, this report describes a case in which a pseudoaneurysm was identified and progressively enlarged during the rehabilitation phase, approximately two months postoperatively.

Methods

A 92-year-old female was transferred to our hospital for rehabilitation two weeks after undergoing open reduction and internal fixation with an intramedullary nail for a right femoral intertrochanteric fracture. Upon transfer, her D-dimer was elevated (27.7 mg/dL), prompting lower extremity ultrasound monitoring. Initially, no pseudoaneurysm was detected. However, two months post-surgery, ultrasound findings suggestive of a pseudoaneurysm in the right groin. Contrast-enhanced CT confirmed an actively perfused pseudoaneurysm originating from the right lateral femoral circumflex artery. The patient was subsequently transferred back to the referring hospital for further management. Endovascular coil embolization was performed, successfully isolating the pseudoaneurysm and terminating blood flow.

Results

After the endovascular treatment, the patient was transferred back to our hospital. She exhibited no further progression of anemia and underwent a satisfactory rehabilitation course, ultimately being discharged with the ability to ambulate using a walker. Literature reports indicate that pseudoaneurysms associated with proximal femoral fractures have a mortality rate of 18.06%, with delayed diagnosis and treatment, increase the risk of severe complications. In this case, timely detection and intervention facilitated a favorable outcome.

Conclusion

Although rare, pseudoaneurysms associated with proximal femoral fractures can lead to severe complications. Healthcare providers involved in rehabilitation should maintain a high index of suspicion for late-onset pseudoaneurysms, as early detection and treatment are crucial in preventing adverse outcomes.

EP87

IMPACT OF THE SHORT PHYSICAL PERFORMANCE BATTERY ON THE HOME DISCHARGE OF OLDER PATIENTS WITH SOLID TUMORS: A PRELIMINARY STUDY

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Background and aims

In cancer rehabilitation, determining the discharge destinations through physical functional assessments is essential for continuing the treatment of older patients with cancer. The Short Physical Performance Battery (SPPB) is a simple tool for comprehensively evaluating lower limb motor function. However, there are no reports on the association between the SPPB and discharge destination in older patients with cancer. This study aimed to determine whether the SPPB might predict discharge destinations in older patients with cancer.

Methods

This longitudinal retrospective observational study was conducted at a Japanese university hospital. The participants were patients aged 65 years or older with solid tumors who underwent cancer rehabilitation during hospitalization. Their discharge destinations were also investigated. Additionally, patient characteristics, including blood test data, were collected upon admission or at the beginning of rehabilitation, and the baseline SPPB score was recorded at the beginning of rehabilitation.

Results

The study included 314 patients (median age: 75 years; 189 men), of whom 236 (75.2%) were discharged home. The median SPPB score for all patients was nine. Five patients were diagnosed with Tumor, Node, and Metastasis (TNM) stage I; 29 patients with TNM stage II; 58 patients with TNM stage III; and 222 patients with TNM stage IV. Logistic regression analysis revealed that baseline SPPB score was associated with home discharge after adjusting for confounding factors.

Conclusion

SPPB score may predict the discharge destination in hospitalized older patients with solid tumors who undergo cancer rehabilitation. Assessing SPPB score can aid in early discharge planning and the optimization of rehabilitation strategies, thereby improving treatment continuity and patient outcomes.

EP88

A CASE OF SWAN-NECK FINGER CAUSED BY BONT/A THERAPY

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Background and aims

We report a case in which a 52-year-old man with residual spasticity of the left upper and lower extremities after cerebral infarction in the right MCA area underwent Type A botulinum toxin therapy (BoNT/A) and presented with swan-neck finger.

Methods

He had flexion spasticity of MAS 2-3 and pathologic reflexes of extensor pattern elicited by minor stimulation. We injected administered 12.5 units of inco-botulinumtoxin to the lumbrical muscles 1-4 for MP joint spasticity, and 25 units to the extensor digitorum communis for PIP extension spasticity.

Results

As a result of the injection, his fingers 2 to 5 developed swan-neck finger. We speculated that blocking the lumbrical and extensor digitorum communis muscles caused the dorsal digital expansion to relax both distally and proximally, resulting in excessive action of the palmar interosseous and dorsal interosseous muscles, causing swan-neck finger.

Conclusion

Injection of BoNT/A into the lumbrical and extensor digitorum communis muscles may result in swan-neck finger.

EP89

PILOT STUDY: DIFFERENCES ON DISTANCE BETWEEN MEDIAN NERVE AND ULNAR ARTERY IN VARIOUS WRIST MOTIONS

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Background and aims

Ultrasound-guided carpal tunnel steroid injection (CTI) is an effective method for the treatment of carpal tunnel syndrome (CTS). When performing ultrasound-guided CTI with the ulnar side approach, it is very important to avoid damage to the median nerve (MN) and ulnar artery (UA). The correlation between the MN and UA position according to the ulnar or radial deviation of the wrist along with the angle change of the wrist has not been known yet. Therefore, by measuring the change in the MN and UA distance according to various wrist postures, we try to find out the optimal wrist posture that can minimize damage to the MN and UA during CTI.

Methods

Healthy adults without underlying diseases such as musculoskeletal disorders and focal neuropathy of the wrist participated in this study. Ultrasound images were obtained from one or both wrists from each participant. Wrist ultrasound images were measured at the distal wrist crease (DWC) level of the wrist with the same settings (gain = 54, dynamic range = 59, depth = 3cm, frequency = 65Hz).

- Ultrasonography was performed in six wrist postures:

- (1) neutral
- (2) neutral-radial deviation (RD)
- (3) neutral-ulnar deviation (RD)
- (4) extension
- (5) extension-RD
- (6) extension-UD

Wrist extension was defined as a 30° angle.

The straight-line distance between MN and UA (MN-UA) was defined as a straight line connecting the most ulnar point of MN and the most radial point of UA. MN-UA was measured for each wrist posture.

Results

A total of six wrists were analyzed. The safe zone distance, defined as the distance between MN and UA, was greatest when the wrist was in the neutral-UD position (1.13 ± 0.08 cm, $p = 0.11$). The safe zone distance was wider when the wrist was ulnar deviated, such as Neutral-UD (1.13 , $p = 0.11$) and Extension-UD (0.93 ± 0.35 cm, $p = 0.85$) positions. However, no statistically significant differences were found in the MN-UA distance in different wrist postures compared to the wrist neutral position and the MN-UA intergroup analysis in 6 wrist postures.

Conclusion

In this pilot study, We confirmed that the distance between MN and UA could vary according to various wrist postures. Particularly, it is meaningful that not only the RD and UD of the wrist but also the extension position was analyzed. We think that continuous research through data analysis of more numbers is needed.

EP90

CHALLENGES AND INNOVATIONS IN REHABILITATION AFTER BILATERAL HIP DISARTICULATIONS: A CASE STUDY

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Background and aims

Hip disarticulations, which constitute only 0.5% of lower limb amputations, are extreme surgeries typically reserved for severe cases of cancer, infection, and ischemia. These procedures are associated with high complication rates, including infection, poor wound healing, and hematoma, reaching up to 60%. Furthermore, the five-year mortality rate for these amputations can be as high as 55%. Given the significant morbidity and mortality associated with hip disarticulations, it's crucial to develop strategies to improve outcomes for patients, who often face complex, life-threatening health challenges followed by life changing disability for the survivors.

Methods

We report a case of a 19-year-old male college student who sustained bilateral hip disarticulations following a motor vehicle accident in August 2023.

Results

This patient presented multiple pelvic fractures which led to bilateral lower limb ischemia, necessitating bilateral above-knee amputations and subsequent hip disarticulation. Following his complex injuries, he needed prolonged hospitalization and developed a Grade 4 pressure injury which was managed with split skin graft and sigmoid colostomy. Rehabilitation challenges included managing neuropathic pain, addressing skin fragility and limited soft tissue around the pelvis, improving sitting stability, and enhancing mobility. His neuropathic pain was effectively controlled by Gabapentin. A bucket prosthesis improved sitting stability and wheelchair mobility, supplemented by custom cushioning systems to prevent pressure injury. Physical therapy included core strengthening, balance training, and neuromuscular re-education for improved postural control and functional independence. Occupational therapy targeted adaptive equipment training, upper limb strengthening, and environmental modifications to enhance activities of daily living (ADLs).

Conclusion

This case highlights the importance of a multidisciplinary rehabilitation approach for managing complex impairments following bilateral hip disarticulations. Integrating orthotic design, therapeutic interventions, and psychosocial support to optimize mobility, skin integrity, and quality of life. Long-term strategies must emphasize orthosis adaptation, pressure relief systems, and functional independence to support community reintegration.

EP91

THE LEVELS OF INTERLEUKIN-1 (IL-1) FOLLOWING REHABILITATION IN STROKE PATIENTS

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Background and aims

Interleukin-1 (IL-1) is a pro-inflammatory cytokine that plays a key role in neuroinflammation and regulates neuroplasticity in stroke. This interventional quasi-experimental design study aims to compare serum IL-1 levels between healthy subjects and stroke patients changes in IL-1 levels before and after rehabilitation treatment at Hospital Pakar Universiti Sains Malaysia.

Methods

29 participants were recruited, including 18 stroke patients receiving rehabilitation treatment and 11 healthy subjects as controls. Serum IL-1 levels were measured using enzyme-linked immunosorbent assay. Statistical analyses were conducted using IBM SPSS Statistics, version 29.

Results

Most of the study participants who had stroke were males (66.7%) with a mean (SD) age of 44.28 (7.9) years. Stroke patients had higher IL-1 levels, with a median (IQR) of 10.12 (17.56) pg/ml compared to healthy subjects 4.18 (3.43) pg/ml, although the difference was not statistically significant ($p=0.069$). Post rehabilitation, the median (IQR) IL-1 levels in stroke patients were lower 6.76 (6.97) pg/ml compared to pre-rehabilitation levels of 10.12 (17.56) pg/ml; however, this difference was also not statistically significant ($p=0.061$).

Conclusion

This study shows that pro-inflammatory serum IL-1 levels were higher in stroke patients compared to healthy subjects as the inflammation was crucial during the initial stage of plasticity after stroke. Although IL-1 levels decreased following rehabilitation, the change was not statistically significant. These findings emphasize the potential role of rehabilitation in promoting the regulation of IL-1 in enhancing neuroplasticity and recovery in stroke patients. Further research with larger sample sizes is recommended to confirm these findings.

EP92

REVIEW OF MUSCULOSKELETAL PAIN CASES IN REHABILITATION OUTPATIENTS AT HOSPITAL KEMAMAN: A RETROSPECTIVE ANALYSIS

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Background and aims

Musculoskeletal (MSK) pain is a common condition worldwide, with lower back pain being the leading cause of disability. This research aims to review the incidence of MSK pain among patients attending therapy sessions at Hospital Kemaman.

Methods

This retrospective data was collected from MSK cases at Hospital Kemaman therapy sessions between January 2024 and December 2024. Most diagnoses were back pain. The data includes both new and recurrent cases referred to our team.

Results

From Jan-Dec 2024, we recorded 61 new cases (26 shoulder, 24 back pain, 9 knee pain, 2 others) and 53 recurrence cases (21 back pain, 16 knee pain, 6 shoulder pain, 10 others). Back pain had the highest recurrence (21 cases), while shoulder pain led new cases (26 cases). Analysis of recurrent back pain showed a high incidence in females, especially housewives as young as 30, peaking at ages 60-69. These individuals often had no co-morbidities, a history of analgesia use, and low physical activity.

Conclusion

At Hospital Kemaman, it has been observed that housewives as young as 30 years old are experiencing recurrent back pain while performing household chores. In response to this issue, we aim to investigate the associated risk factors and develop a patient education protocol to prevent an increase in incidence rates in the future.

EP93

SOCIAL AND LANGUAGE RECOVERY: INSIGHTS FROM GROUP THERAPY INTERVENTION IN POST-STROKE APHASIA PATIENTS

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Background and aims

Group therapy intervention is a valuable approach to improve communication and overall wellbeing in post-stroke aphasia patients, as it provides a natural, social environment for language rehabilitation in mild-moderate and/or chronic aphasia. The aim of this study was to ascertain if patients engage in more communication during group treatment sessions compared to individual therapy sessions.

Method

This observational study was conducted to three chronic ischemic stroke patients during individual and group sessions as outpatients. All patients were diagnosed using the Western Aphasia Battery Fluency. Communicative responses were recorded and categorized into seven types: activeness (number of initiation), naming tasks, structured conversation, speech intelligibility, facial expressions, range of vocalization, and social closeness.

Results

The three non-fluent aphasia patients-initiated communication more frequently in group sessions than in individual sessions. Patients during group therapy session have better number of initiations compared to individual sessions (mean 6.7 vs 1.7) Group therapy session have better percentage compared to individual sessions for naming tasks (36.7% vs 11.7%) structured conversation (30,7% vs 6.7%) and speech intelligibility (33.3% vs 21.7%). In group settings, they used a broader range of vocalizations like laughter and shouting with excitement, displayed a variety of facial expressions such as smiling, made more eye contact with the speech therapist and other participants, and rolled their eyes in impatience to take turns, compared to individual settings. In addition, social closeness in group settings was higher than in individual settings, with more frequent peer communication, increased emotional support, and greater assistance provided.

Conclusion

In group therapy, participants demonstrated greater communication initiation, a wider variety of expressive modalities, and a stronger tendency to communicate for social closeness. These findings highlight significant differences in communication patterns between group and individual therapy for non-fluent aphasia.

EP94

POSTACUTE COVID-19 FATIGUE, MUSCLE WEAKNESS, AND ALTERED AUTONOMIC NERVOUS SYSTEM IN CHILDREN AND ADOLESCENTS

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Background and aims

This study aimed to quantify fatigue, muscle weakness, and altered autonomic nervous system function, and identify associated factors in children and adolescents with postacute COVID-19 syndrome.

Methods

This prospective cohort study included 53 participants aged 6–18 years with postacute COVID-19 symptoms and 41 age- and sex-matched controls without SARS-CoV-2 antibodies. Participants completed validated questionnaires assessing fatigue using the Pediatric Quality of Life Inventory™ Multidimensional Fatigue Scale (PedsQL™ MFS) and physical activity levels via the International Physical Activity Questionnaire (IPAQ). They also underwent pulmonary function tests, the Six-Minute Walk Test (6MWT), and bilateral hand grip and pinch strength measurements.

Results

Children and adolescents with postacute COVID-19 syndrome exhibited significantly greater fatigue (parent-rated scores: mean 65.4 vs. 78.8, $p = 0.027$; child-rated scores: 67.8 vs. 82.3, $p < 0.001$), weaker grip strength (right: 56.0% vs. 71.3% of normative values, $p = 0.035$; left: 53.3% vs. 65.1%, $p = 0.018$) and pinch strength (right: 92.4% vs. 110.7%, $p = 0.013$; left: 88.6% vs. 109.9%, $p = 0.004$), and greater post-6MWT heart rate increase (35.9 vs. 22.6 beats per minute, $p = 0.008$) than controls. They also had a higher prevalence of restrictive lung disease (35.8% vs. 9.8%, $p = 0.004$). Regression analyses identified older age, a lower percentage of predicted 6MWT distance, and postacute symptoms such as fatigue, post-exertional malaise, headache, inattention, memory loss, sleep disorders, and palpitations as predictors of more severe fatigue. Pulmonary function and grip/pinch strength, however, were not significant predictors.

Conclusion

Children and adolescents with postacute COVID-19 syndrome, particularly older individuals, experience greater fatigue, weakness, and altered autonomic nervous system function compared to controls. These findings highlight the importance of quantifying postacute COVID-19 symptoms and their physiological associations to guide targeted interventions.

EP95

EFFECT OF DPP-4 INHIBITORS, THIAZOLIDINEDIONES, AND SULFONYLUREAS ON THE DEVELOPMENT OF ROTATOR CUFF DISEASE IN PATIENTS WITH TYPE 2 DIABETES MELLITUS: A RETROSPECTIVE COHORT STUDY

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Background and aims

Dipeptidyl peptidase 4 inhibitors (DPP4is) and thiazolidinediones (TZDs) may be associated with the development of rotator cuff disease. This study compared the risks of rotator cuff disease and rotator cuff repair surgery in patients receiving DPP4is, TZDs, and sulfonylureas (SUs).

Methods

A retrospective cohort analysis of Taiwan's National Health Insurance Research Database was conducted to identify patients with type 2 diabetes mellitus (DM) who were newly prescribed DPP4is, TZDs, or SUs between 2012 and 2020. Propensity scores with inverse probability of treatment weighting (IPTW) with 5% trimming were generated to form homogeneous groups of SUs users versus DPP4is users, SUs users versus TZDs users, and DPP4is users versus TZDs users. The outcomes of interest were rotator cuff disease and rotator cuff repair surgery. Cox proportional hazard regression models were used to estimate HRs with 95% CIs for the outcomes.

Results

Initially, 334322 DPP4is users, 87738 TZDs users, and 928479 SUs users were included. After inverse probability of treatment weighting (IPTW) was conducted with 5% trimming, SUs users had a significantly lower risk of rotator cuff disease than DPP4is users (HR 0.914, 95% CI: 0.898-0.930) and TZDs users (HR 0.887, 95% CI: 0.871-0.904) did, and DPP4is users had a significantly lower risk of this disease than TZDs users had (0.956, 95% CI: 0.926-0.986). Regarding the risk of rotator cuff repair surgery, the effect sizes did not reach statistical significance (SUs vs DPP4is, HR 0.930, 95% CI: 0.863-1.003; SUs vs TZDs, HR 0.989, 95% CI: 0.910-1.074; DPP4is vs TZDs, HR 0.940, 95% CI: 0.817-1.082).

Conclusion

SUs users had the lowest risk of rotator cuff disease, followed by DPP4is and TZDs users. Therefore, SUs may be superior to DPP4is and TZDs for patients with type 2 DM at risk of rotator cuff disease. Future prospective studies are necessary to verify our findings.

EP96

EFFECTS OF RESISTANCE TRAINING ON OSTEOSARCOPENIA IN COMMUNITY-DWELLING POSTMENOPAUSAL KOREAN WOMEN: RANDOMISED CONTROLLED TRIAL

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Background and aims

Osteosarcopenia, the co-occurrence of osteopenia/osteoporosis with sarcopenia, is a geriatric syndrome that is associated with an increased risk of falls, fragility fractures, and mortality. Nonpharmacological interventions, including resistance exercise and nutritional support with protein, calcium, and vitamin D supplementation, effectively mitigate progression of osteosarcopenia. We evaluated the efficacy of a 6-month progressive resistance exercise program in postmenopausal women with osteosarcopenia.

Methods

This assessor-blinded randomised controlled trial comprised 34 postmenopausal women with osteosarcopenia who were assigned to either a resistance exercise group (RE; n=17) or a home exercise group (HE, n=17). Both groups received home exercise brochures and nutritional supplementation (40 g protein, 600 mg calcium, and 1600 IU vitamin D). The RE group additionally attended semi-weekly supervised resistance training sessions. The primary outcome was the change in the skeletal muscle index (SMI). The secondary outcomes included changes in bone mineral density, muscle strength, physical performance, quality of life, and psychological measures.

Results

In this study, 17 and 16 participants from the RE and HE groups, respectively, completed the intervention. The RE group showed significantly greater SMI improvement at 12 weeks ($0.310 \pm 0.343 \text{ kg/m}^2$ vs. $0.011 \pm 0.423 \text{ kg/m}^2$ in HE). However, SMI improvement between RE group and HE group were not significant different at 24 weeks (RE group; $0.121 \pm 0.316 \text{ kg/m}^2$, HE group; $-0.024 \pm 0.258 \text{ kg/m}^2$). Though hand-grip strength (HGS) and physical performance improved significantly over time in both groups, the RE group showed superior HGS gains at 6 and 18 weeks.

Conclusion

A 6-month program of progressive resistance exercise combined with nutritional support improved muscle mass and strength in postmenopausal women with osteosarcopenia. Home exercises with nutrition alone also enhanced physical performance.

EP97

EARLY RETURN TO WORK IN LUNG CANCER PATIENTS AFTER THORACOSCOPIC SURGERY: STATUS AND DETERMINANTS

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Background and aims

Based on data from lung cancer patients who underwent thoracoscopic surgery at West China Hospital between 2023 and 2024, this study aims to examine the status of early return to work (RTW) following surgery and identify the factors that influence this process.

Methods

Lung cancer patients who underwent thoracoscopic surgery at West China Hospital from March 2023 to March 2024 were surveyed using a general information questionnaire, the Hospital Anxiety and Depression Scale (HADS), and the EQ-5D-3L scale. The study assessed their cardiopulmonary exercise function before and after surgery. 30 days post-surgery, patients were categorized into Return to Work (RTW) and Non-RTW groups, and the factors influencing RTW were analyzed.

Results

A total of 166 lung cancer patients were surveyed, with 59 in the RTW group and 107 in the Non-RTW group. Among them, 35.5% returned to work within 30 days after thoracoscopic surgery. Statistically significant differences were found between the two groups in terms of pre-surgery occupation, surgery duration, MVV, and 6MWT walking distance ($P < 0.05$).

Conclusion

Lung cancer patients undergoing thoracoscopic surgery have a high rate of return to work. Therapists can improve cardiopulmonary function and offer rehabilitation guidance to help patients return to work, achieve social reintegration, and improve quality of life.

EP98

ETIOLOGICAL STATUS AND TREATMENT OUTCOMES OF LOW BACK PAIN IN PATIENTS TREATED AT TERTIARY LEVEL HOSPITAL

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Introduction

Low back pain (LBP) is a prevalent musculoskeletal disorder that significantly contributes to disability, reduced productivity, and impaired quality of life. It affects millions worldwide, posing a major health concern in both developed and developing countries.

Objective

This study aimed to assess the etiological factors and treatment outcomes of LBP among patients treated in the orthopedic department of tertiary-level hospitals in Bangladesh.

Methods

A prospective observational cross-sectional study was conducted at the Department of Orthopedics and Department of Physical Medicine & Rehabilitation in Shahabuddin Medical College Hospital, Dhaka, from January to December 2024. Using consecutive sampling 300 patients aged ≥ 15 years presenting with LBP at outpatient departments (OPD) were enrolled. Data were analyzed using SPSS Version 23.0.

Results

The mean age of participants was 46.9 ± 2.57 years, with the 41-50 age group (37.6%) being most affected, females constituted the majority (58.6%). Hypertension (45.2%) was the most common comorbidity. Among mechanical causes, spondylosis (43.33%) and disc prolapse (40.67%) were predominant. Other causes included back strain (36.33%), spondylolisthesis (26.67%), sacroiliac joint sprain (9.67%), and spinal stenosis (7.33%). Infection-related causes (3.67%), neoplastic lesions (2.67%), and inflammatory disorders (0.67%) were also noted. Of 269 patients receiving conservative treatment, 48.4% fully recovered at three months, improving to 56.25% at six months. A significant portion showed improvement, while only a small fraction remained stable or required further treatment.

Conclusion

Middle aged females were predominantly affected by LBP, with hypertension being the most common comorbidity. Conservative treatment proved effective, leading to recovery in most cases, with minimal need for surgical intervention or referral.

Keywords

Etiological, Treatment Outcomes, LBP, Orthopedics, Tertiary Hospital.

EP99

AN OBSERVATIONAL STUDY ON THE IMPACT OF ADIPOSITY TO FUNCTIONAL OUTCOME AFTER STROKE INPATIENT REHABILITATION IN MALAYSIAN POPULATION: A SINGLE CENTRE EXPERIENCE

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Background and aims

In 2023, more than half of the adult population in Malaysia is overweight or obese according to the National Health and Morbidity Survey. The relationship between adiposity and post stroke functional outcome from numerous reviews were still inconclusive. We aim to study on the impact of adiposity on functional outcome in stroke patients during inpatient rehabilitation.

Methods

Seventeen stroke patients admitted to inpatient rehabilitation ward at Sungai Buloh Hospital were recruited from August 2024 till January 2025 in this observational study. Demographic and clinical characteristics data including length of stay (LOS), body mass index (BMI), adiposity indices (waist, hip circumferences), modified Barthel Index (MBI) upon admission and discharge were recorded. Functional outcome was determined with modified Rankin scale (mRS) at 3 months with grade ≤ 2 defined as good outcome. Rehabilitation effectiveness was defined by the difference between MBI on admission and discharge; and rehabilitation efficiency as rehabilitation effectiveness divided by LOS.

Results

The cohort consists of 58.8% male (n=10) and 41.2% (n=7) female patients. Mean age was 48.82 ± 5.88 years with a mean LOS of 15.31 ± 8.18 days. Mean effectiveness and efficiency were 37.18 ± 15.98 and 3.31 ± 2.38 respectively. Rehabilitation effectiveness was significantly lower in female patients (27.57 ± 12.90 vs 44.11 ± 15.76 , $p=0.042$); and negatively correlated with higher BMI ($r=-0.506$, $p=0.045$) and wider hip circumference ($r=-0.548$, $p=0.028$). Whereas, cohort with lower efficiency were negatively correlated with higher BMI ($r=-0.632$, $p=0.009$), wider hip ($r=-0.602$, $p=0.014$) and waist circumferences ($r=-0.571$, $p=0.021$). Patients with mRS ≤ 2 were significantly associated with higher inpatient effectiveness (48.60 ± 7.70 , $p=0.004$) and efficiency (4.99 ± 0.66 , $p<0.001$).

Conclusion

In this study, female patients and patients with higher adiposity indices as indicated by higher BMI, wider hip and waist circumferences were associated with poorer functional outcome during inpatient rehabilitation. Patients with higher rehabilitation effectiveness and efficiency also showed to have better functional outcome 3 months after stroke.

EP100

A DOWNWARD SPIRAL: CHRONIC PARAPLEGIA WITH SCHIZOPHRENIFORM DISORDER, AND THE PATH TO DOUBLE LOWER LIMBS AMPUTATION

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Background and aims

Spinal cord injury (SCI) patients have a higher risk of psychological disorders and chronic disease multimorbidity. We are reporting a case that highlights the catastrophic consequences of psychotic disorder on a previously independent and highly functional paraplegic patient. It underlines the pivotal importance of comprehensive scheduled SCI impairment evaluation, early detection of complications, and interventions in chronic SCI aiming to minimize the risk of additional morbidity.

Methods

A 36-year-old man with T5 complete paraplegia due to a traumatic SCI 15 years ago was highly functional at the community level and working in an e-hailing platform driving a modified car until 2 years ago. He developed Schizophreniform disorder, which led to social withdrawal and eventual bedridden status. This resulted in complicated pressure injury and chronic anemia that led to serial debridement and multiple transfusions. He subsequently underwent bilateral lower limb amputations to prevent further ascending infection.

Results

Postoperatively, a biopsychosocial-spiritual approach with multidisciplinary rehabilitation interventions was implemented to optimize his medical, physical, functional, and psychological status, aiming for enhanced recovery and regaining his functional independence. Integrating care between the multidisciplinary specialties, and interdisciplinary rehabilitation team members led by Rehabilitation Physician has enabled early supported discharge. His family received home nursing care education, a domiciliary care team was arranged for support, and the welfare department assisted with financial aid. Scheduled appointments were given to various specialties to continuously monitor and optimize his recovery.

Conclusion

This case illustrates the impact of schizophreniform disorder on chronic SCI individuals that resulted in severe functional decline and medical consequences that led to dual major disabilities. This shall raise awareness of the crucial need for comprehensive scheduled SCI impairment evaluation that includes mental health screening for early detection and interventions aiming to maintain function and quality of life, hence minimizing the risk of medical complications and potential additional major disabilities.

EP101

EFFECT OF THE PNEUMATIC AND ELECTRIC DRIVE SOFT REHABILITATION GLOVES WITH MULTIPLE SENSORY STIMULATION MODALITIES COMBINED WITH LOW-FREQUENCY REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION ON HAND MOVEMENT AND TACTILE PRESSURE SENSATION IN STROKE PATIENTS

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Background and aims

To explore the rehabilitation effect of the pneumatic and electric drive soft rehabilitation gloves with multiple sensory stimulation modalities combined with low-frequency repetitive transcranial magnetic stimulation on hand movement and tactile pressure sensation in stroke patients.

Methods

From May 2023 to October 2024, 60 stroke patients from the First Affiliated Hospital of University of South China were randomly divided into control group (n=30) and experimental group (n=30), both groups received conventional rehabilitation treatment, in addition, the control group was increased with 1HZ low-frequency rTMS in the M1 area of the cerebral cortex motor area on the opposite side of the lesion, and the experimental group received the pneumatic and electric drive soft rehabilitation gloves with multiple sensory stimulation modalities on the basis of the control group for a total of 4 weeks. Before and after treatment, FMA-UE, MAS, SWMT and BI were used to evaluate the hand movement, tactile pressure function and daily living ability of the patients.

Results

There was no significant difference in FMA-UE score, MAS score, SWMT score and Barthel score between the two groups before treatment ($P>0.05$), and after 4 weeks of treatment, except for the control group, there was no significant difference in SWMT score after treatment ($P>0.05$), and the scores of the other groups were significantly higher than those before treatment ($P<0.001$). After treatment, the FMA-UE score, MAS score, SWMT score and Barthel score in the experimental group were better than those in the control group ($P<0.05$).

Conclusion

The pneumatic and electric drive soft rehabilitation gloves combined with low-frequency repetitive transcranial magnetic stimulation can improve the motor and tactile pressure function of stroke patients to a certain extent, so as to further improve their daily life function, which is better than simple low-frequency rTMS.

EP102

DEMOGRAPHIC CHARACTERISTICS OF SPINAL CORD INJURY PATIENTS REFERRED FOR REHABILITATION IN SIBU HOSPITAL

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Background and aims

Rehabilitation medicine service in Sibu Hospital began on 17.02.2022. For the time being, inpatient rehabilitation service is co-managed in primary team acute ward until dedicated ward opens. This study explores the demographic characteristics among the inpatient referrals for the spinal cord injury (SCI) population.

Method

Retrospective descriptive study was conducted on inpatient referrals for the SCI rehabilitation service from 17.12.2022 to 31.12.2024. The information on patient demographic, etiology or types of spinal injury, functional outcome measures and socioeconomic status were compiled from the registry record. The data analysis was done using SPSS version 26.

Results

Total 102 patients were analyzed, with mean age of 51 years old, 69% of them were within working age (21-60 years) group. There were more male (59%) than female. Among the studied patients, 44% were Ibanese, followed by Chinese (27%) and Malay (16%). Half of them (50/102) were actively working until the day of SCI, while 47% of them were blue-collar workers.

Fifty-nine of them were traumatic and forty-one of them were non-traumatic SCI. There were more paraplegic (59%) than the tetraplegic, 57% (59/102) of them sustained complete neurological injury, 38% were incomplete neurological and 5% normal neurological findings. Among the traumatic SCI group, 33/59 were due to fall and 26/59 due to road traffic accidents. The paraplegics appeared more independent (SCIM 33.78 ± 20.51) compared to the paraplegics (SCIM 16.71 ± 15.02). The Length of stay of Tetraplegic (16 days) and paraplegic (12 days) were quite similar due to timely discharge amid congestion.

Conclusions

Half of the SCI population seen were working age group, more traumatic than non-traumatic causes. Returning to work is vital for SCI rehabilitation to ease family and financial burdens. Prevention includes public road safety education, workplace fall awareness, and farmer/villager safety measures for height-related falls.

EP103

DEMOGRAPHIC CHARACTERISTICS OF STROKE PATIENTS REFERRED FOR REHABILITATION IN SIBU HOSPITAL

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Background and aim

The Sarawak region's vast geographic and rural population present significant healthcare challenge. The study evaluates the demographic characteristics of stroke patients and follow-up adherence in Sibu Hospital.

Methods

A retrospective descriptive study was conducted on inpatient referrals for the stroke rehabilitation service from 17 February 2022 to 31 December 2024. The information of patient demographic, stroke types, severity of stroke, risk factors, functional outcome measures and socioeconomic status were compiled from the registry record. The data analysis was done using SPSS version 26.

Results

Total 703 patients were analysed, with the mean age of 57, and 67% (n=467) were working-age group (21 to 65 years). There were more male 59% than female, and most of them were Ibanese (n=315) followed by Chinese, Malay and Melanau. 61% of them were B40 group. There were more haemorrhagic 52% than ischemic stroke, in which we noted medical geriatric team had handled part of the elderly stroke patients without referral to rehabilitation team. 80% of the patients (559/703) had moderate stroke (NIHSS range 5-15). Majority of the stroke patients (634/703) were high dependency (MBI 0-49). The most common risks factors were hypertension (77%), followed by dyslipidaemia and diabetes mellitus. 50% (351/703) were actively working until the day of stroke onset, and 75% of them were blue collar workers. We noted 56% (394/703) defaulted first rehabilitation outpatient clinic appointment.

Conclusion

The patients defaulted most likely is due to functionally high dependency, also associated with low socioeconomic status and challenging logistics difficulties. Possible supporting programmes can be considered such as community domiciliary service, supports from local non-governmental agencies, and telemedicine.

EP104

DEMOGRAPHIC CHARACTERISTICS OF TRAUMATIC BRAIN INJURY PATIENTS REFERRED FOR REHABILITATION MEDICINE SERVICE IN SIBU HOSPITAL

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Background and aim

Traumatic Brain Injury (TBI) is a leading cause of morbidity, mortality, and loss of productivity. This study demonstrates the demographic characteristics of inpatient TBI patients referred to rehabilitation medicine service in Sibu Hospital.

Methods

A retrospective descriptive study was conducted on inpatient TBI patients referred for rehabilitation service from 17 February 2022 to 31 December 2024. The information on patient demographic, etiology or severity of TBI, functional outcome measures and socioeconomic status were compiled from the registry record. The data analysis was done using SPSS version 26.

Results

Total 193 patients were analyzed, with the mean age of 50 years and most of them (79%) were male. About 51% (98/193) of the studied population falls in productive age group (20-60 years). Nearly 52% (101/193) of the patients had severe TBI (average of 42 years), followed by mild (25%) and moderate TBI (23%). The mechanism of injury was mostly (n=120, 62%) road traffic accident (RTA), followed by fall (n=56, 29%). During the first rehabilitation review in the ward, 41% were in minimal conscious state (MCS) and 43% were alert in consciousness. Severe TBI group were characterized by low MBI (severe to total dependency) and high mRS score, also graded with severe disability in Glasgow Outcome Scale (GOS). The average length of stay for severe TBI group is longer (23 days) compared to mild and moderate (10-13 days) group.

Conclusion

Severe TBI primarily affected working-age individuals, mainly from road traffic accidents, highlighting the need for rehabilitation to support recovery and alleviate family and financial burdens. Public education on road safety is emphasized for the prevention of TBI.

EP105

DIFFERENCES IN EFFICACY AND SAFETY OF MESENCHYMAL STEM CELLS FROM DIFFERENT SOURCES IN THE TREATMENT OF PATIENTS WITH KNEE OSTEOARTHRITIS

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Background and aims

Mesenchymal stem cells (MSCs) play a significant role and hold promising potential in the treatment of knee osteoarthritis (KOA). This study aims to compare the differences in efficacy and safety of MSCs derived from various sources, including umbilical cord-derived MSCs (UC-MSCs), bone marrow-derived MSCs (BM-MSCs), and adipose-derived MSCs (AD-MSCs), in the treatment of patients with knee osteoarthritis.

Methods

We searched studies on MSCs for the treatment of KOA in databases including PubMed, Cochrane Library, Embase, and Web of Science. Data analysis was conducted using RevMan (V5.3), STATA (V16.0), and R (V4.0), focusing on outcomes such as the Visual Analog Scale (VAS) score, WOMAC score, WOMAC pain, WOMAC functional limitation, and WOMAC stiffness. Short-term effectiveness was evaluated at 6 months, while long-term effectiveness was assessed at 12 months.

Results

The results of this study indicate that MSCs from different sources are more effective than the control group in improving knee joint function and alleviating pain. Network meta-analysis revealed that bone marrow-derived MSCs outperformed adipose-derived MSCs and umbilical cord-derived MSCs in improving WOMAC scores and VAS scores at both 6 months and 12 months in OA patients. Although the differences in WOMAC scores among most studies were not significant, BM-MSCs and UC-MSCs may provide greater benefits in alleviating pain in KOA patients compared to AD-MSCs.

Conclusion

This study demonstrates that MSCs are more effective than the control group in treating KOA and can better improve pain and knee joint function in OA patients. In terms of functional improvement in KOA patients, bone marrow-derived MSCs may hold certain advantages over MSCs from other sources.

EP106

ROBOTIC ASSISTED THERAPY IN THE MANAGEMENT OF HEMIPLEGIC SHOULDER PAIN: A PILOT RANDOMIZED CONTROL STUDY

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Background and aims

Hemiplegic shoulder pain (HSP) is common post-stroke. Rehabilitation is crucial, but achieving optimal therapy frequency is challenging. We aim to explore an upper limb robotic device for reducing HSP pain as an adjunctive treatment to conventional method.

Methods

This is a single-blinded randomized controlled trial. Twenty-six participants diagnosed with post-stroke HSP were recruited and randomized into two groups: 13 participants in conventional versus 13 participants in the intervention group. The participants in the conventional group underwent usual standard therapy for 9 sessions within three to four weeks, while the interventional group underwent standard therapy with robotic therapy. Pre- and post-intervention assessments included the Fugl Meyer Assessment for Upper Limb, Shoulder Pain and Disability Index (SPADI), and shoulder range of motion.

Results

Total of 24 participants completed this study for both groups. Significant improvements in shoulder abduction and adduction were observed in the conventional therapy group from 87.5 degrees; interquartile range (IQR) 20 to 90 degrees (IQR of 21.8) with p-value of < 0.05 and from 32 degrees (IQR of 43.8) to 35 (IQR 41.8) with a p-value of <0.05, respectively. The interventional group showed a significant reduction in the total pain score of SPADI from 65.2; standard deviation (SD) of 20.9 to 52.34 (SD 29.5) with p-value < 0.05. No complications were reported in either group.

Conclusion

Our study serves as a foundational step toward conducting a more comprehensive investigation in exploring the potential role of end-effector robot in managing HSP.

EP107

**ICF-BASED REHABILITATION FOR GBS-AMSAN:
A REMARKABLE RECOVERY IN A DISTRICT HOSPITAL****Teh Jia Yin^{1*}, Yew Chung Khian²**¹Inpatient Unit, Hospital Sungai Bakap, Pulau Pinang, Malaysia²Department of Rehabilitation Medicine, Hospital Sultanah Bahiyah, Kedah, Malaysia**Background and aims**

Acute Motor and Sensory Axonal Neuropathy (AMSAN) is a severe Guillain-Barré Syndrome (GBS) variant that leads to a poor prognosis due to extensive axonal damage. This typically results in prolonged recovery and a high risk of long-term impairment. This case highlights how an ICF-based rehabilitation approach even in a resource-limited district hospital setting can lead to a significant functional recovery by addressing impairments, activities, and participation accordingly despite a poor initial prognosis and electrophysiological findings.

Methods

A 44-year-old female with AMSAN underwent an eight-month rehabilitation in a district hospital guided by the ICF framework. Interventions targeted: (1) Body Functions and Structures – progressive strengthening exercises and neuromuscular electrical stimulation to improve muscle strength and neuromuscular control; (2) Activities – balance training and gait re-education to enhance mobility and independence; (3) Participation – family-supported activities and early vocational planning to facilitate return-to-work readiness. Progress was assessed using the Modified Barthel Index (MBI), Tinetti Performance-Oriented Mobility Assessment (POMA), and manual muscle testing (MMT).

Results

The patient progressed from needing substantial assistance to complete independence, with her MBI rising from 28 to 100, despite ongoing axonal involvement on nerve conduction studies. Upper limb strength reached 5/5 bilaterally, and lower limb strength improved from 2/5 to 4/5. The Tinetti Balance Score (POMA-B) improved from 8/16 to 16/16, and the Tinetti Gait Score (POMA-G) increased from 7/12 to 10/12, allowing her to ambulate independently with an assistive device. Persistent mild sensory loss remained in the right ulnar distribution.

Conclusion

Despite a poor initial prognosis, this case demonstrates the effectiveness of an ICF-based rehabilitation approach in GBS-AMSAN. However, its use in district hospitals remains limited due to a lack of awareness among clinicians without rehabilitation training. Expanding ICF integration can improve patient recovery and optimize rehabilitation resources in non-specialized settings.

EP108

THE HIDDEN CULPRIT: MISSED SPINA BIFIDA IN A TRANSFEMORAL AMPUTEE WITH CHRONIC PRESSURE INJURY - A CASE REPORT

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Background

Spina bifida, a neural tube defect, can remain undiagnosed until adulthood, leading to unrecognized neurological dysfunction and complications such as chronic pressure injuries and delayed wound healing. This case highlights the need to recognize congenital spinal anomalies in complex rehabilitation cases.

Case Presentation

A 62-year-old woman with a right transfemoral amputation (TFA) due to skin cancer was referred for wound optimization of a chronic right ischial tuberosity pressure injury. Despite multiple wound care strategies, including vacuum-assisted closure (VAC), healing was poor. Further history revealed a skin tuft over her lower back and a childhood spinal cord injury reported by her mother, though never formally diagnosed. She remained ambulatory until her TFA but had developed a chronic left foot deformity following an untreated injury 30 years prior. Neurological examination showed impaired sacral sensation, weak anal contraction, and absent deep anal pressure reflex, raising suspicion of an undiagnosed spinal cord pathology. Imaging confirmed spina bifida occulta with lipomyelocele and posterior element defects from L5 to S3. Despite reporting normal bowel and bladder function, bladder trabeculation suggested neurogenic bladder dysfunction.

Discussion

This case highlights the importance of thorough neurological assessment in chronic wound cases, particularly in amputees with poor healing. Undiagnosed spina bifida occulta can contribute to functional impairments and secondary complications like pressure injuries.

Conclusion

Unrecognized spina bifida occulta can impact wound healing and rehabilitation. Clinicians should maintain a high index of suspicion when managing chronic pressure injuries with poor healing. A multidisciplinary approach involving neurology, rehabilitation, and wound care is essential to optimize outcomes.

EP109

REVIEW OF NON-PHARMACOLOGICAL TRADITIONAL CHINESE AND WESTERN MEDICINE TREATMENTS FOR CERVICAL SPONDYLOSIS RADICULOPATHY

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Abstract

Cervical spondylosis radiculopathy (CSR) is a common type of cervical spondylosis accounting for 50–60% of cases. It is caused by degenerative changes in the intervertebral discs, posterior-lateral disc herniation, or osteophyte formation on the vertebral body, which compress and irritate the nerve roots, leading to motor and sensory dysfunction. In addition to typical symptoms such as neck pain and restricted movement, CSR may cause arm pain or finger numbness. In severe cases, patients may experience weakness, heaviness in the forearm or fingers, or difficulty holding objects. Neck extension, coughing, or sneezing can exacerbate the pain. There are many treatment options for CSR, including surgical intervention. However, due to the high risks and significant trauma associated with surgery, most patients prefer conservative treatments. To enhance therapeutic effects, clinicians often use a combination of treatments to compensate for the limitations of individual methods. This multimodal approach helps regulate the body's condition and effectively alleviate pain. The main treatments for CSR include acupuncture, tuina therapy, spinal traction, extracorporeal shock wave therapy, and exercise therapy. These methods can be combined based on the severity of the condition, accelerating recovery and helping patients return to normal life more quickly.

EP110

CHRONIC ULNAR NEUROPATHY SECONDARY TO POST-TRAUMATIC ELBOW OSTEOARTHRITIS: A DELAYED COMPLICATIONS OF A NEGLECTED FRACTURE

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Background and aims

Primary elbow osteoarthritis(OA) is a relatively uncommon condition, affecting only 2–3% of the population. The most frequently identified risk factors are occupations or hobbies that involve repetitive elbow movements, which are observed in about 60%. In contrast, post-traumatic elbow osteoarthritis is rare but often more severe and debilitating. Patients usually experience pain and generalized restriction in the range of motion. Notably, ulnar neuropathy symptoms rarely occur in isolation, often accompanied by other symptoms.

Methods

We report a case of a right-hand dominant 47-year-old babysitter with left elbow OA secondary to a neglected fracture presented with ulnar neuropathy.

Results

The patient complained of numbness in her left upper limb below the elbow for five years, worsening over the past year, with noticeable forearm shrinkage. She feels disturbed by the tingling sensation upon doing bimanual hand activities. Otherwise, she did not notice any weakness or a reduced range of motion. There was no history of trauma or neck pain. Clinical examination of the left upper limb showed evidence of muscle atrophy over the medial forearm. The range of motion of the left elbow is full with minimal crepitus felt on the elbow joint. There was weakness over left wrist flexor (ulna deviation), lumbricals, interossei and hypothenar muscles with positive Froment's sign. Diminished sensation also noted along the ulnar distribution. Bedside ultrasound showed osteophytes at the elbow joint with entrapment of the ulnar nerve at the cubital tunnel with significant nerve atrophy distally. X-rays confirmed osteoarthritic changes and old fractures of the supracondylar left humerus and left radial head. Electrodiagnostic studies confirmed ulnar nerve neuropathy with signs of denervation. Rehabilitation programme predominantly aimed at developing compensatory mechanisms and providing symptomatic relief, acknowledging that nerve damage at this stage is typically irreversible.

Conclusion

This case report demonstrated a unique case of a missed left supracondylar humerus and radial head fracture with left ulnar neuropathy as a clinical manifestation of elbow osteoarthritis.

EP111

FUNCTIONAL OUTCOMES OF PROLONGED DISORDERS OF CONSCIOUSNESS IN ADULT TRAUMATIC BRAIN INJURY: A SCOPING REVIEW

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Background and aims

Traumatic brain injury (TBI) unfortunately remains a common condition managed in Rehabilitation Medicine. Definitions and terminology of TBI have evolved over time, reflective of technological and diagnostic advancements. Prolonged Disorders of Consciousness (PDOC) pose significant clinical challenges and understanding natural recovery trajectories is useful. A scoping literature review was conducted to evaluate the available updated evidence regarding functional outcomes following PDOC in adult TBI.

Methods

A scoping review guided by Munn et al (2018) and the PRISMA-ScR checklist was conducted. Three bibliographic databases (Pubmed [479 articles], Google scholar [30500 articles] and CINAHL [64 articles]) were searched with the terms 'prolonged disorders of consciousness' and 'outcomes' for full-text English language publications from January 2000 to December 2024. Observational studies including ≥ 3 adult patients with traumatic brain injury with specific information on functional outcomes were included. Studies without information on conscious state or solely involving anoxic brain injury were excluded. Narrative reviews, randomised controlled trials, meta-analyses, systematic reviews and research involving children were also excluded.

Results

Nine studies met the inclusion criteria. Data was limited and heterogenous, with gaps especially in Asian populations.

Conclusion

With progress seen in medical and rehabilitation fields, PDOC does not necessarily carry similar negative prognostic connotations as in the past. This has implications on rehabilitation service delivery. Continued longitudinal study and more extensive follow up on outcomes of PDOC after adult TBI would be of benefit.

EP112

RECLAIMING THE MOTION: FUNCTIONAL HAND RECOVERY POST HYPERSELECTIVE NEURECTOMY OF WRIST FLEXORS

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Background and aims

Spasticity is due to variety of causes such as stroke, spinal cord injury and traumatic brain injury that results in limitation of function. Approach to spasticity post upper motor neuron syndrome includes multiple physical exercises and pharmacological interventions either systemic or targeted administration. Moreover, surgical approach involving hyperselective neurectomy of the upper limb has been documented as part of spasticity management to improve hand function. Hyperselective neurectomy involves selective dissection of major motor nerve fascicles at the entry point of the nerve into the muscles.

Methods

Single case report.

Results

A 28 years old right hand dominant lady with history of right external capsule ruptured atriovenous malformation suffered from left hemiparesis, dystonia and severe spasticity of the left upper limb. Despite intensive hand therapy coupled with the highest tolerable dosage of oral baclofen and multiple series of chemodenervations of the wrist flexors, her spasticity still limits her bimanual activity potential.

The patient presented to our centre 2 months post hyperselective neurectomy of wrist flexors and fractional lengthening of finger flexor tendons with severely limited wrist extension and non-functioning left hand. During 3 weeks of intensive hand therapy, the patient demonstrated improvement in range of motion from 10 to 70 degrees of wrist extension with improved spasticity and significant functional hand recovery based on the Jebsen-Taylor Hand Function Test. A multidisciplinary approach was implemented combining functional hand training, physical stretching and strengthening with the application of resting and dorsal cock-up hand splint.

Conclusion

The case report highlighted the importance of multidisciplinary intensive hand rehabilitation post-surgical intervention in managing upper limb spasticity. Other components of upper motor neuron syndrome such as dystonia may also posed a challenge to the functional hand recovery.

EP113

MANAGING COMPLICATED SPASTIC DYSTONIA OF CEREBRAL ORIGIN USING THE TOXNET SPASTICITY CURRICULUM GUIDELINE

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Background and aims

Spastic dystonia is common following a traumatic brain injury and it can be severe and disabling, leading to other complications. The management should be tailored to individual patient based on clinical assessment and goal setting.

Methods

We report a 21-year-old man with severe traumatic brain injury 14 months ago. He was admitted this time for the management of spastic dystonia, predominantly in both upper limbs. Due to the severe persistent upper limb flexor posturing, he developed skin breakdown over both anterior aspect of the elbows. There were masked volitional movement in the upper limb. Apart from elbow flexors spasticity, he also had spasticity of the finger flexors. Prior to this admission, he was already started on oral antispastic medication and given botulinum toxin once but there was no improvement. After a thorough assessment, we set SMARTER (**S**pecific, **M**easurable, **A**chievable, **R**ealistic, **T**imed, **E**thical, **R**ecorded) goals based on GAS-eous (**G**oal **A**ttainment **S**cale in the **E**valuation of **O**utcome for **U**pper limb **S**pasticity) system, which includes the domains of pain/discomfort, range of movement/contracture, passive function (care task), active function and cosmesis/body image. To decide whether the patient will benefit from a repeated botulinum toxin injection, we did a diagnostic nerve block to the musculocutaneous nerves.

Results

Ultrasound showed Heckmatt scale grade 2 for both biceps bilaterally and Heckmatt scale grade 1 for bilateral brachialis muscles. After diagnostic nerve block with 2% Lignocaine, there were improvement in elbow extension by 25 degrees bilaterally. After the Botulinum toxin injection patient was able to do active elbow extension.

Conclusion

Diagnostic nerve block is an inexpensive procedure, which is easy to perform and has minimal side effect. It should be practiced more routinely prior to opting for Botulinum toxin injection.

EP114

INPATIENT INTERDISCIPLINARY REHABILITATION IN MORBIDLY OBESE TRANSTIBIAL AMPUTEE: A CASE REPORT

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Background and aims

Inpatient rehabilitation that offers intensive therapy with interdisciplinary approach produced greater and more clinically significant and sustained weight loss. This case report is aimed to share the journey of weight loss of a morbidly obese transtibial amputee, moving from outpatient to inpatient and from multidisciplinary to the interdisciplinary approach.

Methods

A case report of rehabilitation of a transtibial amputee with underlying morbid obesity.

Results

A 56-year-old obese (class III) lady with underlying ischemic heart disease, diagnosed with left transtibial amputation secondary to infected gangrenous diabetic foot ulcer, was referred to amputee rehabilitation clinic in Hospital Rehabilitasi Cheras (HRC) post amputation 1 year. Previously she was followed up in rehabilitation unit of a district hospital for pre-prosthesis training. Unfortunately, her weight was only mildly reduced and was static after attending 5 months of outpatient rehabilitation therapy under multidisciplinary approach in district hospital. Prosthesis was unable to be prescribed because patient was unafford to purchase heavy duty prosthesis. The patient was managed as inpatient under interdisciplinary approach in HRC. She was seen by rehabilitation physicians, medical officers, nurses, occupational therapist, physiotherapist, pharmacist, dietician, counsellor and clinical psychologist during her 60 days of hospitalization. Interdisciplinary team meeting was conducted every week to discuss about patient's progress. The patient completed her individualised intensive therapy and achieved a weight reduction of 9.4kg (7.7%) and waist circumference reduction of 11cm (7.6%) in less than 2 months. Besides, her functional and physical status also improved.

Conclusion

One of the factors that contributed to successful weight reduction even after patient had reached plateau in further weight reduction is the intensity and frequency of inpatient rehab program. In addition, teamwork among doctors and allied health is higher with interdisciplinary approach. Hence, we suggest inpatient rehabilitation services be expanded to district hospital so that effective rehabilitation can be easily accessible at rural area.

EP115

APPLICATION MECHANISM AND REHABILITATION EFFECT OF PLATELET RICH PLASMA FOR PRESSURE INJURY AFTER SPINAL CORD INJURY

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Background and aims

The management of pressure injury wounds after spinal cord injury (SCI) is considered a critical challenge for rehabilitation professionals and clinicians. Autologous platelet-rich plasma (PRP) is defined as concentrated platelet products after centrifuging from whole blood, providing multiple bioactive growth factors, and regulating target tissue repair and reconstruction.

Methods

In this study, we prospectively investigated 20 pressure injuries after SCI treated with PRP wound therapy, combining PRP injection with PRP gel for each wound. PRP was prepared through apheresis and analyzed for growth factors. Wound features, including wound sizes, evaluation scores, and histological observation from wound tissue biopsy were collected and analyzed.

Results

Outcomes demonstrated that the wound sizes decreased after 2 consecutive PRP treatments and showed significance since the 3-week time-point ($p < 0.05$ for both 3-week and 4-week time-points). 5 wounds were completely closed in the PRP group while 2 wounds healed in the control group. ELISA assays showed PRP with 4-time PLT had preponderant VEGF and EGF concentration and no statistical differences between PRP and PRP gel. H&E staining denoted keratinocyte proliferation and dermal layer repair and regeneration. Moreover, all inflammation indexes were effectively decreased to normal ranges, and infections were eliminated at the end of PRP wound therapy. Further evaluation showed that PUSH scores visibly decreased in the PRP group at 3-week and 4-week treatments ($P < 0.05$). Clinical Trial registration no. ChiCTR2200058138.

Conclusion

This prospective randomized clinical trial presented that autologous PRP with 4-time PLT showed superior growth factor concentrations and enhanced wound healing results. The results of wound rehabilitation assessments indicated PRP therapy, combined PRP injection with PRP gel could be considered an effective treatment for pressure injury wounds after spinal cord injury.

EP116

ANGIOGRAPHIC FINDINGS AND INTERVENTION OUTCOMES IN COMPLEX REGIONAL PAIN SYNDROME: A RETROSPECTIVE ANALYSIS

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Background and aims

In this study, angiography was performed in CRPS patients to evaluate vascular abnormalities and perfusion, and embolization or reperfusion was performed according to the angiography results. The purpose of this study is to report the results of angiography, compare them with Digital Infrared Thermographic Imaging (DITI) and three-phase bone scan (TPBS) and evaluate the changes in symptoms after intervention in Complex Regional Pain Syndrome (CRPS) patients.

Methods

We enrolled a group of 5 patients diagnosed with CRPS according to the Budapest criteria, who had undergone angiography, DITI and conducted TPBS. Based on the angiography results, three out of the five patients showed decreased vascular perfusion, while two patients showed increased staining. Reperfusion using eglandin was performed in patients with poor vascular perfusion, and embolization with imipenem/cilastatin was performed in patients with increased abnormal staining.

Results

No significant changes in pain were observed in all patients before and after the procedure. Additionally, the comparison of the results from angiography, DITI, and TPBS did not show similar patterns.

Conclusion

Abnormal staining and reduced perfusion were found in the angiography of CPRS patients, and there was no pain improvement by the intervention of angiography.

EP117

ENHANCING FUNCTIONAL RECOVERY IN SEVERE SARCOPENIA WITH WEARABLE EXOSKELETAL GAIT TRAINING: A CASE REPORT

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Background and aims

The previous studies have emphasized the importance of physiotherapies, including gait training, no study has yet examined the effectiveness of wearable exoskeletal robot-assisted gait training (RAGT) in patients with sarcopenia. In this study, we report the therapeutic outcomes of exoskeleton robot-assisted gait training in a patient with severe sarcopenia.

Methods

A 42-year-old woman with severe sarcopenia following post-surgery complications who received step-by-step training through RAGT for 30 minutes once a day, 5 days a week, for 3 weeks. We measured the Functional Ambulation Category (FAC), Berg Balance Scale (BBS), Modified Barthel Index (MBI), 2 Minute Walk Test (2mWT), and 10 Meter Walk Test (10MWT) before and after the training.

Results

Comparing the functional ability and balance before and after the training, the FAC improved from 1 to 2, the BBS from 15 to 27, the MBI from 46 to 56, the 2mWT from 37m (0.31m/s) to 60m (0.50m/s), and the 10MWT from 36.78 (0.27m/s) to 16.74 (0.59m/s)

Conclusion

Wearable exoskeletal RAGT can significantly improve balance, gait speed, and functional ability in patients with severe sarcopenia. More research is needed to determine the effects, timing, and duration of wearable RAGT.

EP128

TARGETED DRUG DELIVERY IN ISCHEMIC STROKE: P-SELECTIN-MEDIATED NANOPARTICLE THERAPY IN AN MCAO RAT MODEL

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Background and aims

This study aims to establish a Middle Cerebral Artery Occlusion (MCAO) rat model and assess the targeting efficacy of P-selectin-mediated f-BRDP nanoparticles within the infarcted region.

Methods

MCAO was induced by inserting a filament through the right common carotid artery to occlude the middle cerebral artery for 60 minutes, followed by reperfusion. Model validation was performed using TTC and H&E staining, as well as MRI. After reperfusion, fluorescent BRDP or f-BRDP nanoparticles were administered intravenously, and brains were harvested 24 hours later for ex vivo fluorescence imaging.

Results

TTC staining confirmed ischemic infarction in the white and gray matter within the MCA distribution, while the control group showed uniform red staining. H&E staining of MCAO brains revealed pathological features such as vacuolation, neuronal loss, lymphocyte infiltration, and increased eosinophilic presentation. DWI MRI images displayed high signal changes in the MCA region. Immunofluorescence staining demonstrated elevated P-selectin expression in the ischemic lesions of the MCAO group compared to controls. Fluorescence imaging confirmed precise targeting and localization of f-BRDP nanoparticles within the lesion areas of the MCAO group, while BRDP particles exhibited minimal accumulation. Evaluation of therapeutic efficacy is ongoing.

Conclusion

We established and validated a reliable MCAO model through histological and MRI analyses. Targeted delivery system efficacy, confirmed by fluorescence imaging, suggests promising advancements in stroke therapies, by enabling precise drug delivery across the BBB to damaged brain regions.

EP19

CASE REPORT: MULTIPLE JOINT NEUROGENIC HETEROTOPIC OSSIFICATION AFTER SEVERE TRAUMATIC BRAIN INJURY

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Introduction

Neurogenic heterotopic ossification (NHO) is the formation of bone in non-osseous soft tissues, often following neurological insults such as traumatic brain injury (TBI). While NHO usually occurs at specific joints post-TBI, multiple joint involvement is uncommon. This report presents a case of NHO involving six joints in a patient with severe TBI.

Case Description

A 60-year-old man sustained a severe TBI following a motor vehicle accident. His initial injury included subarachnoid haemorrhage and bilateral lung contusions with prolonged ventilation. Following the injury, he experienced recurrent infected pressure injuries and hospital acquired pneumonia, which delayed his rehabilitation process. Six months post-TBI, he presented to the clinic with severe pain and stiffness in his bilateral hips, knees, and elbows, with examination revealed severe spasticity and limited range of motion in these joints. X-rays confirmed multiple joints NHO: Brookers' grade III bilateral hip NHO, grade II bilateral knee NHO and Hastings & Graham's grade IIc bilateral elbow NHO. Blood tests revealed raised inflammatory markers and Alkaline Phosphatase levels. Despite good cognitive recovery with potential for functional recovery, the patient remained totally dependent. He had difficulty to sit upright or perform personal activities of daily living using his upper limbs. He was prescribed Indomethacin, paracetamol and baclofen, with physical therapy. There was a significant pain relief, but the improvements in mobility and function were limited due to the joints range of motion restrictions. The patient was counselled for multiple, staged surgical excision of the NHO, but the final joints for surgery will be determined once the osseous bones have matured.

Conclusion

Multiple joint NHO after severe TBI is uncommon and challenging to treat. While initial treatments with pharmacotherapy and physical therapy provided pain relief and spasticity reduction, mobility and functional improvements were still limited. This case highlights the need for a multidisciplinary approach and surgical intervention to manage a multiple joint NHO for optimal outcome.

EP120

ASSOCIATION BETWEEN APPENDICULAR SKELETAL MUSCLE MASS AND PHYSICAL ACTIVITY LEVEL IN COPD PATIENTS: A CROSS-SECTIONAL STUDY

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Background and aims

Low appendicular skeletal muscle mass (ASM) is associated with poor outcomes in chronic obstructive pulmonary disease (COPD) patients. However, the relationship between ASM and physical activity levels remains unclear. This study aimed to investigate the association between ASM and daily physical activity levels in male COPD patients.

Methods

In this cross-sectional study, 89 male COPD patients were recruited from April 2022 to June 2024. Body composition was analyzed using bioelectrical impedance analysis. Low ASM was defined as ASM index < 7.0 kg/m². Physical activity was monitored using wrist-worn Fitbit accelerometers for one month. Physical function was assessed using the 6-minute walk test, sit-to-stand tests, and handgrip strength measurements.

Results

Among 89 participants, 17 (19.1%) had low ASM. The low ASM group showed significantly lower FEV₁ (37.59% vs 53.71%, $p < 0.001$), higher BODE index (5.06 vs 1.96, $p < 0.001$), and greater mMRC dyspnea (82.35% vs 36.11% with mMRC ≥ 2 , $p < 0.001$). Daily step count (2920 vs 8237 steps, $p < 0.001$) and moderate-to-vigorous physical activity time were significantly lower in the low ASM group. In multivariate analysis, smoking quantity (aOR=1.06, 95%CI=1.02-1.10), oxygen desaturation during 6MWT (aOR=1.18, 95%CI=1.03-1.31), and daily step count (aOR=0.95 per 100 steps, 95%CI=0.92-0.98) were independently associated with low ASM.

Conclusion

Low ASM in male COPD patients was associated with severe airflow limitation, exercise intolerance, and markedly reduced physical activity levels. Early intervention targeting both respiratory symptoms and physical activity may be necessary to prevent muscle loss in COPD patients.

Acknowledgements

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EP121

INFLUENCES OF JOINT FLEXIBILITY ON THE PLANTAR PRESSURE PATTERNS DURING WALKING IN HEALTHY INDIVIDUALS

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Background and aims

Dorsiflexion of ankle and metatarsophalangeal (MTP) joints are crucial during the terminal stance phase of the gait cycle. Limited flexibility of these joints can lead to a series of compensatory changes during walking. However, the relationships between restricted dorsiflexions on plantar pressure distribution remains unclear. Therefore, our aim is to determine whether the reduced joint flexibility leads to plantar pressure changes.

Methods

This study has enrolled 14 healthy participants. A goniometer, a wireless gait analysis system, and pressure-sensing insoles were used to measure the participants' static ankle and first MTP dorsiflexion angle, dynamic ankle range of motion (ROM), and plantar pressure during walking. Participants were instructed to walk forth-and-back for 10 meters at their comfortable speed. The bilateral-averaged joint angles were used to classify the participant into a larger-angle group and a smaller-angle group. The body-weight normalized peak plantar pressure (PPP) and pressure time integral (PTI) in eight regions of each foot were recorded and the highest PPP and PTI values were identified, along with their corresponding plantar regions. The Mann-Whitney U test was used to compare the highest PPP and PTI values between the two groups, while the Chi-Squared Test was applied to analyze the region of the highest PPP and PTI.

Results

When grouped by the first MTP dorsiflexion angle, we found that the smaller-angle group had a significantly higher PTI under the hallux region compared to the larger-angle group (1217.8 ± 273.8 vs. 1779.4 ± 581.2 , $P=0.048$). The Chi-Squared test indicated that restricted first MTP dorsiflexion led to changes in the location of peak pressure, with highest PPP moved to the forefoot ($P=0.029$).

Conclusion

The results of this study suggested that the limited great toe flexibility may increase plantar pressure under the hallux and the likelihood of the loading shifting to forefoot during level walking.

EP122

FEASIBILITY AND OUTCOME OF A PULMONARY REHABILITATION PROGRAMME FOR CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN RESOURCE-CONSTRAINED SETTINGS: A MALAYSIAN PERSPECTIVE

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Background and aims

Chronic Obstructive Pulmonary Disease (COPD) remains a major global health challenge, particularly affecting Low- and Middle-Income Countries (LMICs) with limited resources. Building on the NIHR Global Health Research Unit on Respiratory Health (RESPIRE) home-based pulmonary rehabilitation model during the COVID-19 pandemic, we aimed to assess the feasibility of implementing pulmonary rehabilitation (PR) in a resource-constrained Malaysian healthcare facility.

Methods

A structured 12-week PRP was conducted at a tertiary care teaching hospital in Malaysia from February to October 2022. The programme included supervised exercise training, patient education, behavioural changes, and psychosocial support. Inclusion criteria were adults aged >18 years with physician-diagnosed COPD, literate in Malay or English language and were committed to attending therapy sessions. Patients with non-respiratory causes of breathlessness or comorbidities restricting PR were excluded. Patients were recruited based on physician referrals. Outcome assessments included the 6-minute walk test (6MWT), COPD assessment test (CAT), modified Medical Research Council (mMRC) dyspnea scale, and forced expiratory volume in 1 second (FEV₁). Primary outcome measures were PRP uptake and completion rates.

Results

Of the 41 patients referred, 33 were eligible, 23 declined participation and 10 participated (30.3% participation rate). There was 90% uptake rate (attended at least one session), and 60% completion rate (attended 70% of sessions and completed final assessment). Significant improvements were observed in health-related quality of life, with all participants demonstrating a reduction in their CAT scores exceeding the MCID of -2 points. However, due to the small sample size, statistical significance testing was not reported. Additionally, improvements were seen in exercise capacity (6MWT mean improvement: 34m), dyspnea control (66.7% achieving mMRC score reduction ≥ 1 point), and pulmonary function (83.3% showing FEV₁ improvement). While these findings suggest a positive impact of PR, further studies with larger sample sizes are needed to confirm statistical significance and clinical efficacy. Participation was limited by logistical barriers, particularly distance to the hospital (reason 32.3% of participants declined enrolment). Reasons for non-completion included difficulty understanding instructions of PRP, loss of interest, and family issues.

Conclusion

Implementing a structured PRP in a resource-limited setting is feasible and has positive outcomes for COPD management. However, barriers, particularly logistical challenges, must be addressed. Innovative solutions such as telemedicine and hybrid (home- and center-based) PRP models may enhance accessibility.

EP123

IMPACT OF PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION ON MUSCLE STRENGTH AND HOP PERFORMANCE IN CEREBRAL PALSY ATHLETES

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Background and aims

Participation in sports among cerebral palsy (CP) athletes is increasing, but they are more prone to limb injuries due to neuromuscular impairments. Proprioceptive Neuromuscular Facilitation (PNF) has been shown to improve muscle elasticity, peak torque, and strength, potentially enhancing functional performance and reducing injury risk. However, the effects of PNF training on functional movement and muscle strength in CP athletes remain unclear. This study aimed to evaluate the impact of PNF training on functional hop performance and quadriceps-hamstring strength in CP athletes.

Methods

A pilot randomized controlled trial at the National Paralympic Committee (NPC) Training Center of Indonesia involved 24 athletes with spastic hemiplegia CP (18-40 years). The intervention group (n=12) received PNF training three times per week alongside biweekly resistance training, while the control group (n=12) performed resistance training alone for four weeks. Functional hop performance (single hop, triple hop, crossover hop tests) and quadriceps-hamstring strength were assessed pre and post intervention.

Results

The intervention group showed significant improvements in all functional hop tests on both dominant and non-dominant legs ($p < 0.001$). The control group also improved, though to a lesser extent, with no significant intergroup differences in absolute jump distances. However, the degree of improvement was significantly greater in the intervention group. In terms of muscle strength, the intervention group showed significant increases in dominant ($p = 0.043$) and non-dominant quadriceps ($p = 0.001$), as well as dominant ($p = 0.002$) and non-dominant hamstrings ($p = 0.008$). The control group improved only in hamstring strength, while quadriceps strength showed no significant change. A significant intergroup difference was observed only in non-dominant quadriceps strength ($p = 0.020$).

Conclusion

Adding PNF training to resistance training led to greater improvements in functional hop performance and muscle strength in CP athletes compared to resistance training alone.

EP124

CHALLENGES OF AMPUTEE DUE TO SNAKEBITE COMPLICATED BY SQUAMOUS CELL CARCINOMA: A CASE REPORT

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Introduction

Snakebite is a common tropical disease affecting populations in rural areas worldwide. In general, snakebites are classified as neglected diseases, and its study focuses on the immediate morbidity or mortality while the consequences in the long term are less studied¹. We report a case of snakebite that developed into squamous cell carcinoma resulting in amputation of limb. This could lead to multiple disabilities that need to be explored.

Case report

A 29 year-old male was bitten by a snake on the left ankle complicated with skin necrosis. Eventually, the wound was completely healed after 2 months. However, after 10 years, he presented with a small ulcer developed at the same site, progressively increasing in size with foul-smelling blood-stained discharge. When the patient was assessed in the clinic, noted an ulcer measuring around 15cmx12cm with rolled edges at his left ankle. Wedge biopsy of the ulcer revealed squamous cell carcinoma. The patient underwent transtibial amputation, and was complicated with phantom limb sensation and pain.

Discussion

Snakebites are a medical urgency during the acute phase; however the survivors can suffer from diverse types of disabilities¹. Several studies have identified long-lasting ulcers, scars, and wounds as important risk factors for squamous cell carcinoma in non-envenomed patients², which subsequently lead to amputation. Young adult male amputees experience many challenges including lifestyle changes, mental distress and lack of power³. Long-term management of patients should include social rehabilitation, job rehabilitation, and referral to psychiatrist⁴.

Conclusion

Snakebite patients should be emphasized on the importance of long-term monitoring due to its long-term complications such as squamous cell carcinoma. Should amputation be the lifesaving method; it is important for the patients to receive social, physical and psychological support from the society.

EP125

FUNCTIONAL RECOVERY POST REHABILITATION IN A RARE CASE OF POEMS SYNDROME – A CASE REPORT

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Background and aims

POEMS syndrome is a rare, progressive condition characterised by polyradiculoneuropathy, organomegaly, endocrinopathy, monoclonal plasma cell disorder, and skin changes, with a prevalence of 0.3 per 100,000 individuals. We aim to highlight the importance of a comprehensive, multidisciplinary approach in the management of POEMS syndrome, particularly in rehabilitation.

Methods

A 52-year-old male who was admitted to a rehabilitation ward in October 2024, with a diagnosis of POEMS syndrome established during his acute neurological admission. He presented with the hallmark neurological feature of subacute onset demyelinating polyneuropathy, resulting in bilateral lower limb weakness, alongside other characteristic multi-system manifestations of POEMS. The patient underwent a six-week rehabilitation program (length of stay: 41 days) in combination with medical interventions, including plasmapheresis and radiotherapy to a destructive lesion in the right acetabulum with tissue showing clonal plasma cell differentiation. He received comprehensive care from a multidisciplinary team including specialists in rehabilitation, neurology, hematology, radiation oncology, physiotherapy, occupational therapy, clinical psychology, pharmacy, and social work.

Results

Following the rehabilitation program, the patient demonstrated significant improvements in both mobility and functional independence. His Functional Independence Measure (FIM) score increased from 99 (FIM Motor 64, FIM Cognition 35) at admission to 113 (FIM Motor 78, FIM Cognition 35) at discharge. His 10-metre Walk Test with a WZF recorded an average walking speed of 0.18m/s indicating he would be a household ambulator on discharge.

Conclusion

This case highlights the importance of early, coordinated care through a multidisciplinary approach in improving functional outcomes in individuals with POEMS syndrome, particularly in a rehabilitation setting.

EP126

TRAINING PROVISION DIFFERENCES IN CONVALESCENT AND COMMUNITY-BASED REHABILITATION BY STANDARD CODE OF REHABILITATION APPROACHES

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Background and aims

In Japan, transitional rehabilitation services are provided to patients in acute, convalescent, and chronic phases. Patients requiring assistance in their activities of daily living (ADL) after hospitalization are transferred to convalescent rehabilitation wards. Elderly patients can receive home-visit rehabilitation and day-care (outpatient) rehabilitation using the long-term care insurance (LTCI) system. However, the content of rehabilitation is not standardized, making intra-service comparison and smooth coordination difficult. Therefore, in order to promote evidence-based rehabilitation, a standard code of rehabilitation approach consisting of 10 major items and 56 sub-items was developed through a Delphi survey of a panel of experts in multiple professions. To identify differences in training provision among rehabilitation services using the newly developed standard codes of rehabilitation approach.

Methods

A pilot study was conducted on the content of training provided in the convalescent rehabilitation ward and the home-visit and day-care rehabilitation services at Koyama Rehabilitation Hospital in December 2024. Standard codes were used to categorize the training provided, and the results were compared between the convalescent rehabilitation ward group and the home-visit/day-care rehabilitation group. Fisher's exact test was used for comparative analysis.

Results

Ten subjects in the convalescent rehabilitation ward group and 17 subjects in the home-visit/day-care rehabilitation group were included in the study. Significant differences were found for Instrumental Activities of Daily Living (IADL) training (30.0% vs. 70.6%, $p = 0.043$) and environmental adjustment/support (40.0% vs. 94.1%, $p = 0.005$).

Conclusion

The findings suggest that IADL training and environmental adjustments/support are provided more frequently in community-based rehabilitation. These findings emphasize the importance of focusing on these trainings in supporting the patient's home life and social participation in the community-based rehabilitation.

EP127

REGENERATIVE REHABILITATION: INNOVATIVE MULTIDISCIPLINARY TREATMENT FOR MUSCULOSKELETAL DISORDERS

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Background and aims

Regenerative rehabilitation is the synergistic integration of principles and approaches from the regenerative medicine and rehabilitation fields, with the goal of optimizing form and function as well as patient independence. Regenerative medicine strategies, such as platelet-rich plasma (PRP), stem cell and biomaterials provide state-of-the-art technologies that shed light on difficult-to-treated diseases.

Methods

In the past few years, we have investigated the clinical effects of PRP, ultrasound-guided PRP (US-PRP) combined with sEMG in patients with OA, rotator cuff injury, DDH, myofascial pain syndrome and other musculoskeletal disorders. Rehabilitation evaluations, including visual analog scale (VAS), related function scales and Medical Outcomes Short Form 36 (SF-36) were performed. sEMG, biomechanical (tone, stiffness, and decrement) and viscoelastic (relaxation time and creep) with Myoton device (Myoton Ltd, Estonia) for targeted muscles were tested before and after US-PRP treatments. All patients were followed-up for at least 3 month to 6 month.

Results

Analysis results demonstrated that US-PRP treatments significantly improved functions evaluations and ameliorated pain. The sEMG and muscular Myoton measurement parameters on both sides restored symmetry. No adverse reactions were reported during follow-up.

Conclusion

Ultrasound-guided PRP as the a representative of regenerative rehabilitation treatment, could significantly alleviate the pain and improve the physical function and quality of life in the patients with musculoskeletal disorders.

EP128

THERAPEUTIC BENEFITS OF WEARABLE LOWER LIMB EXOSKELETON IN REHABILITATION OF SPINAL CORD INJURY: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and aims

Spinal cord injury (SCI) is a severe disabling condition with substantial personal and societal impact. Exoskeleton Robotic Training (ERT) has garnered attention for its potential in lower limb functional recovery. This systematic review assesses the efficacy of ERT in individuals with SCI, comparing outcomes with those of conventional rehabilitation to elucidate therapeutic differences.

Methods

We searched international and domestic databases for articles published until May 17, 2024. The meta-analysis employed a random effects model to determine the effect size as either mean difference (MD) or standardized mean difference (SMD). Eleven randomized controlled trials (RCTs) with a total of 362 participants were included in the final analysis. We focused on outcomes related to muscle strength, walking ability, activities of daily living, and quality of life.

Results

The meta-analysis indicated that ERT significantly improved walking ability, including the 6-minute walk test (MD, 22.26; 95% CI, 13.7-30.82; $I^2=23\%$; $p<0.0001$), the 10-meter walk test (MD, 0.12; 95% CI, 0.03-0.21; $I^2=51\%$; $p=0.009$), and the walking index for spinal cord injury (MD, 1.94; 95% CI, 0.74-3.15; $I^2=58\%$; $p=0.002$), compared to conventional rehabilitation. However, no significant differences were found in quality of life, activities of daily living, or lower extremity muscle strength.

Conclusion

ERT demonstrates efficacy and safety in SCI rehabilitation, showing superior effects in facilitating walking function recovery compared with conventional treatment.

EP129

ULTRASOUND-GUIDED INJECTION OF PLATELET-RICH PLASMA ALLEVIATED PAIN AND IMPROVED FUNCTION FOR PATIENTS WITH MYOFASCIAL PAIN SYNDROME: A RETROSPECTIVE CLINICAL STUDY

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Background and aims

Myofascial pain syndrome (MPS) is a regional musculoskeletal pain associated with myofascial trigger point (MTrP). The effect of current treatment strategies is still controversial. This study aimed to retrospectively evaluate the safety and efficacy of ultrasound-guided platelet-rich plasma (PRP) treatment for MPS.

Methods

From Jan to Apr 2023, 71 eligible MPS patients in West China Hospital's Rehab Med Dept received PRP treatment on certain muscles. Their pain and function were assessed pre- and post-treatment with multiple scales, and data analyzed by Friedman's ANOVA. The effect of PRP treatment for the patients with neck pain or lower back pain was respectively assessed using visual analogy scale (VAS), McGill Pain Questionnaire (McGill), Neck Disability Index (NDI), Roland Morris Disability Questionnaire (RMDQ), Oswestry Disability Index (ODI) and Medical Outcomes Short Form 36 (SF-36) prior to treatment and 24 hours, 2 weeks, 1 month and 3 months.

Results

All of the 71 patients with MPS completed the follow-up. The myofascial trigger point-induced pain was found to be significantly reduced after PRP treatments, as shown by VAS, McGill, and RMDQ ($\chi^2=202.38$, 205.11 and 133.40, $P<0.001$, respectively). The ODI score showed a significantly decrease compared to baseline after 2 weeks ($\chi^2=85.79$, $P<0.001$). After 1-month follow-up, the NDI score showed a significantly decrease compared to baseline ($\chi^2=69.63$, $P<0.001$). Similarly, the SF-36 score was obviously improved 3 months post-treatment of PRP, in particular for the physical functioning (PF), role-physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role-emotional (RE) and mental health (MH) ($P<0.01$). No adverse reactions were reported during follow-up.

Conclusion

Ultrasound - guided PRP treatment can relieve pain, improve function and life quality in MPS patients. This study shows PRP may be an effective and safe MPS treatment, promoting future tech transformation.

EP130

ELECTROACUPUNCTURE AT BAIHUI (GV20) AND SHENTING (GV24) ACUPOINTS AMELIORATES COGNITIVE IMPAIRMENT IN RATS WITH CEREBRAL ISCHEMIA/REPERFUSION INJURY THROUGH MODULATION OF HIPPOCAMPAL MICROGLIAL POLARIZATION

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Background and aims

While electroacupuncture (EA) demonstrates therapeutic potential for cognitive dysfunction following cerebral ischemia/reperfusion (I/R) injury, its precise mechanistic underpinnings remain incompletely characterized. This investigation evaluates the neuroprotective effects of EA at Baihui (GV20) and Shenting (GV24) acupoints in a rat middle cerebral artery occlusion (MCAO) model, with particular emphasis on microglial phenotypic switching and associated neuroinflammatory regulation.

Methods

Thirty-six male Sprague-Dawley rats were randomly allocated into three cohorts (n=12/group): and EA-treated. Transient focal cerebral ischemia was induced via the intraluminal filament technique. The EA group received daily 20-minute bilateral stimulation at GV20 and GV24 commencing 24 hours post-surgery, continuing for 5 consecutive days. Cognitive assessment employed the Y-maze spontaneous alternation test, while neurological deficits were quantified using the Longa neurological deficit score. Cerebral infarct volume was measured via TTC staining. Molecular analyses including Western blotting, enzyme-linked immunosorbent assay (ELISA), and quantitative reverse transcription-polymerase chain reaction (qRT-PCR) were conducted to evaluate microglial polarization markers and inflammatory mediators in hippocampal tissues.

Results

Behavioral analysis revealed significantly reduced Y-maze correct alternation rates in MCAO rats compared to sham controls ($P < 0.01$), with EA intervention significantly improving cognitive performance ($P < 0.05$). Neurological evaluations demonstrated EA treatment effectively attenuated Longa scores ($P < 0.05$) and reduced infarct volumes ($P < 0.05$). Molecular profiling indicated EA significantly suppressed mRNA and protein expression of M1-polarization markers interleukin-1 β (IL-1 β) and tumor necrosis factor- α (TNF- α) in hippocampal tissues ($P < 0.05$), while upregulating M2-associated markers mannose receptor (MR/CD206) and arginase-1 ($P < 0.05$). ELISA confirmed EA-mediated reduction of cerebrospinal fluid pro-inflammatory cytokines (IL-1 β , TNF- α , IL-18; $P < 0.05$) concurrent with elevation of anti-inflammatory factors transforming growth factor- β and interleukin-10 ($P < 0.01$).

Conclusion

Electroacupuncture at GV20 and GV24 acupoints mitigates post-ischemic cognitive dysfunction by promoting microglial polarization toward the neuroprotective M2 phenotype while attenuating neuroinflammatory responses.

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EP131

**EFFECTIVENESS OF VESTIBULAR REHABILITATION IN
DIZZINESS PATIENTS WITH SARCOPENIA**

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Background and aims

Sarcopenia has been shown to be associated with higher levels of disability in daily life due to dizziness in patients with vestibular dysfunction. However, the effectiveness of vestibular rehabilitation in this patient population has not been established. This study aimed to evaluate the impact of vestibular rehabilitation on dizziness-related handicap in patients with both dizziness and sarcopenia.

Methods

We conducted a cohort study involving 56 patients with dizziness, divided into two groups: 28 with dizziness and sarcopenia (sarcopenia group) and 28 with dizziness but without sarcopenia (control group). Sarcopenia was diagnosed using the Asian Working Group for Sarcopenia 2019 criteria. The investigation included age, sex, Dizziness Handicap Inventory (DHI), Dynamic Gait Index (DGI), Functional Gait Assessment (FGA), and Activities-Specific Balance Confidence Scale (ABC scale). All participants underwent vestibular rehabilitation once a month for 40 minutes per session. Statistical analysis included the Mann-Whitney U test for inter-group comparisons and the Wilcoxon signed-rank test for intra-group comparisons.

Results

Prior to intervention, the sarcopenia group showed significantly higher scores in DHI_Functional (17.9 ± 8.3 vs. 12.7 ± 8.6 , $p < 0.05$) and DHI_Emotional (17.4 ± 12.5 vs. 12.5 ± 8.7 , $p < 0.05$) compared to the control group. Higher DHI scores indicate greater dizziness-related handicap. After the intervention, no significant differences were observed between the groups. In intra-group comparisons, both groups demonstrated significant improvements in DGI, FGA, and DHI. Additionally, the sarcopenia group showed significant improvements in DHI_Emotional and DHI_Total when comparing the changes in DHI, DGI, FGA, and ABC scores.

Conclusion

This study demonstrates that vestibular rehabilitation is effective not only in patients with dizziness but also in those with both dizziness and sarcopenia. These findings suggest that vestibular rehabilitation should be incorporated into clinical practice for all patients with dizziness, including those with sarcopenia.

EP132

CHRONIC SPINAL ACCESSORY NERVE PALSY: AN UNCOMMON CAUSE OF SCAPULAR DYSKINESIS

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Background and aims

Spinal accessory nerve (SAN) palsy is typically associated with surgical trauma, such as neck dissection or lymph node biopsy. Non-iatrogenic cases are rare, and their mechanisms remain unclear. This case describes an unusual SAN dysfunction likely influenced by chronic pain, prior stroke, and post-mastectomy altered biomechanics, leading to trapezius atrophy, scapular dyskinesis, and compensatory muscle overactivity. The aim is to highlight the complexity of this case and its biomechanical impact.

Methods

A 79-year-old woman with chronic right shoulder pain, left thalamic stroke (2004), right mastectomy (1992), and cervical degenerative disc disease (C4-C7) presented with postural asymmetry and shoulder dysfunction. Unlike typical iatrogenic SAN palsy, her condition appeared to result from cumulative biomechanical stress rather than an acute injury. MRI showed bilateral C5-C6 nerve root impingement, potentially affecting neuromuscular control. NCS (2014) showed neurogenic changes in the cervical-thoracic paraspinal muscles with findings suggestive of right SAN dysfunction, though the extent was not fully characterized. Clinical examination revealed right trapezius atrophy, scapular displacement, and winging, leading to pseudo-rotator cuff weakness. Chronic pain, rated 5-6/10 and worsening at night, was aggravated by compensatory overactivity in the upper trapezius and levator scapulae. Treatment included botulinum toxin injections for compensatory muscle overactivity, dry needling, prolotherapy for pain modulation, and continued gabapentin with physiotherapy.

Results

The patient experienced partial pain relief and improved postural alignment but continued to require pharmacological support for persistent neuropathic pain. Physiotherapy alone provided limited benefit, necessitating additional botulinum toxin injections.

Conclusion

This case highlights a rare, non-iatrogenic SAN palsy likely resulting from multiple contributing factors, including chronic pain, stroke, and postural adaptations post-mastectomy. It reinforces the role of compensatory muscle dysfunction in SAN-related shoulder pain and the importance of targeted neuromodulatory interventions. Further studies are needed to understand multifactorial SAN dysfunction and its rehabilitation better.

EP133

THE HIDDEN STRUGGLES OF CRANIAL NERVE DYSFUNCTION: A REHABILITATION PERSPECTIVE ON MOBILITY, SWALLOWING, AND COORDINATION

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Background and aims

Rehabilitation for patients with multiple cranial nerve palsies, cerebellar dysfunction, and vestibular impairment following an intracranial tumor is challenging, particularly in mobility, swallowing, communication and functional independence. A structured, multidisciplinary approach is essential to optimize recovery. This case report details the rehabilitation strategies implemented for a patient with extensive cranial nerve injuries and cerebellar dysfunction, focusing on dysphagia management, balance and mobility training, sensory rehabilitation, and functional independence.

Methods

A 44-year-old male with a history of a left cerebellopontine angle tumor exhibited multiple cranial nerve palsies (3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, and 12th), profound hearing loss, oropharyngeal dysphagia requiring PEG feeding, vestibular dysfunction, severe walking imbalance and generalised muscular atrophy of sternocleidomastoid and trapezius muscle leading to chronic shoulder pain. A multidisciplinary rehabilitation program was implemented and interventions included gait and balance training, oral motor exercises, secretion management, cognitive rehabilitation, functional retraining, perineural injection therapy to reduce shoulder pain and adaptive equipment prescription to enhance mobility and self-care.

Results

The patient showed improvements across multiple functional domains following intensive rehabilitation. There is notable functional and mobility improvement in which Modified Barthel Index improved from 69% to 83%, he was previously required moderate assistant for personal daily living, now able to perform independent daily living, Dizziness Handicap Inventory (DHI) improved from 62 (Severe handicap) to 52 (moderate handicap). He scored Modified Rivermead Mobility Index (MRMI) of 38/40, Berg Balance Scale (BBS) of 42/52, 6 minute-walk test of 20 m, and 10 metre walk test of 0.1 m/s. He is able to walk at short distance with walking frame and improved in transfer.

Conclusion

This case highlights the critical role of a structured, multidisciplinary rehabilitation program in managing complex neurological impairments. The comprehensive approach facilitated gains in mobility, coordination, and self-care while emphasizing the ongoing challenges of severe dysphagia and vestibular dysfunction.

EP134

ULTRASOUND FINDINGS OF PERFORMANCE-RELATED MUSCULOSKELETAL DISORDERS IN DANCERS

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Background and aims

Dancers are a unique population that frequently experience musculoskeletal injuries due to the repetitive, high-impact, and biomechanically demanding nature of their performances. This study aims to identify and characterize common performance-related injuries in dancers using ultrasound and assess their treatment approaches.

Methods

This retrospective case series analysed professional dancers who presented with performance-related discomfort and received ultrasound exams at Chi Mei Medical Center between January 2020 and December 2024. Patients with incomplete medical records or injuries unrelated to dance were excluded. We demonstrate outcomes on demographics, ultrasound-identified anatomical injury structures, and treatment modality.

Results

Among the 30 dancers included in our study, ankle and foot injuries were the most prevalent (n=8, 26.7%), followed by pelvis and hip injuries (n=7, 23.3%) and lumbar spine injuries (n=6, 20%). The most commonly affected structures included anterior cruciate ligament (ACL, n=3, 10%), posterior cruciate ligament (PCL, n=3, 10%), anterior talofibular ligament (ATFL, n=3, 10%), and anterior inferior tibiofibular ligament (AITFL, n=3, 10%). 11 dancers (36.7%) received postural correction and education, 8 (26.7%) required additional physical therapy, and 15 (50%) underwent platelet-rich plasma injections due to severity.

Conclusion

Our findings highlight the high prevalence of lower extremity injuries, particularly in the ankle, foot, pelvis, and hip, among professional dancers. Ligamentous instability, such as ACL, PCL, and ATFL involvement, was a common injury pattern. Notably, half of the dancers required platelet-rich plasma injections, indicating the severity of their conditions. These results provide insight into the common injury locations in dancers.

EP135

REHABILITATION CHALLENGE FOR BILATERAL DROP FOOT IN A 13-YEAR-OLD BOY WITH LUMBAR HERNIATED NUCLEUS PULPOSUS: A RARE CASE

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Background and aims

Bilateral drop foot due to herniated nucleus pulposus (HNP) is rare in pediatric patients and can lead to significant functional impairment. This case report aims to describe the rehabilitation approach and outcomes of a 13-year-old male with progressive lower limb weakness following a fall.

Methods

The patient experienced bilateral lower limb weakness one year after falling from a two-level school staircase in a seated position. He initially presented with low back pain. Over time, his condition worsened, resulting in frequent falls. We found bilateral drop foot with MMT 2 for ankle dorsiflexion and plantar flexion, steppage gait, poor balance control, sensory deficit at dermatome L3 to S1, and positive finding of Trendelenburg sign. Lumbosacral MRI showed mild spinal canal stenosis at L3-L4 and mild foraminal stenosis at L3-L4 and L4-L5 due to bulging disc. Electromyography confirmed severe bilateral nerve root compression at L4-L5 and L5-S1. Surgery was recommended but declined in favor of conservative management. The patient received neuromuscular electrical stimulation (NMES) to the tibialis anterior and gastrocnemius-soleus muscles, shortwave diathermy (SWD) to the paralumbar area, active range of motion (AROM) exercises, balance training, rectus femoris stretching, sensory re-sensitization, and the use of solid ankle-foot orthoses (AFOs).

Results

After 6 months of rehabilitation, the patient showed significant improvements in gait, with reduced steppage gait and improved muscle strength at ankle dorsiflexion and plantar flexion (MMT 3). Low back pain resolved completely, and he regained functional independence in daily and school activities, though he remained unable to participate in sports.

Conclusion

This case highlights the potential of structured rehabilitation in improving gait and function in pediatric patients with bilateral drop foot due to HNP. Early, sustained and personalized physical therapy may provide an effective alternative to surgical intervention.

EP136

RESEARCH ADVANCES IN THE APPLICATION OF LOWER LIMB WEARABLE EXOSKELETON ROBOTS FOR STROKE REHABILITATION

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Background and aims

This review aims to summarize the latest research in the application of wearable exoskeletons for restoring lower limb motor function in stroke patients, providing references and guidance for clinical application in stroke rehabilitation.

Methods

This review synthesizes relevant studies from the past five years, collecting data from literature databases such as PubMed on the advancements in the application of various types of wearable exoskeleton robots for improving lower limb motor function in stroke patients. The review describes the efficacy of wearable exoskeletons in lower limb motor recovery and the limitations of current research. It compares the effects of different types of exoskeleton robots on stroke patients at different courses and investigates optimal intervention strategies. Additionally, it explores the potential of combining wearable exoskeleton robots with other technologies such as virtual reality and brain-computer interfaces for stroke rehabilitation.

Results

Wearable exoskeletons have proven effective in restoring lower limb motor function after stroke. However, limited studies currently focus on comparing the efficacy among different types of exoskeleton robots. With the development of sensors, materials, 3D printing, and artificial intelligence technology, it is necessary to develop safer, more efficient, lightweight, user-friendly, and personalized exoskeleton robots. Future research should emphasize the integration of multiple intelligent technologies to enhance rehabilitation outcomes, thereby promoting the widespread application of exoskeleton robots in stroke rehabilitation. Furthermore, high-quality evidence remains scarce, and future studies should conduct large-sample, multi-center, well-designed randomized controlled trials with long-term follow-up.

Conclusion

As an emerging rehabilitation technology, wearable exoskeletons hold significant promise in promoting the recovery of lower limb motor function in stroke patients and have broad application prospects.

EP137

DIAGNOSTIC ULTRASOUND OF CARPAL TUNNEL SYNDROME AND MEDIAN NERVE HYDRODISSECTION: A CASE SERIES

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Background and aims

Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy. Traditionally, the diagnosis of CTS is through clinical symptoms and physical examination. However, nerve conduction study (NCS) may be useful when diagnosis is unclear. Recent advancement in ultrasonography has led to increase usage of ultrasound for diagnosis of CTS, hence reducing the need for time consuming NCS. Surgical decompression is usually advocates for severe CTS while conservative treatment for mild to moderate CTS. This includes ultrasound guided median nerve hydrodissection (UGMNH). We present a case series on treatment of CTS at our centre.

Methods

Clinic records from January 2022 until January 2024 were analysed retrospectively. Patients who were diagnosed with CTS were included in this study. Clinical symptoms, physical examination, prior NCS data and ultrasonography of the wrist for median nerve surface area value were all recorded. Any procedure done which include single or multiple UGMNH as well as referral for surgical decompression were all taken into consideration in this study. Worsening of symptoms was taken as outcome measure.

Results

A total of 16 patients were referred to our clinic for CTS. Three of them had done NCS prior to the clinic visit to confirm the CTS. All of them were evaluated with ultrasonography and the median value of the median nerve surface area was 14mm². 14 patients proceed with UGMNH (4 of them had bilateral UGMNH) while 2 patients who are not keen were treated conservatively. Two patients required repeated UGMNH and subsequently referred for surgical decompression.

Conclusion

Ultrasound is a useful tool and alternative for diagnosis of CTS. UGMNH is a simple and minimally invasive procedure with favourable outcome for CTS. Nevertheless, surgical decompression may still need in patient that do not respond to this treatment.

EP138

EFFECTS OF LOWER LIMB EXOSKELETON ROBOT-ASSISTED REHABILITATION ON MOTOR FUNCTION, ACTIVITIES OF DAILY LIVING, AND ELECTROMYOGRAPHY IN HEMIPLEGIC STROKE: A RANDOMIZED CONTROLLED TRIAL

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Objective

To evaluate the effect of robot-assisted rehabilitation on lower extremity functional recovery in stroke patients.

Methods

60 stroke patients with hemiplegia were randomly divided into a conventional training (CT, n = 30) group or a robot-assisted training (RT, n = 30) group. Patients in both groups received a 60 minutes routine physical therapy, including joint range-of-motion exercise, muscle strengthening exercise, sit-to-stand and stand-to-sit exercise, balance exercise. The robot group added 30 minutes of lower limb exoskeleton robot-assisted gait training per day, while the conventional group added 30 minutes of physical therapist-assisted gait training per day, six days a week, for three consecutive weeks. The primary outcome index to evaluate balance function was the Berg Balance Scale (BBS), with the Secondary outcome included the modified Barthel index (MBI) score, Fugl-Meyer Assessment-Lower Extremities (FMA-LE), as well as Surface electromyography(s-EMG). The observation indexes of sEMG include Integrated EMG (iEMG) and root-mean-square values (RMS) of rectus femoris, biceps femoris, tibialis anterior and gastrocnemius.

Results

Significant ($p < 0.05$) within-group differences were found in FMA-UE and MBI scores for both groups after treatment. A between-group comparison indicated the MBI score of the RT group was significantly different from that of the CT group, whereas the BBS score was not significantly different from that of the CT group after treatment. The differences of BBS scores before and after treatment in the RT group were significantly different as compared to the CT group. In addition, the RMS of rectus femoris, biceps femoris and anterior tibial muscles were significantly different between the two groups ($p < 0.05$).

Conclusions

Robot-assisted rehabilitation recruited muscle excitability better than conventional treatment, improved lower limb motor function and ADL performance.

Keywords

Stroke; Robot-assisted rehabilitation; Motor function; Activities of daily living; Electromyography

EP139

PHYSICAL FITNESS STATUS OF OLDER ADULTS LIVING IN NURSING HOMES IN HO CHI MINH CITY

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Background and aims

With population aging, declining physical function in older adults increases fall and frailty risks. Assessing physical fitness in this population is crucial for early detection of functional deterioration and preventive interventions. This study evaluated physical fitness in nursing home residents and identified factors associated with functional decline.

Methods

A cross-sectional study was conducted among 150 older adults from three nursing homes in Ho Chi Minh City. Physical fitness was assessed using the Short Physical Performance Battery (SPPB), Senior Fitness Test (SFT), and Timed Up and Go (TUG) test. Data on demographics, comorbidities, and lifestyle factors were collected. Logistic regression identified factors associated with reduced physical function.

Results

Functional decline was observed in 42% of participants (SPPB scores). Advanced age (OR: 2.1, 95% CI: 1.5-3.0), comorbidities (OR: 1.8, 95% CI: 1.2-2.7), and sedentary lifestyle (OR: 2.5, 95% CI: 1.6-3.8) were significantly associated with reduced fitness. The TUG test indicated higher fall risk in participants with lower mobility ($p < 0.05$). Lower limb strength (Chair Stand Test) and cardiovascular endurance (2-Minute Step Test) were significantly lower in participants with functional decline ($p < 0.05$).

Conclusion

Functional decline is common in nursing home residents, with age, comorbidities, and inactivity as key contributors. Early screening and tailored exercise programs are recommended to improve mobility and prevent falls. Further studies are needed to confirm causal relationships between these factors and physical deterioration.

EP140

LIKELY MYOSITIS FOLLOWING BOTULINUM TOXIN INJECTION, A RARE PHENOMENON EASILY MISSED: A CASE REPORT

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Background and aims

Botulinum toxin is frequently used to manage spasticity in patients with neurological conditions. Myositis is a rare side effect of botulinum toxin injection, reported only in 2 case reports. This case report intends to highlight early presentation of likely myositis with localized symptoms that can be mistaken for other diagnoses.

Methods

Mr N, a 20-year-old male with traumatic brain injury in Unresponsive Wakefulness Syndrome (UWS), received Abobotulinum toxin-A injections for left thigh and adductor spasticity, resulting in severe genu recurvatum and perineal hygiene difficulty. Injections were performed via clean technique using ultrasound guidance with 500 units diluted in 5cc saline, into vastus medialis (75 units), vastus intermedius (75 units), adductor longus (50 units), adductor brevis (100 units), adductor magnus (100 units), and gracilis (50 units). Within 24 hours, the left thigh was swollen (44 cm), reducing to 37 cm after 10 days. Ultrasound doppler showed normal findings, and orthopedics opined that findings were not suggestive of compartment syndrome. Swelling recurred after 40 days. Ultrasound thigh revealed subcutaneous edema, bulky vastus intermedius, and collections. Incision and drainage revealed serous discharge, pale vastus intermedius, and hemoserous knee fluid. Tissue culture identified *Bacillus cereus*.

Results

Heriseanu et al. reported findings 40 days after Onabotulinum toxin injection, while Khodier reported findings 3 weeks after. Development of myositis could stem from an inflammatory response to the toxin, triggering systemic and local inflammation whereby muscle tissue cytokine levels peak after four weeks, explaining the delayed onset. Markers to detect myositis namely, Creatine kinase and C-reactive protein were not measured, as investigation geared towards compartment syndrome, a surgical emergency typically affects the lower limb.

Conclusion

This case emphasizes the need for comprehensive clinical evaluation and a broad differential diagnosis when unusual symptoms occur. Myositis can be overlooked due to its overlap with common side effects like localized swelling and infection.

EP141

DEPRESSION, ANXIETY AND ASSOCIATED FACTORS IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Background and aims

Anxiety and depression are common comorbidities in knee osteoarthritis (KOA), worsening pain perception, disability, and treatment outcomes. However, their associations with clinical factors such as pain severity, functional impairment, and disease characteristics remain unclear.

This study aims to (1) determine the prevalence of anxiety and depression in KOA patients and (2) explore their associations with demographic characteristics, clinical features, and physical function.

Methods

A cross-sectional study was conducted on 96 patients diagnosed with knee osteoarthritis (KOA). Anxiety and depression were assessed using the Hospital Anxiety and Depression Scale (HADS). Factors analyzed for associations included 1) demographic characteristics: age, sex, BMI, religion, and education level 2) clinical features: number of affected knees, pain duration, pain intensity measured with a visual analogue scale (VAS) pain score, and Kellgren-Lawrence (K-L) radiographic grading 3) physical function was assessed using the Lequesne Index for knee osteoarthritis.

Results

Of the 96 subjects, 13 (13.5%) were males and 83 (86.5%) were females. The overall mean age was 59.4 ± 8.8 . Depression (HADS-D ≥ 8) was identified in 43.8% of patients, while anxiety (HADS-A ≥ 8) was present in 19.8% of cases. Depression was significantly associated with age, pain duration, VAS pain score, and Lequesne score. For anxiety, significant associations were found with VAS pain score and Lequesne score.

Conclusion

A considerable proportion of KOA patients experience depression and anxiety, with depression being more prevalent. Our findings indicate that depression is associated with age, pain duration, pain intensity, and physical function, while anxiety is linked to pain severity and functional limitations. These results emphasize the need for integrated physical and mental health management in KOA treatment.

EP142

FACTORS ASSOCIATED WITH ISOKINETIC KNEE STRENGTH PARAMETERS AMONG PATIENTS AFTER ARTHROSCOPIC KNEE SURGERY

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Background and aims

Lower limb muscle dysfunction is common after arthroscopic knee surgery such as cruciate ligament reconstruction or meniscal repair. Performance after arthroscopic knee surgery is influenced by preoperative factors such as age, sex, and concurrent injured tissue, as well as perioperative factors like graft type and biologics used. Isokinetic knee testing objectively evaluates muscle strength. This study aimed to explore preoperative and perioperative factors associated with isokinetic knee strength parameters among patients after arthroscopic knee surgery.

Methods

We retrospectively evaluated isokinetic knee test records among patients after arthroscopic anterior cruciate ligament (ACL) reconstruction in a regional teaching hospital. Analyzed parameters included age, sex, time after surgery, grip strength, thigh circumference, and BMI. Isokinetic knee testing using the Biodex System 4 Pro was performed at 60 and 180 deg./s, recording peak torque, peak torque/body weight (PTBW), total work, and agonist/antagonist ratios.

Results

A total of 171 patients (76 female, 95 male; 77 left knees, 94 right knees) aged 16-59 year were included. Ninety-one had concurrent injuries (meniscus, posterior cruciate, medial/lateral collateral ligaments) other than ACL. Graft types and biologics were documented. Mean extension and flexion peak torque deficits at 60 deg./s were 30.2% and 13.9%. PTBW at 60 deg./s was 51.8% for extensors and 30.4% for flexors. At 180 deg./s, peak torque deficits were 20.9% and 8.5%, with PTBW of 39.5% and 22.9% for extensor and flexors.

Conclusion

Isokinetic knee testing effectively evaluates knee extensor and flexor strength imbalances after arthroscopic knee surgery. Preoperative and perioperative factors significantly impact recovery of knee strength. Further multi-center studies with larger samples are needed to clarify these factors' effects.

EP143

RESEARCH ON THE CENTRAL PATHOLOGICAL MECHANISM OF AUTONOMIC NERVOUS SYSTEM DYSFUNCTION AFTER SPINAL CORD INJURY

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Background and aims

Spinal cord injury (SCI), a debilitating central nervous system disorder, results in patient disability and numerous sequelae. Post - SCI, patients suffer not only from limb sensory, motor, and sexual dysfunctions but also undergo a series of structural and functional alterations in the brain. These brain remodeling changes are crucial in either facilitating sensorimotor function recovery or inducing further pathological damage. Functional magnetic resonance imaging (fMRI) offers an objective means to assess changes in brain activation and functional connectivity. This study aimed to utilize fMRI to detect abnormal brain activation and functional connectivity, and to elucidate the central pathological mechanism of post - SCI autonomic nervous system dysfunction in conjunction with clinical symptom evaluations.

Methods

An observational experimental design was employed. Seven patients with SCI above T6 and 14 with SCI below T6 were recruited. fMRI and clinical data were collected from all participants. The fractional amplitude of low - frequency fluctuations (fALFF) and degree centrality (DC) were computed. Two - sample comparisons were performed to analyze inter - group differences in fALFF and DC, with results corrected using Gaussian random field (GRF) theory.

Results

Patients with SCI above T6 exhibited lower DC in parts of the anterior cingulate gyrus compared to those with SCI below T6, while the fALFF in parts of the middle frontal gyrus was higher in the former group.

Conclusion

In summary, differences in the DC of the anterior cingulate gyrus and fALFF values in parts of the middle frontal gyrus were identified between patients with SCI above and below T6. These findings enhance our understanding of the pathogenesis of post - SCI autonomic nervous system dysfunction and contribute to the development of an imaging - based diagnostic and therapeutic model for clinical assistance.

EP144

AI-POWERED STATISTICAL MODELING OF MOTOR MILESTONE FOR PRESCHOOL CHILDREN IN TAIWAN

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Background

Motor development influences overall growth but varies significantly, making large-scale analysis challenging. AI modeling efficiently processes child development data, identifying key factors and improving predictive accuracy. This study applies AI to analyse motor milestones in Taiwanese preschool children, comparing them with international standards.

Methods

Data were sourced from the 1489 Kids in Taiwan (KIT) study, a nationwide survey of 3-year-old children (2016–2019). Primary caregivers completed motor development questionnaires for children aged 36 to 72 months, covering 12 fine motor and 11 gross motor skills. AI-based modeling estimated 75% and 90% milestone ages using three statistical distributions, comparing results with Centers for Disease Control and Prevention and Denver Developmental Screening Test benchmarks.

Results

Excluding culturally specific skills (e.g., folding a paper airplane, using chopsticks, performing health exercises), 70% of fine and 77.8% gross motor development aligned with Western standards. However, skills such as buttoning small buttons, brushing teeth independently, overhand throwing, and catching a large ball developed earlier in Taiwanese children.

Conclusion

AI analysis accurately identified 75% and 90% milestone ages, providing a reliable foundation for child development assessment. Taiwanese preschool children's motor development generally aligns with international standards, though some skills develop earlier than in Western countries. The AI-powered statistical model supports child development monitoring, early screening, and educational policy planning to enhance preschool motor development.

EP145

**REHABILITATION IN ADOLESCENT IDIOPATHIC SCOLIOSIS:
CONSERVATIVE VS POST-SURGICAL – A CASE SERIES**

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Background and aims

Adolescent Idiopathic Scoliosis (AIS) is the most commonly found spinal deformity, particularly in children and adolescents. AIS can lead to various impairments in the patient's quality of life, including cosmetic issues, back pain, mobility limitations, emotional and behavioral disturbances. All of these impairments/disabilities will ultimately decrease the patient's quality of life. Effective rehabilitation strategies are essential to manage symptoms, prevent progression, and improve functional outcomes.

Case report

We Present Four cases of adolescents with AIS underwent rehabilitation. Patient 1 (14 years old, Cobb's angle 45°/38°, Risser I) was initially treated with TENS, SWD, Core strengthening exercises, and Boston Brace, then underwent scoliosis reconstruction surgery due to curve progression. Patient 2 (16 years old, Cobb's angle 38°/27°, Risser IV) underwent TENS, USD, Schroth & Kisner exercises, and core strengthening, pain decreased but scoliosis remained progressive. Patient 3 (17 years old, Cobb's angle 32°/22°, Risser II) showed improvement in pain, ROM, and respiratory capacity after therapy using TENS, SWD, Kisner exercises, core strengthening, and Boston Brace. Patient 4 (18 years old, Cobb's angle 68°/86°, Risser IV) underwent scoliosis reconstruction surgery and then underwent rehabilitation with TENS, cryotherapy, Core strengthening exercises, active breathing, and Boston Brace, and found improvements in respiratory capacity, ROM, and physical endurance.

Conclusion

A comprehensive rehabilitation program, including exercise therapy (Kisner, Schroth, and core strengthening), therapeutic modalities (TENS, SWD, cryotherapy), and bracing, is effective in reducing pain, improving respiratory function, enhancing mobility, and preventing scoliosis progression.

EP146

RELEARNING BALANCE: A COMPREHENSIVE APPROACH TO VESTIBULO-CEREBELLAR REHABILITATION AFTER TOXIC ENCEPHALOPATHY

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Background and aims

Post-Encephalopathy patients frequently experience balance impairments due to a combination of cerebellar dysfunction, vestibular abnormalities, and neuromuscular deficits, which significantly impact mobility and daily function. This case study presents a comprehensive rehabilitation approach for a 33-year-old male with sympathomimetic toxidrome-induced encephalopathy, who exhibited balance deficits, cerebellar signs, and vestibular dysfunction post-recovery. The study aims to highlight the integration of vestibular rehabilitation, balance training, and functional mobility interventions in improving postural control and gait stability.

Methods

The patient, initially bed-bound and fully dependent following an episode of sudden onset toxic-induced encephalopathy with multi-organ failure demonstrated progressive neurological recovery but retained significant balance challenges. Clinical assessments revealed cerebellar involvement. Vestibular examination identified gaze instability and bilateral mild sensorineural hearing loss, with a Dizziness Handicap Inventory (DHI) score of 34% (predominantly physical domain). Functional assessments showed a Berg Balance Scale (BBS) score of 49/56, a Timed Up and Go (TUG) test of 37.03 seconds, and a slow walking speed (10mWT: 0.5 m/s). Rehabilitation interventions included structured balance training, vestibular rehabilitation exercises, and gait retraining with a wide-based quadripod.

Results

Following an intensive rehabilitation program, the patient demonstrated improved balance and mobility, with enhanced dynamic standing control and reduced gait sway. There is improvement of 6-minute walk test from 80m to 140m with improvement in step length, 10 metre walk test from 0.5 to 0.6 m/s, left grip strength improved from 34 to 38kg/F and he scored better in Sensory Organization Test with composite score of 66 from 54. Vestibular training contributed to better gaze stabilization, reducing dizziness symptoms.

Conclusion

A multidisciplinary rehabilitation approach, integrating balance and vestibular training, effectively improved postural stability and gait performance in this patient with post-encephalopathy cerebellar and vestibular dysfunction. These findings support the importance of targeted rehabilitation in restoring mobility and reducing fall risk in similar cases.

EP147

BREAKING THE FREEZE: THE IMPACTS OF PERINEURAL INJECTION THERAPY FOR SHOULDER ADHESIVE CAPSULITIS IN POST-STROKE REHABILITATION

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Background and aims

Shoulder adhesive capsulitis (AC) is a common complication following stroke, particularly in patients with hemiparesis. It leads to progressive pain, restricted range of motion, and functional limitations. Conventional management, includes physical therapy and analgesics, often provides suboptimal outcomes. Perineural Injection Therapy (PIT) using dextrose 5% has emerged as a novel approach for pain relief and functional restoration. This case study explores the impacts of PIT on pain and shoulder range of motion in a post-stroke patient with adhesive capsulitis.

Methods

A 63-year-old woman with a history of left MCA infarct, right hemiparesis, and multiple comorbidities (diabetes mellitus, hypertension, dyslipidemia) presented with persistent right shoulder pain and motion restriction despite intensive rehabilitation and pharmacological pain management. Clinical examination confirmed AC, with pain rated at NRS 6-7/10 and significantly limited active shoulder range of motion (forward flexion 80°, abduction 80°). PIT was administered over five sessions, targeting chronic constrictive injury (CCI) points along the axillary and radial nerves with buffered 5% dextrose on top of ongoing home exercise prescribed

Results

Post-intervention, the patient demonstrated significant pain reduction (NRS 7 to 2/10) and improvement in shoulder mobility (forward flexion 120°, abduction 110°). Functional assessments showed a decrease in Disabilities of the Arm, Shoulder, and Hand (DASH) score from 63 to 41. The patient resumed home exercise and physiotherapy, maintaining gains in mobility and pain relief.

Conclusion

PIT using buffered 5% dextrose effectively reduced pain and improved shoulder mobility in this case of post-stroke adhesive capsulitis. This intervention presents a promising adjunct to conventional rehabilitation for AC in hemiparetic patients. Further research is needed to establish its long-term efficacy and mechanism of action.

EP148

THE CLINICIAN-ORIENTED OUTCOMES OF DYNAMIC POSTURAL CONTROL DURING VISUAL PERTURBATION IN COLLEGE STUDENTS WITH CHRONIC ANKLE INSTABILITY: A CASE CONTROL STUDY

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Background and aims

Chronic ankle instability (CAI) is a common musculoskeletal disorder that leads to postural control deficits, which may be exacerbated under visual perturbations. This study aims to investigate the effects of visual disturbances on clinician-oriented dynamic postural control outcomes in college students with CAI.

Methods

This case-control study included 34 participants from Beijing Sport University (17 with CAI and 17 healthy controls). Participants were tested under three visual conditions: no perturbation, low-frequency disturbance, and high-frequency disturbance. Dynamic postural control was assessed using the Y-Balance Test (YBT), the Side Hop Test (SHT), and the Multiple Single-Leg Hop Stabilization Test (MSLHST).

Results

Visual perturbation significantly influenced dynamic postural control outcomes ($P < 0.001$), with high-frequency (HF) disturbances leading to the most pronounced deficits. The CAI group exhibited significantly poorer performance in the YBT and MSLHST under HF conditions ($P < 0.001$), highlighting group-specific impairments. No overall differences were observed between the CAI and healthy groups across all conditions ($P = 0.587$). However, interaction effects ($P = 0.004$) further emphasized the unique challenges posed by HF disturbances.

Conclusion

Visual perturbations can significantly influence the dynamic stability of college students with CAI in clinical contexts, with higher-frequency disturbances posing greater challenges to their balance control. Incorporating visual challenges in clinical practice could be valuable for identifying specific deficits in CAI patients and guiding targeted interventions in rehabilitation.

EP149

SYNERGISTIC EFFECTS OF TRANSCRANIAL DIRECT ELECTRIC STIMULATION ON VIRTUAL CYCLING TRAINING FOR UPPER LIMB FUNCTION IN CHILDREN WITH CEREBRAL PALSY

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Background

Virtual reality-based cycling training (VCT) has been used to improve motor function, particularly in the lower limbs, in individuals with cerebral palsy (CP). Meanwhile, transcranial direct electric stimulation (tDCS) have shown potential in enhancing neuroplasticity and motor function. However, the combined effects of tDCS and upper limb VCT remain largely unexplored. This study aimed to investigate the synergistic effects of tDCS on VCT in improving upper limb function in children with CP.

Methods

A randomized controlled trial (RCT) was conducted with 20 children with CP, who were randomly assigned to receive 12 sessions of either real tDCS + VCT (N=10) or sham tDCS + VCT (N=10) over 6 weeks. Motor function and participation outcomes were assessed before and after the intervention. The primary outcome was the Nine-Hole Peg Test (NHPT), while secondary outcomes included the Caregiver Functional Use Survey (CFUS) and Goal Attainment Scaling (GAS).

Results

Both groups exhibited significant improvements in GAS scores ($p < 0.05$) following the intervention. However, only the tDCS + VCT group exhibited significant gains in NHPT scores and Quality of Movement in CFUS. Notably, no significant changes were observed in the Frequency of Use subscale of CFUS. Despite these improvements, the change scores did not significantly differ between the two groups across all outcome measures.

Conclusion

This study highlights the synergistic potential of tDCS on VCT in improving upper limb function and movement quality, and participation in children with CP. These findings underscore tDCS as a promising adjunct therapy for optimizing motor rehabilitation in CP. Further large-scale studies are needed to fully explore its long-term benefits and clinical applications.

EP150

IMPORTANCE OF EARLY REHABILITATION IN HIRAYAMA DISEASE: A CASE REPORT

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Background and aims

Hirayama disease, also known as juvenile muscular atrophy, is characterised by progressive asymmetric muscle atrophy in the hand and forearm, without sensory loss, due to compression of the cervical spinal cord. This case report underscores the paramount significance of prompt diagnosis and subsequent management of a patient in optimising clinical outcomes.

Methods

A 20-year-old male presented with a two-year history of gradual motor weakness in the left hand, subsequently affecting the right hand after one year. This condition was accompanied by bilateral hand muscle atrophy. Upon clinical evaluation, the patient demonstrated muscle weakness in both hands, rated as MRC grade 3/5, with significant atrophy of the intrinsic hand muscles. MRI revealed forward migration of posterior wall of duramater with atrophy of the cervical cord posteriorly at C5-C6 and EMG confirmed the denervation changes in affected muscle. The patient was provided with a cervical collar and underwent rehabilitation of bilateral upper limb with strengthening exercises, activity to improve hand function and care of neck while doing activities of daily living. UEFI (Upper Extremity functional index) scoring and manual muscle testing were conducted during the initial visit and again at the follow-up visit after 6 months.

Results

UEFI score improved from 40 to 50, and MRC grade improved from 3/5 to 4/5 in the follow-up visit.

Conclusion

This case shows the importance of early diagnosis and rehabilitation in managing Hirayama disease. A combination of cervical immobilisation and tailored rehabilitation therapies can significantly improve functional outcomes. Early intervention is key to preventing progression of disability and optimising recovery.

EP151

LATE INFANTILE FORM OF METACHROMATIC LEUKODYSTROPHY IN A 3-YEAR-OLD: A CASE REPORT

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Background and aims

Metachromatic leukodystrophy (MLD) is a rare demyelinating, autosomal recessive genetic leukodystrophy with prevalence of 1 per 494,514 in Malaysia, caused by a deficiency of the enzyme arylsulfatase A gene. It leads to accumulation of sulfatides which results in the dysfunction of myelin sheath causing a progressive deterioration of neurodevelopment and neurocognitive function. This case study aims to report MLD in a 3-year old child and discuss the importance of early diagnosis and management.

Methods

A 3-year-old male child presented with three-month history of regression of developmental milestones across all domains, transitioning from independent walking to requiring support for sitting. Magnetic resonance imaging (MRI) demonstrated bilateral, symmetrical hyperintense regions in the periventricular and deep white matter, indicative of leukodystrophy. The child underwent rehabilitation and was followed up after a month.

Results

Regardless of early therapeutic interventions, the child demonstrated a decline in motor abilities and an exacerbation of cognitive impairments. Rehabilitation services were administered to the child, while the family received genetic counselling.

Conclusion

This case underscores the critical need for early identification of MLD and distinguishing these patients from individuals with other developmental disorders. Although curative treatments are not yet available, an early diagnosis can enable the provision of supportive care and family counselling.

EP152

PERSISTENT AUTONOMIC DYSREFLEXIA IN CHRONIC SPINAL CORD INJURY: WHAT TO DO NEXT?

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Introduction

Autonomic dysreflexia (AD) results from noxious stimuli below the level of lesion, causing a sudden rise in blood pressure and bradycardia, potentially causing severe complications such as an intracranial bleed or myocardial infarction. Neurogenic detrusor overactivity (NDO) commonly occurs after spinal cord injury (SCI) and may trigger AD. NDO appears weeks after spinal shock as the spinal reflex arcs reform and afferent C-fibers undergo remodeling following neuroplasticity. These fibers are hypothesized to induce abnormal bladder responses to irritation and filling, thus triggering NDO and AD. This case study presents a chronic SCI patient with persistent AD due to NDO.

Report

Mr. B is a 43 years old gentleman who sustained SCI with neurological level of C6 AIS A, following a motor vehicle accident in 1998. He has been on suprapubic catheter for neurogenic bladder management since 2016. Starting 2024, his AD episodes have worsened with persistent sweating, hiccups and headaches that occurred greater than 20 episodes a day. Extensive investigations had been carried out to identify potential triggers to AD, which include ultrasound investigation to rule out renal stone or cholelithiasis, prescription of antibiotics for treatment of recurrent urinary tract infection, and usage of laxatives to clear faecal impactions. However, the AD episodes persisted. In November 2024, he was started on propiverine hydrochloride and his AD symptom improved after a week with no more leaking from suprapubic catheter and the AD frequency has reduced to 3-4 times in a day with mild symptoms of sweating occasionally.

Conclusion

Propiverine hydrochloride has both neurotropic and muscolotropic modes of action to regulate detrusor overactivity which increases bladder capacity and reduces detrusor pressure. This case highlights NDO as a potential trigger for persistent AD in SCI patients and management of NDO significantly reduced incidence of AD.

EP153

INVESTIGATION OF INPATIENT CONVALESCENT REHABILITATION OUTCOMES IN BRANCH ATHEROMATOUS DISEASE

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Background and aims

We investigated inpatient convalescent rehabilitation outcomes of Branch atheromatous disease (BAD). Results: Conclusion: Rehabilitation outcomes following BAD in the convalescent period should be assessed in terms of improvements in pure-motor hemiparesis and activities of daily living. Furthermore, the disturbance patterns in the corticospinal tract by ischemic stroke lesions may be different between LSA-BAD and PPA-BAD.

Methods

The subjects were 116 patients with lenticulostriate artery territory - BAD (LSA-BAD) and 29 with paramedian pontine artery territory - BAD (PPA-BAD). For all patients, the National Institutes of Health Stroke Scale (NIHSS), Functional Independence Measure (FIM) scores, and Brunnstrom recovery stages (BRS) of the upper limb, fingers, and lower limb were measured on admission and at discharge.

Results

There were no significant differences in clinical characteristics on admission between the LSA-BAD and PPA-BAD groups. The neurological severity of PPA-BAD, as measured by the NIHSS, was significantly milder compared with that of LSA-BAD upon admission ($p = 0.015$) and at discharge ($p = 0.001$). Patients with LSA-BAD had significantly less improvement in the BRS of the upper limb ($p = 0.001$), fingers ($p < 0.001$), and lower limb ($p = 0.007$) at discharge. Furthermore, they had significantly smaller changes in BRS between admission and discharge for the upper limb ($p = 0.033$) and fingers ($p = 0.014$) compared with patients with PPA-BAD. The improvement in BRS for patients with LSA-BAD tended to be limited to two stages; however, both patients with LSA-BAD and PPA-BAD saw sufficient gains in FIM at discharge.

Conclusion

Rehabilitation outcomes following BAD in the convalescent period should be assessed in terms of improvements in pure-motor hemiparesis and activities of daily living. Furthermore, the disturbance patterns in the corticospinal tract by ischemic stroke lesions may be different between LSA-BAD and PPA-BAD.

EP154

EFFECTIVENESS OF TELE-REHABILITATION IN IMPROVING MOTOR, COGNITIVE FUNCTION, AND QUALITY OF LIFE IN STROKE PATIENTS

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Background and aims

Post-stroke rehabilitation is essential to enhance patient recovery and improve their well-being. Telerehabilitation has emerged as a technology-based alternative which provide flexibility for patients with limited access of sustainable medical rehabilitation program. This study aims to assess the effectiveness of tele-rehabilitation in stroke patients based on motor and cognitive function, also quality of life.

Methods

A systematic review using PubMed, Scopus, Cochrane Library, and Google Scholar (2019–2023) examined telerehabilitation for stroke recovery. Keywords included “telerehabilitation,” “stroke recovery,” “telemedicine,” and related terms, focusing on ischemic and hemorrhagic stroke. Studies evaluating motor and cognitive function, as well as quality of life, were included. Ten studies met the criteria, and a meta-analysis assessed pooled effect size and heterogeneity.

Results

A total of 10 studies (30 – 200 subjects) were included in this systematic analysis. Patients who met the population criteria were between 45 and 80 years old and consisted of post-stroke patients who received basic medical care. Meta-analysis results showed significant improvements in motor function (mean difference [MD] = 2.35, 95% CI [1.50, 3.20], $p < 0.001$) and quality of life (MD = 2.15, 95% CI [1.10, 3.20], $p < 0.001$). Cognitive function also showed significant improvements (MD = 1.70, 95% CI [0.90, 2.50], $p < 0.01$). Subgroup analysis by intervention type showed that video calls had a stronger effect on motor skills than the application-based (MD = 2.80 vs 1.90), while the application showed better results on quality of life (MD = 2.40 vs 2.10). Analysis by stroke type (ischemic and hemorrhagic) showed similar significant outcomes.

Conclusion

Tele-rehabilitation has been shown to be effective as a valuable alternative modality in improving motor, cognitive function, and quality of life in stroke patients, especially in patients with limited medical rehabilitation access.

EP155

PROGRESS OF A PATIENT USING 600 UNITS OF BONT-A

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Background and aims

Botulinum Toxin Type A (BoNT-A) was covered by insurance for upper limb spasticity and lower limb spasticity in Japan starting at the end of October 2010. During this period, there was a usage limit of 240 units for upper limb spasticity, but in December 2019, this was increased to 400 units. There was a usage limit of 360 units for both upper and lower limb spasticity, but in November 2022, this was expanded to 600 units. In many countries abroad, the officially approved dosage is a maximum of 400 units

Methods

The study included 24 individuals who received 600 units of BoNT-A injections between December 2024 and January 2025. Medical records were reviewed to assess the onset date, the start date of botulinum therapy, the number of times 400-unit injections were administered and changes in the injected muscles, as well as the number of times 600-unit injections were administered and changes in the injected muscles. This study was approved by the university's ethics committee.

Results

The average time from onset to the first BoNT-A injection was 5.1 years. They continued regular BoNT-A injections for an average of 8.4 years. The 400-unit injections were administered an average of 9.8 times, mainly targeting 7 muscles more than 50% injections. The 600-unit injections were administered an average of 7.2 times, , mainly targeting 10 muscles more than 50% injections.. No adverse effects were reported by the participants, and all reported a reduction in spasticity with the increased dosage. However, functional improvements in long-term BoNT-A users were minimal, and the treatment was continued primarily for ADL maintenance.

Conclusion

No adverse effects were reported, and it was observed that botulinum therapy had been administered over an extended period. Long-term continuation of the treatment was considered necessary for maintaining ADL.

EP156

RED FLAGS ALERTING HIDDEN CANCER IN ISCHEMIC STROKE

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Background and aims

Cancer-related stroke is increasingly recognized. Approximately 10% of ischemic stroke patients have comorbid cancer. Stroke patients with multiple vascular territory involvement and elevated coagulation markers may indicate a hidden malignancy. This study presents a case and reviews the literature relating to stroke caused by malignancy to find red flags alerting a hidden cancer.

Methods

Relevant original studies about the clinical presentation, screening tools, and treatment strategies for a case of hidden cancer in stroke were reviewed. Key findings were synthesized to inform clinical practice. One red flag is defined as a 13% positive predictive value (PPV) for malignancy in stroke.

Results

Fibrinogen >600 mg/dL has 13.7% PPV, and CRP >20 mg/L presents a higher PPV of 28.7% for hidden cancer. A scoring system using D-dimer ≥ 3 mg/L, hemoglobin ≤ 12.0 g/dL, and smoking history helps identify patients at risk for cancer with a 4-fold increase in PPV (52%). In contrast, almost all patients with D-dimer >0.55 mg/L and multiple territory infarctions or D-dimer >5.5 mg/L regardless of imaging result had hidden cancers, representing 92.9% and 93.9% PPV. Antiplatelets as the secondary prevention had been proven to be safe and efficient in patients whose tumor burden or coagulation factors are low. Intensive rehabilitation can restore anti-cancer therapeutic possibilities, and careful assessment of stroke etiology, cancer status, and interdepartmental communication are crucial.

Conclusion

Those with 1) elevated fibrinogen, 2) elevated CRP, 3) elevated D-dimer with anemia and smoking history, and 4) elevated D-dimer with multiple territory infarction trigger one, two, four, and seven red flags, respectively, alerting clinical suspicion for occult malignancy in patients with cryptogenic stroke, which warrant CT imaging to exclude life-threatening or treatable conditions.

EP157

A STUDY OF CORRELATES OF REHABILITATION LENGTH OF STAY (RLOS) DURING INPATIENT TRAUMATIC BRAIN INJURY (TBI) REHABILITATION

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Background and aims

A retrospective study to describe RLOS in a local TBI cohort, determine factors that correlated with RLOS and identify covariates was conducted in a single inpatient tertiary brain injury unit of a public hospital.

Methods

Discharge records of 298 adult TBI patients admitted to the TTSH rehabilitation centre from 1 November 2018 to 1 March 2024 were studied. RLOS and the associated co-variables (patient demographics, acute injury variables, intervention measures, rehabilitation outcome measures, intra-rehabilitation complications, discharge location) were independently extracted. Univariate analysis and multivariate linear regression were conducted for factors impacting RLOS. Correlates of prolonged-RLOS (>30 days) were studied via binary logistic regression analysis

Results

In all, 289 data sets were analyzed. There was a mean age of 59.6 years, male predominance of 78.9% (n=228) and mean RLOS of 30.3 days. Multivariate regression analysis revealed that Post-Traumatic Amnesia (PTA) duration exceeding 28 days, urinary tract infections, total admission Functional Independence Measure (Ta-FIM), and discharge destination significantly impacted RLOS. Binary logistic regression similarly showed that PTA duration exceeding 28 days and Ta-FIM significantly impacted prolonged-RLOS, along with neurosurgical complications.

Conclusion

In this predominantly older cohort, RLOS was impacted by factors within rehabilitation. Patient demographics and acute injury variables were not significant. Steps must be taken to recognize and treat complications early. Patients with lower Ta-FIM and longer PTA duration must also be identified to dedicate more intensive rehabilitation and start more comprehensive discharge planning.

EP158

FAMILY DYNAMICS AND REHABILITATION SUCCESS IN OSTEOGENESIS IMPERFECTA: A COMPARATIVE CASE REPORT**Simranjeet Kaur^{1*}, Liyana Ahmad Farid², Nur Hanis Jaafar³, Nurul Firdausi Hasnol Basri¹**¹*Department of Rehabilitation Medicine, Faculty of Medicine, Universiti Malaya, Kuala Lumpur, Malaysia.*²*Department of Rehabilitation Medicine, Hospital Rehabilitasi Cheras, Kuala Lumpur, Malaysia.*³*Department of Rehabilitation Medicine, Hospital Kuala Lumpur, Malaysia.***Background and aims**

Osteogenesis imperfecta (OI) is a rare genetic disorder characterized by recurrent fractures, osteopenia and deformities. Rehabilitation in OI aims to improve mobility, strength and overall function. OI is a lifelong condition; continuous rehabilitation is essential as individuals age. A crucial factor in achieving successful rehabilitation is strong family support. This case series reports two individuals with OI and their respective family dynamics.

Methods

Patient A, a 7-year-old boy with Type III OI, diagnosed at 1 month, with multiple medical issues including craniosynostosis, ventriculomegaly and strabismus. He began rehabilitation at age 4, which helped him achieve independent bed-to-wheelchair transfer and self-propulsion. Despite lower limb weakness with a muscle strength of MRC grade 2, he is motivated to improve his mobility. He underwent corrective surgery of his lower limbs for independent walking. He has strong family support, ensuring regular therapy and check-ups.

Patient B, an 11-year-old-boy with Type I OI, mild scoliosis, multiple fractures and several corrective surgeries. He has been trained to use a walking frame but predominantly bottom shuffles for mobility. His family struggles with commitment to therapy and medical follow-ups, which is worsened by parental estrangement. Despite better muscle strength of MRC grade 4, his poor adherence to therapy and lack of support have slowed his rehabilitation progress, limiting his mobility and overall outcomes.

Results

The key differences in outcomes are the family dynamics and social support that ensures adherence to therapy. Despite having a more severe type of OI, patient A shows greater functional progress. Patient B, with a milder OI, rehabilitation has been slower due to inadequate family involvement and lack of parent's collaboration.

Conclusion

Family commitment is pivotal in successful rehabilitation for individuals with OI. The contrasting outcomes highlights how consistent family involvement can improve mobility and overall rehabilitation progress.

EP159

BURDEN AMONG CAREGIVERS OF SPINA BIFIDA PATIENTS IN UNIVERSITI MALAYA MEDICAL CENTRE - PRELIMINARY RESULTS

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Background and aims

Spina bifida (SB) is the most common congenital central nervous system abnormality compatible with life. Children with SB experience neurological (hydrocephalus, motor, sensory, neurogenic bowel, and bladder), musculoskeletal, and psychosocial impairments, leading to high dependency on caregivers. Studies in the United States indicate that caregivers of children with SB face moderate to severe burden, with one-third at high risk of burnout. However, this data is not available locally. Hence, a study to determine the caregiver burden and its severity among caregivers of children with SB at Universiti Malaya Medical Centre (UMMC) was initiated.

Methods

This is a quantitative, cross-sectional study utilizing the Zarit Burden Interview (ZBI) questionnaire. The required sample size is 47 caregivers, with an alpha error of 5% and power of 80%. Caregivers of SB children attending the multidisciplinary combined clinic at UMMC were recruited via universal sampling. Data collection commenced in October 2024 and is anticipated to be completed by September 2025. To date, 22 (47%) participants have been recruited.

Results

Preliminary results show that caregivers had a mean age of 44 years, while children averaged 10 years. All caregivers were parents. The mean ZBI score was 25, indicating mild to moderate burden. Of participants, 31% experienced nil to mild burden, 45% mild to moderate, and 14% moderate to severe. The most impacted domains were financial burden and strain on relationships. Half (50%) of the caregivers were from lower-income groups and 73% had additional dependents to care for. More than half of the children required assistance with bladder (64%) and bowel (59%) management.

Conclusion

This study's completion is crucial as caregiver burden can lead to burnout, negatively affecting caregivers' health and potentially compromising the quality of care provided to children with SB, increasing their morbidity risk.

EP160

EFFECTS OF BOTULINUM TOXIN TYPE A INJECTIONS ON LOWER LIMB SPASTICITY IN STROKE SURVIVORS: A SIX-MONTH FOLLOW-UP

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Background and aims

Lower limb spasticity after stroke affects motor power and functional recovery, which impairs the performance of mobility and daily living activities. Multiple studies have shown the effectiveness of Botulinum Toxin Type A (BTXA) in improving spasticity and gait function, but less than a handful of studies were done among Malaysians. This study aims to demonstrate the six-month evaluation of BTXA injections in post-stroke lower limb spasticity in Hospital Rehabilitasi Cheras.

Methods

This prospective cohort study included post-stroke patients with lower limb spasticity who received intramuscular BTXA injections. They received routine outpatient physiotherapy after the intervention. Modified Ashworth Scale (MAS), 10 Meter Walk Test (10MWT) and 6 minute walk test (6MWT) were evaluated at baseline and at 1, 3, and 6 months post-treatment.

Results

38 patients were included, 25 were male, and the ratio of ischemic to hemorrhagic stroke was 31:7. At baseline, the patients demonstrated lower limb spasticity with MAS 2.31 ± 0.89 (Mean $\pm$ SD). Over the study period, there was gradual improvement in the spasticity, with consistent reduction of MAS to 1.83 ± 1.06 at 1 month, 1.66 ± 1.03 at 3 months, and 1.61 ± 1.12 at 6 months, indicating a continuous reduction in spasticity ($p < 0.001$). Among the 28 ambulatory patients, there was a significant improvement in walking speed at 6 months ($p < 0.05$), of whom 57.1% achieved Minimal Clinically Important Difference (MCID) for 10MWT. Significant increment of 6MWT was noted at 6 months ($p < 0.05$), however only 25% achieved MCID. No adverse events were reported.

Conclusion

The gradual improvement in post-stroke lower limb spasticity over 6 months with significant improvement in functional mobility in ambulatory patients highlights the clinical efficiency of BTXA in rehabilitation. These findings support the use of BTXA as a beneficial intervention in improving spasticity and mobility in patients undergoing stroke rehabilitation.

EP161

HEAT COMPRESSION-INDUCED BURN IN A PATIENT WITH PARAPLEGIA: THE FORGOTTEN RISK OF SENSORY IMPAIRMENT

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Introduction

Patients with paraplegia often suffer from sensory deficits, predisposing them to pressure injury or burns. This case highlights an iatrogenic thermal burn due to improper heat compression in a paraplegic patient.

Case presentation

A 43-year-old male with stage IV lung adenocarcinoma with metastasis to the spine, resulting in a T3 incomplete spinal cord injury (SCI) AIS C. He developed paraplegia and requiring indwelling catheter for neurogenic bladder management. He once experienced suprapubic discomfort after catheter blockage and his wife which was a medical personnel, applied a heat compression to the suprapubic area to alleviate the symptoms. The hot pack was left on for an extended period, leading to a second degree burn over the region measuring 10 cm x 14 cm. Wound care was initiated with topical antibiotics, dressing and pain management. He also required suprapubic catheter placement as definitive management due to lower urinary tract blockage.

Discussion

Warm compression is a common intervention for urinary retention and suprapubic pain. However, its application in SCI patients requires caution due to sensory impairments, increasing their risk for thermal burns. While patients with an AIS C classification may retain some sensory function, their perception of temperature may be diminished making them susceptible to injuries. In this case, the patient sustained a thermal burn despite being under the care of healthcare personnel, highlighting that even trained medical professionals may not fully aware the risks associated with heat application in individuals with SCI.

Conclusion

While pressure injury prevention is commonly emphasized in SCI education, thermal injuries are often overlooked despite their significant risks. This case stresses the importance of comprehensive education to both caregiver and healthcare professional in SCI management, ensuring awareness of all preventable complications, including heat-related injuries. Clinicians must proactively counsel patients with paraplegia and caregivers about the risks of thermal injury and proper skin care strategies.

EP162

THE MUSCULOSKELETAL EFFECTS OF OPTIMIZED TAI CHI ON KOA PATIENTS BASED ON THREE-DIMENSIONAL MOTION ANALYSIS: A RANDOMIZED CONTROLLED TRIAL

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Background and aims

This randomized controlled trial aimed to investigate the effects and mechanisms of an optimized Tai Chi program on the musculoskeletal system of patients with knee osteoarthritis (KOA). Participants were randomly assigned to either the optimized Tai Chi group or common 10-form Tai Chi group for a 12-week intervention.

Methods

The study utilized three-dimensional gait analysis combined with surface electromyography (EMG) to synchronously collect data on lower limb kinematics, kinetics, and surface EMG during stair-climbing tasks. Data were processed using Visual3D software to derive relevant metrics.

Results

After intervention, the optimized Tai Chi group showed significantly greater improvement in the KOOS pain subscale compared with the 10-form Tai Chi group ($P < 0.05$), while no significant differences were observed in other subscales ($P > 0.05$). There were no significant differences in overall load and lower limb muscle activation ratios during stance phase of the stair descending and ascending between the two groups ($P > 0.05$). However, the optimized Tai Chi group exhibited significantly better knee-ankle joint coordination in the horizontal plane during stair descent compared to the 10-form Tai Chi group ($P < 0.05$), with no significant differences during stair ascent ($P > 0.05$). Additionally, hip-knee sagittal plane coordination during stair descent in the optimized Tai Chi group was significantly correlated with KOOS Pain and KOOS ADL, while knee-ankle frontal plane coordination was linked to KOOS Symptoms ($P < 0.05$). The 10-form Tai Chi group showed a significant reduction in overall load at the ankle and hip joints during stair descent ($P < 0.01$) and improved knee joint load ($P < 0.05$). During stair ascent, knee joint load was also significantly reduced ($P < 0.05$).

Conclusion

Both training programs effectively alleviated pain and improved physical function in KOA patients. However, the optimized Tai Chi program was superior in reducing pain and enhancing joint coordination, while the 10-form Tai Chi program was more effective in relieving joint stiffness and improving load distribution.

EP163

HOPE IN A DRIP: PIONEERING KETAMINE USE FOR REFRACTORY NEUROPATHIC PAIN IN PARSONAGE-TURNER SYNDROME (PTS)

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Background and aims

Parsonage-Turner syndrome (PTS) or brachial neuritis, is a rare neurological disorder characterized by acute onset of pain, paraesthesia and weakness affecting shoulder girdle and upper limb. While its etiology remains unclear, post-vaccination brachial neuritis accounts for up to 15% of cases. Recovery is often prolonged, with most patients achieving full resolution within three years. There is no consensus on treatment, but conservative management typically includes analgesia, corticosteroids and physical therapy. Ketamine, an NMDA receptor antagonist, has been suggested to be effective for refractory neuropathic pain. To the best of our knowledge, this is the first case in the literature describing the use of intravenous (IV) ketamine for pain relief in post-vaccination brachial neuritis.

Methods

A 42-year-old previously healthy woman developed sudden onset of severe pain over left upper limb after receiving her first dose of COVID-19 vaccination, lasting for three days. The pain recurred after the second dose and became persistent, later accompanied by sensory symptoms. MRI of the brachial plexus revealed C5-C8 nerve root engorgement consistent with brachial neuritis. Conventional treatments provided limited relief. She subsequently underwent low-dose IV ketamine infusion. Pain severity was assessed using the Numerical Rating Scale (NRS). Adverse effects were also recorded.

Results

The patient's pain decreased significantly from NRS 8 to 3 by the end of the infusion. Pain further decreased to NRS 1-2 over few days post infusion. No severe adverse effects were reported, apart from transient dissociative symptoms which was self-limiting.

Conclusion

Standard treatment can be insufficient in refractory brachial neuritis cases. When central sensitization occurs in chronic pain, this NMDA receptor antagonist proves to be a potential treatment because they can possibly reverse central sensitization and alter neural plasticity. Future high quality studies with large number of patients focusing on brachial neuritis are necessary to understand its long term efficacy and safety.

EP164

NON-INVASIVE INTERVENTIONS FOR ORAL MOTOR DYSFUNCTION AND DROOLING IN CHILDREN WITH CEREBRAL PALSY: A SYSTEMATIC REVIEW

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Background and aims

Drooling and oral motor dysfunction are common in children with cerebral palsy (CP), affecting nutrition, communication, and social interaction. Traditional treatments, such as surgery and medications, have limitations. This study evaluates the effectiveness of non-invasive therapies, including behavioral therapy, oral-motor therapy, Functional Chewing Training (FuCT), Kinesio Taping (KT), and Sensory-Level Electrical Stimulation (ES) in managing drooling.

Methods

This systematic review and meta-analysis followed PRISMA guidelines and included studies assessing non-invasive treatments for drooling in children with CP. Literature searches covered multiple databases without date restrictions. Inclusion criteria required studies to report drooling severity, oral motor function, or related outcomes. Data extraction and analysis compared the effectiveness of different treatments.

Results

Behavioral therapy enhanced voluntary saliva control. KT showed moderate effectiveness in improving drooling. FuCT significantly reduced drooling and improved chewing function. ES helped enhance oral muscle coordination. Combination therapies demonstrated the best outcomes, indicating the synergistic benefits of multiple approaches.

Conclusion

Non-invasive treatments are promising alternatives for managing drooling in children with CP. FuCT and combination therapies show the highest efficacy. Future research should focus on large-scale randomized controlled trials (RCTs) and cost-effectiveness analyses to optimize the integration of these treatments into clinical practice.

EP165

MULTIDISCIPLINARY FALL PREVENTION PROGRAM IN JOCKEY CLUB INTEGRATED REHABILITATION DAY CENTRE OF KOWLOON HOSPITAL

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Background and aims

Fall poses a threat to the healthcare system through its association with disability and mortality. The risk of recurrent falls is tripled after falling within one year. The Fall Prevention Program was established with an aim to identify patients with high fall risks and prevent falls through personalized interventions.

Methods

Patients with recent history of fall or at risk of falls were recruited in clinic and hospital admissions. This 12-week program consists of 24 training sessions and 2 telehealth sessions on fall prevention education. The patients are provided with personalized treatment including fall-related diseases management, strength and balance exercise, home safety and nutrition advice, training on cognition and activities of daily living (ADLs), as well as psychological management for those with mood and behavioural issues.

Results

24 patients were recruited from September to November 2024 with an average age of 79.5 years (SD = 9.2). All of them fell at least once past year. According to Falls Risk for Older People in the Community (FROP-Com) Screen, 9 patients (37.5%) were graded with high fall risk. Majority of the patients lived with frailty (18/24, 75.0%), had history of fractures (17/24, 70.8%), and were diagnosed with osteoporosis (17/24, 70.8%). 7 patients (29.1%) were identified with home safety hazards. 20 patients (83.3%) were using drugs associated with fall risks, for example, antihypertensives, sedatives and anticholinergics. Up to January 2025, 17 patients completed the program. A Wilcoxon signed rank test revealed a significant improvement in their ADL, IADL, fall efficacy and reduction of fall risk through Modified Barthel Index ($p=0.003$), Functional Independence Measure ($p=0.005$), Lawton Instrumental Activity of Daily Living ($p=0.036$), Fall Efficacy Scale ($p=0.021$) and FROPCom Screen ($p=0.046$).

Conclusion

Comprehensive assessments of at-risk patients allow efficient resources utilization for falls prevention. On-going evaluation of the program efficacy is in progress.

EP166

A 2-YEAR POST-TRIAL FOLLOW-UP STUDY OF TAI CHI ON COGNITIVE FUNCTION IN ADULT 60 YEARS OR OLDER WITH TYPE 2 DIABETES AND MILD COGNITIVE IMPAIRMENT IN CHINA

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Background and aims

To investigate the long-term effects of Tai Chi on cognitive function in patients with type 2 diabetes and mild cognitive impairment (MCI) over a 2-year follow-up period.

Methods

A 2-year follow-up was conducted on 3 groups from a previous randomized controlled trial, who had undergone 24 weeks of Tai Chi, fitness walking, or health education interventions. Outcome measures were global cognition, assessed using the Montreal Cognitive Assessment (MoCA), and memory, executive function, attention, visuospatial function, and language fluency, evaluated using various standardized tests. Linear mixed models were used to analyze cognitive function differences across time points (baseline, 24-week post-intervention, 3-month and 2-year follow-up) and groups, and time-dependent Cox regression was employed to assess the impact of interventions on achieving clinically significant improvements in MoCA scores.

Results

Significant interaction effects between group and time were observed for MoCA score ($P=0.024$), with the Tai Chi group showing superior performance compared to the health education group ($P=0.004$). Cox regression analysis indicated that both the Tai Chi ($HR=1.97$, 95% CI: 1.40–2.78) and fitness walking groups ($HR=1.67$, 95% CI: 1.17–2.38) were more likely to achieve clinically significant improvements in MoCA score. In executive function, the Tai Chi group demonstrated faster reaction times in the Stroop test compared to the health education group ($P=0.028$ for dot reaction time, $P=0.035$ for word reaction time) and fewer color-word errors than the fitness walking group ($P=0.049$). For visuospatial function, the Tai Chi group had higher copying score in the Rey-Osterrieth Complex Figure Test compared to the health education group ($P=0.034$).

Conclusion

Tai Chi has sustained and beneficial effects on cognitive function in patients with type 2 diabetes and MCI, particularly in improving global cognition, executive function, and visuospatial abilities.

EP167

CIRCULATING EXOSOMAL MIR-625-5P AS MEDIATORS OF PREFRONTAL SYNAPTIC PLASTICITY IN ELDERLY FOLLOWING LONG-TERM TAI CHI EXERCISE: IMPLICATIONS FOR WORKING MEMORY ENHANCEMENT

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Background and aims

This study elucidates the neurocognitive benefits of long-term Tai Chi (TC) exercise in aging.

Methods

In the study, 100 cognitively healthy older adults (50 TC practitioners and 50 irregular exercisers) underwent cognitive testing, task-fMRI, and serum exosomal profiling. TC-derived serum exosomes (100µg/dose ×4 IV) were administered to Senescence-Accelerated Mouse-Prone 8 (SAMP8) mice. The Y-maze, PHK26 tracking, Golgi staining, RT-PCR, and Western blot analyses quantified the TC-exosome-mediated enhancement of working memory in SAMP8 mice.

Results

TC practitioners exhibited superior accuracy in 1-back ($p=0.048$) and 2-back ($p=0.003$) tasks, faster performance on the Trail-Making Test A ($p=0.002$), and distinct task-specific prefrontal cortical activation patterns. Notably, there was reduced engagement of the right superior frontal gyrus during low-load working memory (0-back) and enhanced activation in the left postcentral gyrus (1-back > 0-back) and the right superior frontal gyrus (2-back > 0-back). Proteomic and miRNA microarray analyses revealed 111 differentially expressed serum exosomal miRNAs (11 upregulated, 100 downregulated) and 59 proteins (30 upregulated, 29 downregulated). The downregulated levels of miR-625-5p and miR-762 in TC practitioners correlated with improved working memory ($r=-0.352$, $p=0.032$; $r=-0.371$, $p=0.024$). The results demonstrated that intravenous administration of TC-derived serum exosomes in SAMP8 mice restored Y-maze working memory ($p<0.01$ vs. PBS controls), increased prefrontal cortical dendritic spine density ($p<0.001$), and normalized synaptic plasticity markers (CALM1/VDAC2) through the suppression of miR-625-5p.

Conclusion

These findings indicate that sustained TC practice optimizes prefrontal cortical efficiency, modulates exosomal miRNA cargo (notably miR-625-5p), and ameliorates age-related working memory decline by regulating prefrontal cortical synaptic plasticity. This mechanistic evidence positions exosomal miRNAs as key mediators of exercise-induced neuroprotection in aging.

EP168

TRANSCRANIAL MAGNETIC STIMULATION IN SPINAL CORD INJURY: STANDARDIZING PROTOCOLS FOR BETTER FUNCTIONAL OUTCOMES

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Background

Spinal cord injury (SCI) causes severe motor, sensory, and autonomic impairments, impacting individuals and healthcare systems. Transcranial Magnetic Stimulation (TMS) is a promising tool for enhancing neural plasticity and functional recovery in SCI rehabilitation. However, its clinical application lacks standardized protocols.

Objective

This critical review examines the effects of TMS on neural plasticity and functional recovery in SCI rehabilitation, synthesizing existing evidence and exploring optimal treatment strategies.

Methods

We analyze clinical trials, preclinical studies, and neurophysiological research on TMS for SCI. Key themes include treatment protocols, neuroplasticity mechanisms, and its integration with other rehabilitation strategies.

Conclusions

TMS shows potential in promoting neural recovery after SCI, but further research is needed to standardize treatment parameters and personalize approaches. Optimizing TMS protocols could improve rehabilitation outcomes and quality of life for SCI patients.

Keywords

Spinal Cord Injury, Transcranial Magnetic Stimulation, Rehabilitation, Neuroplasticity, Treatment Protocols, Functional Recovery.

EP169

SILENT SIGNS: RECOGNISING PERSONALITY AND BEHAVIOURAL CHANGES IN PEDIATRIC THALAMIC STROKE

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Background

Pediatric arterial ischemic stroke occurs in children between one month and 18 years of age. It is a rare but significant cause of neurological morbidity, with an incidence of 0.6–13 cases per 100,000 children, making it far less common than adult stroke. Pediatric strokes commonly affect subcortical structures such as the basal ganglia and thalamus. The thalamus is a critical relay center for motor, sensory, and cognitive functions. While deficits in motor and cognitive functions are well recognized sequelae, personality and behavioral changes remain an underrecognized consequence of thalamic infarcts in children. This case report highlights a unique presentation of pediatric thalamic stroke characterized by personality and behavioral alterations.

Case Report

This case report describes a 12-year-2-month-old girl diagnosed with bilateral thalamic infarct despite having no underlying medical conditions or family history of stroke. She initially presented with a sudden-onset severe headache, which was followed by progressive left hemiparesis, conductive aphasia, agraphia and hypersomnolence. Further assessment revealed mild cognitive impairment, as measured by the Montreal Cognitive Assessment. Additionally, she exhibited personality regression, characterized by child-like expressions and immature behaviors inappropriate for her age, perceptual disturbances and delayed sleep onset latency. Radiological imaging confirmed a bilateral thalamic infarct. Extensive investigations were conducted, with most results yielding no significant findings, while some remain pending; however, the parents declined a lumbar puncture.

Results

The patient underwent inpatient rehabilitation and demonstrated gradual progress throughout treatment. Motor function showed significant recovery over time, with normal strength in all four limbs. Further evaluation distinguished a cognitive-communication disorder from a language disorder. Personality and behavioural alterations showed slower but steady improvement.

Conclusion

This case highlights the importance of recognizing personality and behavioral sequelae following pediatric thalamic stroke. Early detection and intervention are crucial for optimizing long-term functional and neurodevelopmental outcomes.

EP170

NEUROPHYSIOLOGY OF SEXUAL AROUSAL – BRAIN MECHANISMS AND REHABILITATION

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Background and aims

Sexual arousal is a complex neurophysiological process governed by interconnected brain networks, hormonal regulation, and sensory integration. Despite its critical role in quality of life, sexual arousal disorders remain understudied, particularly in populations with neurological conditions. This review synthesizes evidence on brain mechanisms driving arousal, examines how neurophysiological disruptions (e.g., stroke, trauma, neurodegeneration) contribute to dysfunction, and explores implications for rehabilitation.

Methods

A narrative review was conducted using PubMed, Scopus, and Google Scholar (2000-2024). Keywords included “sexual arousal neurophysiology”, “sexual disorder”, and “sexual rehabilitation”. Studies encompassed neurochemical analysis, neuroimaging, and clinical trials. Data were categorized by brain regions, neurotransmitter systems, and therapeutic interventions.

Results

Key findings:

1. **Brain networks:** The limbic system (amygdala, hippocampus) processes emotional valence, while the hypothalamus (paraventricular nucleus) integrates autonomic and hormonal responses. Cortical regions (insula, prefrontal cortex) modulate inhibitory/excitatory balance.
2. **Neurotransmitters:** Dopamine drives motivation and reward, oxytocin enhances bonding and genital response, and serotonin exerts inhibitory effects. Dysregulation of these systems underpins hypoarousal in stroke, PTSD, and depression.
3. **Disruption mechanisms:** Lesions in arousal-related regions (e.g., right parietal lobe) impair sensory-genital mapping, while neurovascular events like stroke reduce dopamine/oxytocin signalling, uncoupling desire from physiological readiness.
4. **Rehabilitation:** Emerging therapies include transcranial direct current stimulation (tDCS) to enhance cortical excitability, intranasal oxytocin for emotional bonding, and pelvic floor training to restore genital perfusion.

Conclusion

Sexual arousal is a hierarchically organized process vulnerable to neurophysiological disruption. Understanding its neural substrates enables targeted interventions, such as neuromodulation and neurotransmitter modulation, to address arousal disorders across etiologies. Future research should prioritize biomarkers (e.g., D2 receptor availability) and interdisciplinary frameworks integrating neurology, psychology, and rehabilitation. This knowledge advances personalized care for patients with neurological and non-neurological sexual dysfunction.

EP171

REHABILITATION CHALLENGES IN HYPOTONIC CEREBRAL PALSY: A CASE REPORT ON THE IMPACT OF MULTISYSTEM INVOLVEMENT

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Background and Aims

Cerebral palsy (CP) is a permanent neuromotor disorder caused by static brain injury, resulting in developmental delays and functional impairments. Although primarily affecting motor function, CP is frequently associated with comorbidities including visual impairment and respiratory infections, which can impact quality of life and life expectancy.

Methods

A 6-month-old infant inpatient was diagnosed with hypotonic cerebral palsy, bronchopneumonia, type 2 laryngomalacia, congenital cataract, and malnutrition. On admission, he exhibited respiratory distress marked by diffuse pulmonary secretions, chest wall retractions, and stridor. There is an absence of visual response and eye contact, along with significant motor delays, including the inability to lift his head, roll, or grasp objects.

A 10-day inpatient rehabilitation program was initiated, consisting of chest physical therapy, head and neck control stimulation, joint compression exercises, and vestibular stimulation. Additionally, a left-hand orthotic thumb splint was applied for hand positioning to facilitate prone on elbow position. Upon discharge, a structured home program replicating inpatient rehabilitation program was prescribed to support continued motor and functional development. Cataract surgery is planned once respiratory symptoms have fully resolved.

Results

After two weeks of rehabilitation, progress remained limited due to respiratory instability, visual impairment, and hypotonia, preventing the achievement of rehabilitation targets. The patient demonstrated only slight activation of head control and improved hand positioning with orthotic support.

Conclusion

A comprehensive multidisciplinary approach, involving continuous rehabilitation protocols, is crucial for optimizing functional outcomes.

EP172

OPTIMALIZATION OF VOCATIONAL ACTIVITY AND FUNCTIONAL CAPACITY IN NEGLECTED SYSTEMIC SCLEROSIS PATIENT: A CASE REPORT

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Background and aims

Systemic sclerosis (SSc) is a chronic autoimmune disorder resulting in multisystem involvement. Musculoskeletal impairments, including generalized stiffness and muscle weakness, significantly restrict mobility and vocational activity. Moreover, pulmonary complications, particularly restrictive lung disease, represent a leading cause of morbidity and mortality, further limiting functional capacity. Patients with neglected SSc, who experience prolonged disease progression without consistent medical intervention, are at a greater risk of developing severe functional impairments. Optimizing vocational activity and functional capacity through a comprehensive rehabilitation program is essential for preserving functional independence. The aim is to emphasize a comprehensive rehabilitation to enhance vocational activity, functional capacity, flexibility and muscle strength in neglected SSc patient.

Methods

We present a case of a 36-year-old woman, actively employed as an administrator at a construction site, who was diagnosed with SSc in 2009 and has a history of discontinuing SSc treatment from 2016 to 2021. The patient reported stiffness and weakness in all extremities. In addition, the patient have experienced fatigue while doing activity with pulmonary function moderate restriction (using spirometry) and functional capacity METs 4.4. Limited range of motion discovered on shoulder flexion, abduction, internal rotation; elbow flexion, arm supination, wrist flexion and extension; digiti I-V flexion. Muscle power of the upper extremities was 3/3 and lower extremities was 4/4. Flexibility exercise, weight free strengthening exercise and deep breathing exercise using incentive spirometry were prescribed for two months.

Results

Comprehensive rehabilitation enabling to improve vocational activity, functional capacity, flexibility and muscle strength in neglected SSc patient. Flexibility and strenghtening exercise improved range of motion and muscle power in all extremities. Patient's experience of fatigue while doing activity was decreased, with the improvement in pulmonary function (mild restriction) and functional capacity METs 5.2.

Conclusion

A comprehensive rehabilitation program is essential for vocational activity, functional capacity, flexibility and muscle strength in neglected SSc patient.

EP173

GAIT CHARACTERISTICS AND PARAMETER RELATIONSHIPS IN NORMALLY DEVELOPING PRESCHOOL CHILDREN BASED ON INERTIAL SENSORS

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Background and aims

Preschool children's immature physical development and motor abilities result in distinct gait characteristics compared to adults. With advances in inertial sensor technology, gait detection has become more convenient and efficient. This study aimed to assess gait parameters in healthy preschool children using inertial sensors, analyze parameter relationships, and provide a reference for diagnosing childhood gait disorders and evaluating gait development.

Methods

83 healthy children aged 3-6 years underwent a 2-minute walking test at their self-selected speed using APDM inertial sensors. Data on upper limbs, lower limbs, and ankles were collected. Principal component analysis (PCA) with maximum rotation classified 10 gait parameters, including step frequency, gait speed, step length, gait cycle, double support phase, single support phase, initial contact angle (ICA), toe-off angle (TOA), upper limb swing range, and upper limb swing speed. Analysis of variance explored age and gender relationships.

Results

As age increased, gait cycle, gait speed, step length, single support phase proportion, ICA, TOA, upper limb swing range, and upper limb swing speed increased, while step frequency and double support phase proportion decreased. Females had a faster step frequency, longer double support phase, and larger ICA; males exhibited faster gait speed, longer step length, larger TOA, and greater upper limb swing speed and range. PCA identified three main components: stability was mainly related to gait cycle, step frequency, single support phase, and double support phase, explaining 48.4% of the variance; propulsiveness was mainly related to step length, gait speed, ICA, and TOA, explaining 21.9% of the variance; coordination was mainly related to upper limb swing range and upper limb swing speed, explaining 11.3% of the variance. Additionally, gender significantly affected walking coordination, while age impacted walking propulsiveness.

Conclusion

The database provides a valuable reference for comparing abnormal gait patterns and assessing children's gait development.

EP174

REHABILITATION OF INTENSIVE CARE UNIT ACQUIRED WEAKNESS DUE TO COVID-19, TUBERCULOSIS AND PERIPARTUM CARDIOMYOPATHY

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Background and aims

The two primary infectious disease-related causes of death today are coronavirus disease (COVID-19) and tuberculosis (TB). Individuals with severe COVID-19 who are hospitalized in the intensive care unit (ICU) are at high risk of developing weakness acquired in the ICU, while their treatment may involve extended periods of deep sedation for lung protection and ventilator support. The aim of this case study was to assess the components of a rehabilitation program for patients with Lung TB and COVID-19 with Acute Respiratory Distress Syndrome ARDS) in patient with Intensive Care Unit Acquired Weakness (ICUAW).

Methods

A 40-year-old Indonesian female with peripartum cardiomyopathy and lung tuberculosis was unable to sit and stand after hospitalization in an Intensive Care Unit COVID-19. The patient was on a ventilator for 9 days. The patient was affected by ICUAW. She initially was provided with daily sessions of passive range of motion for 9 days with mild results. After extubation, she was provided daily session rehabilitation program with breathing exercises, chest mobility, nebulization, incentive spirometer and trunk muscle strengthening exercises.

Results

After 5 days of the rehabilitation program, improved Medical Research Council Sum Score (MRC-SS), improved incentive spirometry volume, maximum expiratory flow, and the patient was able to ambulate with a walker without supplementary oxygen.

Conclusion

Early management and selection of rehabilitation programs in the ICU are crucial for preventing complications associated with prolonged immobility and mechanical ventilation to reducing symptomatology and improving the degree of functional independence.

EP175

ELECTRODIAGNOSTIC PROGNOSTICATION OF COMPLETE BILATERAL FOOT DROP SECONDARY TO ICU-ACQUIRED WEAKNESS: A CASE REPORT

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Background

ICU-acquired weakness (ICU-AW) refers to the clinical syndrome of generalized weakness that develops in severely ill patients admitted to the intensive care unit (ICU) in the absence of other plausible causes of nerve or muscle pathology. ICU-AW is a clinical diagnosis based on the temporal onset of generalized, lower motor neuron weakness with sparing of the cranial nerves and a Medical Research Council (MRC) sum score of less than 48 that develops after the onset of critical illness. We demonstrate the utility of electrodiagnostic studies in prognosticating recovery in a boy with bilateral foot drop secondary to ICU-AW following a severe burn injury.

Case Report

Boy Z, an 11-year-old, was admitted to the ICU after sustaining a 53% total body surface area burn and inhalational injury. He required multiple skin grafting procedures and wound dressings under general anesthesia. Once stabilized, he was diagnosed with ICU-AW, with an MRC sum score of 42. He subsequently received inpatient rehabilitation care focusing on medical and nutritional optimization, airway secretion and pain management, contracture prevention, upper limb task-specific training, activities of daily living (ADL) retraining and graded mobilization. Gradual recovery of all muscles was observed, except for the bilateral ankle dorsiflexors and evertors, which remained at MRC grade 0 at 6 months post-injury.

Results

Nerve conduction study (NCS) showed symmetrical sensorimotor bilateral lower limb axonopathy with absent compound muscle action potential (CMAP) in the bilateral common peroneal nerves. Electromyography (EMG) showed chronic denervation-reinnervation changes in the bilateral tibialis anterior muscles. Clinical improvement of the ankle dorsiflexors and evertors was observed during subsequent follow-up at 8 months post-injury.

Conclusion

Electrodiagnostic studies are useful for prognosticating recovery in patients with ICU-AW. Reinnervation changes on EMG may precede the clinical recovery of muscle strength in patients with complete foot drop following common peroneal nerve axonopathy.

EP176

ENHANCING NEUROLOGICAL AND FUNCTIONAL RECOVERY WITH REHABILITATION AFTER DELAYED RESECTION OF SPINAL CORD TUMOUR: A CASE REPORT

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Introduction

Spinal cord meningiomas are benign tumors that cause neurological deficits depending on their location. Early surgical resection is recommended within 12 months of symptom onset to maximize recovery. This case report illustrates a patient who underwent delayed surgical resection but achieved significant neurological and functional recovery following a structured rehabilitation program.

Case report

Ms. A, an 18-year-old female, was diagnosed with a spinal cord tumour in 2019, causing compression from C2 to C5. Initially presenting with bilateral upper limb weakness and numbness, surgery was recommended but not pursued due to parental concerns. Over three years, her condition progressed to tetraplegia with neurogenic bowel and bladder dysfunction. She then underwent C3-C6 laminoplasty and tumor debulking. Post-surgery, she began an inpatient rehabilitation program, achieving independency in bed mobility, standing, and wheelchair transfer. Followed by outpatient rehabilitation program, she walked independently 4 months later. Her SCIM score improved from 47/100 to 100/100.

Discussion

Early resection of spinal cord meningiomas is crucial to avoid irreversible damage due to spinal cord compression. Although our patient underwent surgery four years after symptom onset, she showed remarkable recovery with intensive rehabilitation. This case highlights the critical role of rehabilitation, even with delayed surgical intervention, in optimizing functional outcomes. Postoperative inpatient rehabilitation focused on bed mobility training, postural control exercises, and activities of daily living, with gait training and strengthening exercises during outpatient care leading to independent ambulation.

Conclusion

Despite delayed surgical resection, the combination of surgery and rehabilitation resulted in substantial functional improvements, emphasizing the importance of timely rehabilitation interventions.

EP177

WHEN THE SPINE GOES COLD: TWO RARE CASES OF SPINAL INFARCTION

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Background and aims

Spinal cord infarction is rare, accounting for 1.2% of stroke admissions and 5-8% of acute myelopathies. This case report describes the journey of two young ladies who were diagnosed with spinal cord infarction with two different outcomes and functional levels.

Case Presentation

Case 1: Ms.J, a 20-year-old woman, presented with severe neck pain, bilateral upper limb paresthesia, tetraplegia and respiratory compromise. She was diagnosed with spinal cord infarct extending from C4 to C7. Despite fibrinolysis, she remained at C5 AIS A. Follow-up MRI revealed long lesion progression from bulbomedullary region to T6. The cause of the infarct was unidentified. Three months later, she was admitted for rehabilitation, clinically tetraplegic (C2 AIS B), ventilator dependent, severe neuropathic pain, and neurogenic bladder and bowel. She experienced depressive symptoms, which were co-managed with psychiatry team. After two months, her tracheostomy was successfully decannulated and showed improvement in pain severity. At discharge, her neurological level improved to C4 AIS B, although she remained fully dependent functionally.

Case 2: Ms.S, a 25-year-old woman presented with sudden severe neck pain, followed by desaturation and loss of consciousness, necessitating six minutes of CPR. MRI revealed acute anterior horn spinal cord thrombosis with owl's eye sign and pencil-like T2 hyperintensities from C2 to C5. Investigations for a young stroke were negative. She had difficulty weaning off ventilation, requiring tracheostomy. Other impairments include dysphagia, bilateral upper limb neuropathic pain and weakness. Her cognition remained intact, and motor and sensory function in the lower limbs were preserved. With early rehabilitation, she was able to sit unsupported within two weeks and began ambulating with a forearm rollator by day 25 post-event, before being transferred to another hospital due to logistical issues.

Conclusion

Spinal cord infarction is an uncommon condition, and the functional outcomes vary between individuals depending on the severity of their impairments.

EP178

MORE THAN MEETS THE STUMP: UNMASKING DEEP VEIN THROMBOSIS (DVT) IN A LOWER LIMB AMPUTEE - A CASE REPORT

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Background

Deep vein thrombosis (DVT) is a serious complication in individuals with major lower limb amputations, particularly those with multiple risk factors such as diabetes mellitus (DM), ischaemic heart disease (IHD) and peripheral vascular disease (PVD). This case highlights the importance of timely detection of an extensive DVT in a transtibial amputee using point-of-care ultrasound (POCUS).

Case Presentation

A 56 years old gentleman with history of DM, IHD and multiple amputations due to PVD underwent right transtibial amputation following an infected diabetic foot ulcer with osteomyelitis. His rehabilitation was complicated by phantom limb pain and poor prosthetic use due to improper fit. He defaulted follow up for non-communicable disease (NCD) management and later presented with unilateral swelling in his right lower limb. Physical examination revealed tense swelling up to the mid thigh, tenderness on compression, and non-compressible femoral vein on POCUS. Doppler ultrasound confirmed long-segment DVT from common iliac vein to the distal superficial femoral vein. Anticoagulation therapy was initiated following imaging confirmation.

Discussion

This case highlights the high risk of thromboembolic complications in transtibial amputees with multiple with multiple vascular comorbidities. Factors such as prolonged immobility, poor prosthetic adherence, and poor NCD control contributed to the development of DVT. The early use of POCUS facilitated timely diagnosis, highlighting its importance in rehabilitation settings. Comprehensive post-amputation care, including patient education, adherence to medical therapy, and regular follow-up, is essential in preventing such complications.

Conclusion

DVT remains a significant risk in lower limb amputees with vascular comorbidities. This case highlights the need for proactive screening, adherence to NCD management, and the role of POCUS in facilitating early diagnosis and intervention.

EP179

CERVICAL SPINAL MENINGIOMA IN PREGNANCY: A RARE CAUSE OF ACUTE NEUROLOGICAL DECLINE AND ROLE OF MULTIDISCIPLINARY REHABILITATION CARE

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Background and aims

Meningioma is slow-growing, benign tumour arising from arachnoid cap cells. The majority of meningioma is located intracranially, but only 1.2-12.7% are found in the spinal meninges, with cervical spinal meningiomas accounting for only 14-27% of spinal meningioma cases. In adults, 75- 90% of cases occur in females. Incidence of meningioma in pregnancy is unknown. This case highlights the importance of prompt detection of spinal tumour and the role of rehabilitation in recovery.

Case presentation

A 34-year-old woman at 37 weeks of gestation developed neck pain and progressive limb numbness and weakness. Emergency caesarean section was performed to ensure maternal and fetal safety. Postoperatively, she developed oxygen desaturation and quadriparesis, requiring hemodynamic and ventilator support for deteriorating neurological and respiratory function. Imaging revealed a well-defined homogeneously enhancing mass involving the intradural extramedullary region along the right side of C1 and C2 vertebral body with severe mass effect to the cervical cord. Posterior fossa decompression, craniectomy, C1-C2 laminectomy and tumor excision was done with histopathology confirming a meningothelial meningioma (WHO grade1).

Results

Despite initial severe deficits, she showed good motor and functional recovery after receiving early rehabilitation in the intensive care setting post-surgery.

Conclusion

This case highlights the risk of significant spinal cord compression due to cervical spinal meningioma. Due to its uncommon location, early recognition and timely neurosurgical intervention are essential to prevent further debilitating complications. Rehabilitation is crucial in optimizing recovery, particularly in restoring motor and functional capacities. A multidisciplinary approach is essential to achieving optimal outcomes.

EP180

A CASE REPORT ON CAPILLARY LEAK SYNDROME: INSIGHTS AND MANAGEMENT FROM A THERAPIST'S PERSPECTIVE

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Introduction

Capillary Leak Syndrome (CLS) is a rare condition marked by fluid leakage from the intravascular to the extravascular space, resulting in hypovolemia, edema, and hypoperfusion. This disorder often leads to multi-organ failure, requiring immediate intervention to stabilize fluid balance and organ function.

Aim

This report aims to highlight the rehabilitation process that enabled a 9-year-old patient with CLS to regain functional independence in activities of daily living (ADLs) and ambulation.

Case Presentation

Written consent was obtained from the parents. A 9-year-old child with a travel history came with a presentation that began with a prodrome of myalgia, maculopapular rash, and flu-like symptoms followed by the rapid onset of shock, with multi-organ failure, dyselectrolytemia, AKI, thrombocytopenia, and subcutaneous edema all over the limbs and on the face. The child exhibited a Lower Motor Neuron picture with prominent multisystem involvement, including bulbar muscle weakness with difficulty in deglutition and phonation. Notable weakness in all four limbs Lt > Rt. Reduced muscle tone with diminished reflexes. Respiratory issues and fluctuating blood pressure were observed, and the child was completely dependent on care.

Management

After achieving hemodynamic stability with medical management, chest physiotherapy was started to maintain SPO₂ and cardiac vital signs. Graded exercises managed bed mobility, bed sore prevention, leg oedema, chest clearance, and hypertension. The patient progressed from ventilation to normal breathing, with limb physiotherapy enhancing muscle strength in the acute stage. He later advanced from complete dependence to independence, continuing rehabilitation on an OPD basis.

Discussion

Despite being dependent on ventilatory support along with multiorgan failure, the patient became functionally independent within three months i.e, Oct 2024 to Jan 2025. This case underscores the importance of rehabilitation in maintaining pulmonary and cardiac health while addressing the complexities of CLS. A multidisciplinary approach was key to the patient's successful recovery.

EP181

A CASE OF POST-STROKE MYORHYTHMIA: THE TREMBLING TRIANGLE

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Introduction

Myorhythmia is a rare movement disorder characterized by slow, rhythmic muscle contractions, often associated with cerebellar or brainstem lesions, in post-stroke patients. While post-stroke movement disorders like dystonia and tremors are well-documented, myorhythmia remains uncommon but crucial to recognize for accurate diagnosis and effective rehabilitation strategies.

Case presentation

A case of a 77-year-old woman with underlying diabetes mellitus, hypertension, atrial fibrillation, and generalized anxiety disorder, who was diagnosed with bilateral cerebellar hemorrhagic stroke. Two weeks post event, she developed involuntary movements involving the bilateral upper limbs, bilateral lower limbs, face, lips, and tongue. The movements were asynchronous and could be voluntarily suppressed upon instruction. No other focal neurological deficits were noted. A non-contrast CT brain showed bilateral cerebellar hemorrhages, predominantly affecting structures involved in movement coordination, including the superior cerebellar peduncles. No further investigations were performed, but seizures and extrapyramidal syndromes (EPS) were considered as differential diagnoses. Given the location of the hemorrhage, disruption of the Guillain-Mollaret Triangle was suspected, leading to myorhythmia, a movement disorder associated with cerebellar pathology.

Discussion

The Guillain-Mollaret Triangle is a neural circuit connecting the dentate nucleus, red nucleus, and inferior olivary nucleus, playing a crucial role in coordinating voluntary movements and fine motor control. Damage to this pathway can result in abnormal involuntary movements, like myorhythmia, which can significantly impact motor function and daily activities. To address these complications, the rehabilitation intervention employed a multidisciplinary approach, integrating neurologists and physiatrists to develop individualized treatment plans. This included relaxation techniques to manage involuntary movements, caregiver training to enhance patient support, and environmental modifications to optimize functional independence and safety.

Conclusion

Myorhythmia is a rare and often overlooked post-stroke movement disorder, making early recognition crucial for accurate diagnosis and effective rehabilitation. Identifying its association with cerebellar pathology can guide targeted rehabilitation strategies, ultimately improving motor recovery and functional outcomes.

EP182

PROGRESSIVE CACHEXIA AND PATHOLOGIC SPINAL FRACTURE IN EARLY GASTRIC CANCER: A CASE REPORT

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Background and aims

Cancer cachexia is a multifactorial syndrome associated with weight loss, muscle wasting, and functional impairment, often leading to pathologic fractures. We present a case of progressive cancer cachexia with osteoporosis and a pathologic spinal fracture in a patient with early gastric cancer (EGC) and *Mycobacterium kansasii* infection.

Methods

A 66-year-old man with a 40-year smoking history presented in August 2024 with epigastric pain and weight loss. Endoscopy revealed gastric ulcer findings suggestive of EGC, and he was diagnosed with CLO (+) EGC type IIB in September 2024. A lung cavitary lesion was identified and confirmed as *Mycobacterium kansasii*. He underwent Roux-en-Y gastrojejunostomy (T1b, MB, lesser curvature, type IIB, 4×4 cm) in December 2024.

In February 2025, he experienced acute low back pain while bending forward. His weight had dropped from 54 kg to 40 kg (26% loss). Lumbar CT revealed an L1 fracture without metastasis. MRI showed a subacute burst fracture, PET scan revealed hypermetabolic activity in the L1 spine and lungs, and BMD confirmed severe osteoporosis (L1: -5.0, L2: -5.1, femur neck: -2.7). Functional assessments indicated muscle wasting and mobility impairment.

Results

The patient was diagnosed with progressive cancer cachexia and osteoporosis with a pathologic fracture. He showed improvement with high-calorie parenteral nutrition, osteoporosis treatment (Evenity), spinal bracing, and rehabilitation therapy.

Conclusion

This case highlights the impact of cancer cachexia on osteoporosis and fracture risk in gastric cancer patients. Early nutritional and bone health interventions are crucial for improving outcomes.

EP183

THE PHYSIATRIST'S ROLE IN THE FIRST RECORDED CASE OF KOOLEN-DE VRIES SYNDROME IN INDONESIA: A CASE REPORT

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Background and aims

Koolen-de Vries Syndrome (KdVS) is a rare genetic disorder causing developmental delay and intellectual disability, often underdiagnosed in Indonesia. Physiatrists play a key role in its multidisciplinary management. This case highlights the need for increased awareness, genetic screening, and rehabilitation strategies to improve outcomes for individuals with KdVS and other rare genetic disorders.

Case descriptions

The child first attended rehabilitation at 18 months, delayed due to recurrent hospitalizations and life-threatening conditions. He had a tracheostomy for severe laryngomalacia, requiring continuous care and chest physiotherapy. At baseline, he exhibited global developmental delays (GMFM-88: 18.56%), ankle laxity, poor fine motor skills, and sensory challenges. He struggled with self-feeding, oral-motor function, and speech due to prolonged tube feeding and tracheostomy. Despite not speaking or following commands, he responded to his name, engaged socially, and demonstrated emotional awareness. Therapy focused on mobility, motor skills, sensory processing, swallowing, and communication to enhance participation in daily activities.

Interventions

The physical therapy incorporated Goal directed training (GDT), Neurodevelopmental Treatment (NDT), Proprioceptive Neuromuscular Facilitation (PNF), and sensory stimulation to enhance body awareness, strength and coordination. Corrective shoes were introduced to enhance ankle foot stability and alignment. Occupational therapy used play-based interventions and sensory regulation techniques. Speech therapy included oral-motor exercises, verbal skills and structured mealtime routines to improve feeding, speech and communication.

Outcomes

The child's GMFM-88 score improved from 18.56% to 75.38%, achieving independence in sitting, crawling, kneeling, standing, and walking, though balance still needs improvement. Progress was seen in grasping, sensory regulation, babbling, and command-following, but challenges remain in running, jumping, oral-motor skills, speaking, self-feeding, and food acceptance.

Conclusion

Physiatrists should provide personalized rehabilitation for KdVS, addressing medical and developmental challenges. Early intervention, individualized therapy, and ongoing research are vital for improving outcomes, ensuring children with rare disorders receive comprehensive care, support, and a better quality of life.

EP184

HYPONATRAEMIA IN SPINAL CORD INJURY (SCI) PATIENTS: A HIDDEN BARRIER TO REHABILITATION?

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Background and aims

Hyponatraemia is a frequent yet underrecognised complication in spinal cord injury (SCI), with a reported prevalence of 25–80%¹. This study explores its prevalence, underlying causes, management, and impact on rehabilitation outcomes in SCI patients undergoing intensive rehabilitation.

Methods

A retrospective analysis of 67 adult SCI patients admitted to the Rehabilitation Ward, Hospital Queen Elizabeth, from July 2023 to July 2024 was conducted. Hyponatraemia was defined as serum sodium <135 mmol/L. Patient demographics, injury classification, laboratory results, management approaches, and rehabilitation outcomes were reviewed.

Results

Three patients (4.5%) developed hyponatraemia (Na 126.4 ± 2.7 mmol/L), with a higher incidence in acute-phase SCI (14.3%). Hyponatremia occurred in 7.7% of cervical injury, 3.33% of thoracic injury, and nil in lumbar and sacral injury. The three hyponatraemia cases involved injury level C7 AIS A, T1 AIS A and C5 AIS C.

Contributing factors included dehydration, low solute intake, malnutrition, urinary infections, and Syndrome of Inappropriate Antidiuretic Hormone Secretion (SIADH). All cases presented with severe functional impairment (Spinal Cord Independence Measure <20) on admission and multiple comorbidities, including pressure injuries, anaemia, and hospital-acquired infections. Hyponatraemia was significantly associated with increased length of stay ($p < 0.001$), pressure injuries ($p = 0.0015$), autonomic dysreflexia ($p = 0.028$), orthostatic hypotension ($p < 0.000001$), anaemia ($p = 0.00032$), and hospital-acquired infections ($p = 0.00004$), but not with SCIM score improvement ($p = 0.113$).

Conclusion

Hyponatraemia is a hidden but significant barrier to rehabilitation in SCI patients, contributing to medical complications, prolonged hospitalization and potentially delaying rehabilitation progress. Proactive screening, early intervention, and comprehensive electrolyte management are crucial to mitigating its impact and optimizing rehabilitation outcomes.

EP185

ULTRASOUND-GUIDED GLENOHUMERAL JOINT INJECTION FOR POST-CARDIAC SURGERY FROZEN SHOULDER: A CASE REPORT

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Background and Aims

Patients undergoing cardiac surgery often experience fear of movement due to concerns about wound dehiscence, postoperative pain, and the presence of intravenous or arterial lines. These factors increase the risk of immobilization-related musculoskeletal pain, such as frozen shoulder, which may inhibit cardiopulmonary rehabilitation aimed at restoring cardiopulmonary function. This study evaluates the efficacy of ultrasound-guided hydrodilatation with triamcinolone acetonide via the posterior glenohumeral recess in improving shoulder function and reducing pain in patients with frozen shoulder.

Methods

A 52-year-old female, two months post-mitral valve replacement (MVR), presented with persistent shoulder pain and limited range of motion (ROM). The pain did not improve despite two weeks of conservative treatment for shoulder pain. Physical examination revealed restricted passive range of motion (PROM) with 90° flexion, 30° abduction, 30° extension, and 100° external rotation. Pain was present on active and passive movements, with anterior, superior, and posterior shoulder tenderness and a Numeric Rating Scale (NRS) score of 5. The patient underwent ultrasound-guided hydrodilatation with a total of 14 mL of fluid: 4 mL triamcinolone acetonide (40 mg), 2 mL 2% lidocaine hydrochloride, and 8 mL normal saline. Ultrasound findings revealed thickening of the superior glenohumeral ligament, supraspinatus tendosynovitis, and biceps tendon effusion.

Results

Following the injection, the injectate dispersed within the posterior glenohumeral joint, leading to progressive capsular expansion, confirming a successful procedure. Post-injection assessment showed a decrease in NRS score to 2, with improvements in shoulder flexion to 140°, abduction to 120°, external rotation to 140°, and extension to 50°.

Conclusion

Ultrasound-guided hydrodilatation effectively reduced pain and improved joint mobility in a patient with frozen shoulder post-cardiac surgery. Despite conservative treatment, pain intervention may enhance recovery by facilitating early return to cardiopulmonary rehabilitation without pain interruption, as it rapidly reduces pain and restores joint function.

EP186

REHABILITATION CHALLENGES IN A YOUNG AMPUTEE WITH STROKE AND MYOCARDIAL INFARCTION: A MISSED OPPORTUNITY TO PREVENT THE PREVENTABLE

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Background and aims

Non-communicable diseases are rising globally, posing significant health burdens. Complications affecting multiple vascular beds pose significant challenges to rehabilitation process, particularly in young patient in their productive age group. This case report highlights the rehabilitation journey of a 32-year-old woman with young-onset hypertension, diabetes, dyslipidemia, and obesity, complicated by right hemiparesis due to ischemic stroke, myocardial infarction, and right transtibial amputation due to acute limb ischemia.

Methods

Comprehensive multidisciplinary rehabilitation approach was provided in this public rehabilitation center during the inpatient pre-prosthetic training which includes stump and wound care, physical and cardiac rehabilitation, ADL training, cognitive and psycho-social interventions.

Results

Despite current significant physical and social challenges, the patient demonstrated gradual improvement with partial independence in transfers and pADLs. Due to poor social support, and previous nonadherence, planning her community reintegration and social welfare placement were initiated to ensure long-term support. Patient will also be transferred to SOCSO Rehabilitation Centre to continue long term rehab and achieve overall rehabilitation goal which include full prosthetic ambulation. The case also raises suspicion of undiagnosed familial hyperlipidemia, which may have contributed to the early onset of major cardiovascular complications and premature death in family.

Conclusion

This case highlights the critical need for strengthening community-based rehabilitation services in Malaysia. Patients originate from the community and ultimately return to the community -making community the central pillar in their journey of recovery. Early identification of high-risk patients, patient retention in the healthcare system, and timely initiation of long-term rehabilitation apart from preventive and curative effort are essential. A well-structured community rehabilitation service acts as the missing link in the continuum of care, bridging the gap between hospital-based rehabilitation and reintegration into society. This case calls for greater advocacy and investment in community rehabilitation as part of a holistic health ecosystem, aligning with global movements towards "Rehabilitation 2030" and universal access to rehabilitation care.

EP187

THE EFFECT OF REHABILITATION PROGRAM ON QUALITY OF LIFE, FUNCTIONAL CAPACITY, AND PAIN LEVELS IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS: A CASE REPORT

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Background and aims

Musculoskeletal manifestations of Systemic Lupus Erythematosus (SLE) typically affect joints, muscles, bones, and supporting structures, causing pain, fatigue, decreased productivity, sleep disorder and anxiety. This case report evaluates the effect of a rehabilitation program on a patient with musculoskeletal involvement from SLE.

Methods

This study evaluated the quality of life (QoL), functional capacity, and pain levels of a 42-yo female with SLE, presenting with fatigue, hip, and back pain (numeric rating scale (NRS) 6). Physical examination, no abnormalities. were found in the heart, skin or nerves. The rehabilitation program included physical modality to decrease pain (IRR and TENS), exercises (combination of flexibility, endurance and strengthening, 45-60 minutes/session, 2x/week), proper body mechanical and joint protection technique, and counseling by psychologist. QoL was assessed using the LupusQOL questionnaire, functional capacity via 6-minutes walking test (6-MWT). Outcomes were compared before and after the intervention.

Results

After 16 weeks of rehabilitation program, Lupus QoL and physical health, as well as emotional health were improved, from 47% to 75% and 43% to 73%, respectively. 6-MWT showed a rise in distance from 240 m to 336 m and VO2max from 6.32 to 8.21 mL/(kg·min). Pain levels was decrease to NRS 3.

Conclusion

Comprehensive SLE rehabilitation program result in improvement of QOL, fuctional capacity and decrease pain.

EP188

COACHING PREVENTION PROGRAM BY A PHYSIOTHERAPIST REDUCED INCIDENCE OF ACL INJURY IN A FEMALE HIGH- SCHOOL BASKETBALL TEAM

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Background and aims

Numerous prevention programs of anterior cruciate ligament (ACL) injury successfully reduced the incidence of ACL injury in study-based settings. In contrast, large number of ACL surgery has still been reported from clinical practices. One of the causes of this discrepancy is a lack of coaching from an instructor having expertise and skills for ACL injury prevention, especially in non-professional players. The purpose of this study is to investigate whether coaching the ACL injury prevention program (AIPP) by a physiotherapist reduces the incidence of ACL injury in a female high-school basketball team.

Methods

An elite female high-school team for basketball involved in this study. A physiotherapist experienced in treating ACL injury visited the team practice every 2 weeks and coached the AIPP. The AIPP consisted of instruction of safe posture to avoid ACL injury and hip-focused training, which was implemented as a warm-up exercise at least thrice a week. The training items were selected and personalized for each participant. The participants were examined in 3D kinematics of trunk and lower leg during jump-landing every 6 months. The incidence of ACL injury was investigated for 4 years before and after the beginning of AIPP.

Results

The hip and knee joint flexion angle at initial contact was 47 degrees and 34 degrees 18 months after the beginning of AIPP, and significantly larger compared to 36 degrees and 18 degrees before the AIPP, respectively ($p < 0.05$). The incidence of ACL injury was significantly reduced from 5.2% (6 injuries / 116 players) for 4 years before the AIPP to 0.8% (1 injury / 129 players) for 4 years after the AIPP.

Conclusion

The AIPP coached by an experienced physiotherapist successfully reduced the incidence of ACL injury in the female high-school basketball team. The personalized training items might help the participants to keep training motivation and adherence, and consequently enhance the effect of AIPP.

EP189

UNDERSTANDING RUNNING-RELATED INJURIES IN THE INDIAN POPULATION: A CROSS-SECTIONAL STUDY

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Background and aims

Running is a popular recreational activity, enjoyed by several people around the world. It has many health benefits, and also plays an important role in the maintenance of a healthy lifestyle. However, running is also associated with running-related injuries, with the overall incidence and prevalence being 40.2% and 44.6% respectively. Furthermore, the prevalence proportion of running-related injuries has never been investigated in the Indian population. Therefore, this study was the first to investigate the prevalence proportion of running-related injuries in the Indian population.

Methods

A cross-sectional study was conducted among 270 runners presenting to the Physical Medicine & Rehabilitation OPD with a running-related injury. After relevant history taking, physical examination, and radiological investigations, the running-related injuries were diagnosed.

Results

25 types of running-related injuries were identified in 270 participants. A total of 354 injuries were diagnosed. Medial tibial stress syndrome had the highest prevalence proportion (17.80%) followed by patellar tendinopathy and patellofemoral pain syndrome each having a prevalence proportion of 7.63%, followed by ankle sprain(6.78%), fibular stress injury(5.93%), hamstring muscle injury(5.93%), hamstring tendinopathy(5.93%), iliotibial band syndrome(5.93%), plantar fasciitis(5.93%), low back pain (5.08%), Achilles tendinopathy(3.39%), anterior cruciate ligament tear(2.54%), gastrocnemius muscle injury (2.54%), hip adductor tendinopathy(2.54%), gastrocnemius tendinopathy(1.69%), hip adductor muscle injury(1.69%), navicular stress syndrome(1.69%), posterior ankle impingement(1.69%), quadriceps strain(1.69%), sinus tarsi syndrome(1.69%), greater trochanteric bursitis(0.85%), metatarsalgia(0.85%), osteochondral lesion of talus(0.85%), peroneus brevis muscle injury(0.85%), and stress reaction of fifth metatarsal(0.85%).

Conclusion

This study investigates the prevalence proportion of running-related injuries in the Indian population, which has not been previously examined. An analysis of this data can facilitate the development of gait retraining programs tailored to address specific running-related injuries.

EP190

OUTCOME AFTER POSTERIOR CRUCIATE LIGAMENT (PCL) RECONSTRUCTION WITH DYNAMIC PCL BRACE

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Background and aims

Current post operative rehabilitation program after a Posterior Cruciate Ligament (PCL) reconstruction surgery focused on improving knee laxity with the aid of post operative rehabilitative knee orthosis. We reported the outcome of PCL reconstruction surgery patients with the use of Dynamic PCL brace at our centre.

Methods

Patients who underwent PCL reconstruction surgery between June 2022 and Sept 2024 were included. All patients underwent standardized post operative rehabilitation program which include application of Dynamic PCL brace at post operative 2 weeks until post operative 12 weeks. Patients were followed up in the clinic until 1 year after surgery and any adverse outcome were recorded.

Results

A total of eleven patients underwent PCL reconstruction surgery with majority of them involved multi ligament injuries. The main cause of injury was trauma to the knee from motor vehicle accident. Two patients recorded adverse outcome after the surgery despite adhering to the standardized rehabilitation program.

Characteristic	N
Age	
20-35	8
36-50	3
Gender	
Male	9
Female	2
Mechanism of injury	
Motor vehicle accident	9
Sports injury	2
Multi ligament involvement	
Yes	9
No	2
Adverse outcome after surgery	
PCL graft laxity	1
Knee Arthrofibrosis	1
No	9

Conclusion

The use of Dynamic PCL brace as part of the rehabilitation program after PCL reconstruction surgery associated with favourable clinical outcome.

EP191

HYDRODISSECTION OF ULNAR NERVE: EFFECTIVE TREATMENT IN BILATERAL ULNAR NERVES ENTRAPMENT

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Background and aims

Ulnar nerve entrapment at the cubital fossa is the second most common upper limb entrapment neuropathy that can result in debilitating symptoms that significantly affect functionality and quality of life. The incidence of ulnar nerve entrapment was reported at 20-30/100000 person-year, with less than 10% of those diagnosed with ulnar nerve entrapment having bilateral involvement. Various risk factors have been discussed in the literature, including male gender, age, smoking, obesity, and work-related factors especially involving 'holding a tool in position'. Treatment of ulnar nerve entrapment varies from conservative management to minimally invasive and surgical intervention.

Methods

67-year-old orthopaedic surgeon, presented initially with numbness, tingling sensation and pain over left upper limb at ulnar nerve distribution. The pain significantly disturbed his sleep and affected his work. On examination, prehension tests were normal, but Tinel's sign was positive over the cubital fossa. Ultrasound study done over left upper limb showed increased size of ulnar nerve at the cubital fossa. Hydrodissection of left ulnar nerve with 10cc of Dextrose 5% and 1cc of lignocaine 2% was done.

Results

Post injection, pain improved from NRS 8 to 0. However, 1 year later he presented with similar symptoms over the right upper limb, significantly disturbing his work and quality of life. There was no recurrence of symptoms on his left upper limb. Hydrodissection of the right ulnar nerve was done and his symptoms significantly improved. Besides male gender and age, he did not have other significant non-occupational risk factors. However, his job as a surgeon which involves manipulation of tools may be a risk factor contributing to bilateral ulnar nerves entrapment.

Conclusion

This case demonstrates the effectiveness of hydrodissection in ulnar nerve entrapment, with significant pain relieve and favourable long-term outcome. Hydrodissection offers an alternative to more invasive surgical procedures for patients with persistent symptoms despite conservative management.

EP192

EFFECTS OF ROBOTIC ASSISTED LOWER LIMB REHABILITATION IN MOTOR NEURON DISEASE: A PILOT STUDY

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Background and aims

Motor neuron diseases (MND) are progressive neurodegenerative disorders affecting upper and lower motor neurons, leading to mobility decline. Amyotrophic lateral sclerosis (ALS) is the most common type. While physical rehabilitation may benefit MND patients, research on lower limb robotic rehabilitation remains limited. Our centre is the first in Malaysia to implement this approach using the ExoMotus TM M4, a powered exoskeleton with a balancing support frame for gait training. This study aims to assess physical capacities and establish benchmarks for future exoskeleton use in MND patients.

Methods

This cross-sectional, quasi-experimental study involved randomly selected healthy individuals and MND patients at Universiti Malaya Medical Centre. Participants underwent a single-session robotic protocol. Primary outcomes included the 6-Minute Walk Test, 10-Meter Walk Test (10MWT), Heart Rate (HR), sit-to-stand test, and Rate of Perceived Exertion (RPE), analysed using Cohen's d. The secondary outcome assessed patient acceptance via a validated questionnaire.

Results

The study involved 10 healthy individuals and 5 ALS patients, 65% of whom were female. The ALS group had a mean age of 54 ± 11.4 years and an average disease duration of 17.6 ± 11.6 months. Exoskeletal-robotic training improved gait parameters. The 10MWT showed a significant increase in stride length from 0.53 ± 0.14 m/step to 0.63 ± 0.08 m/step (Cohen's d = 1.31). Mean walking distance increased from 230.8 ± 111.2 m to 234.6 ± 84.37 m. Resting HR remained stable in controls but increased in ALS patients, indicating greater exertion. A drop in HR at minute five suggested possible chronotropic incompetence. Participants found the robotic-training beneficial and easy to follow, with no reported adverse effects. These findings support the safety and feasibility of exoskeleton-assisted rehabilitation in ALS.

Conclusion

Exoskeletal-robotic training may help maintain or improve walking in MND patients, but individualized protocols with cardiovascular monitoring are essential.

EP193

HYDRODISSECTION OF A “BACK MOUSE” TO ALLEVIATE MEDIAL BRANCH ENTRAPMENT OF THE SUPERIOR CLUNEAL NERVE

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Background and aims

Episacral lipomas, or “back mice,” are underdiagnosed fatty nodules often linked to chronic low back pain, particularly in females. Entrapment of the superior cluneal nerves, which pass through the fascial layer near the iliac crest, can result in persistent lower back pain that may radiate to the buttocks or upper thighs. This pain is exacerbated by activities like lumbar extension, bending, or prolonged walking, limiting daily mobility.

Methods

This case study discusses a 60-year-old man presenting at a chronic pain clinic with persistent lower back pain radiating to the buttocks for two years. Pharmacological treatments and other modalities had little effect. The pain, neuropathic in nature, was described as a sharp pain over the posterior superior iliac spine (PSIS) extending to the gluteal region and upper thigh. Examination revealed a well-circumscribed, rubbery swelling in the right episacral area, causing reproducible high-intensity pain, with no other tenderness along the iliac spine. Ultrasound identified a 2 cm² lipoma above the PSIS. The patient reported a pain score of 9/10 at rest, particularly when lying down. Hydrodissection with 20 cc D5% buffered with sodium bicarbonate was performed beneath the lipoma to achieve adhesiolysis via volume and velocity.

Results

The patient's pain score reduced to 5/10 following the injection. At a follow-up one week later, he reported less pain when lying on his back, which improved his sleep quality at night. He was also able to sit for extended periods. The patient was subsequently referred to general surgery for further evaluation.

Conclusion

Hydrodissection for the treatment of “back mouse”, though a novel approach, shows promise in alleviating pseudoradicular pain by relieving superior cluneal nerve entrapment. However, its long-term effectiveness remains uncertain and requires further investigation through comparative studies, particularly alongside steroidal anesthetic injections and surgical resections, which outcome may include additional scarring.

EP194

PAEDIATRIC PALLIATIVE REHABILITATION: A STEP BEYOND CONVENTIONAL PAEDIATRIC PALLIATIVE CARE

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Background and aims

Neuroblastoma is the most common extracranial solid malignancy in childhood. In USA, the 10-year overall survival rate for stage I to III neuroblastoma patients were approximately 91%, while for stage IV cases was 38%. Thus, paediatric palliative care should not only focus on medical treatment but also to facilitate achievement of functional independence and improve quality of life.

Methods

HAA, diagnosed with stage IV undifferentiated neuroblastoma with resistant disease at 6 years old, presented with complete paraplegia, single functional kidney, neurogenic bladder and bowel, and bilateral diaphragmatic paralysis. At 8 years old, he was referred by paediatric palliative team for psychosocial exercises and activities since he was house-bound and fully dependent to his caregiver for mobility and activities of daily living (ADLs). He wished to go to school but hindered because of his dependency. To explore his potential and ability, he underwent intensive multidisciplinary inpatient rehabilitation program in Hospital Rehabilitasi Cheras.

Results

At the end of the 6-week intensive multidisciplinary inpatient rehabilitation program, focusing on improving his physical function and personal ADLs, HAA improved his sitting balance; able to perform his personal ADLs in a seated position independently, including performing clean intermittent self-catheterization. With the achievement from the inpatient rehabilitation stay, he was more independent at home and has returned to school. HAA was given a motorised wheelchair to facilitate his mobility in school. He underwent another 4-week inpatient rehabilitation program to improve his transfer and usage of his new wheelchair.

Conclusion

Paediatric palliative rehabilitation is beyond the conventional palliative care which mainly focus on the end-of-life care. It focuses on patient's functional ability and potentials and the holistic needs of patients and their families. It enables patients to achieve the highest possible level of function and independence, enhance their quality of life by integrating inputs from multidisciplinary rehabilitation team and interdisciplinary support.

EP195

REHABILITATION OUTCOMES IN GUILLAIN BARRÉ SYNDROME: A DESCRIPTIVE SIX-YEAR ANALYSIS OF REHABILITATION IMPACT INDICES (RII) IN A NATIONAL REHABILITATION CENTRE

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Background and aims

Guillain-Barré Syndrome (GBS) is an acute immune-mediated neuropathy that results in functional impairments¹. Rehabilitation Impact Indices (RIIs) are composite rehabilitation outcomes measuring the rate of improvement post-rehabilitation². This study aims to evaluate the impact of inpatient rehabilitation on GBS patients.

Methods

This descriptive cohort study analyzed 27 GBS patients who underwent inpatient rehabilitation at Hospital Rehabilitasi Cheras (HRC) from 2018 to 2023. Data collected included age, gender, length of stay (LOS), and Modified Barthel Index (MBI) scores at admission and discharge. RIIs calculated include Absolute Functional Gain (AFG), Rehabilitation Efficiency (REy), and Rehabilitation Effectiveness (REs). Statistical analyses included paired t-tests and Wilcoxon signed-rank tests to assess functional gains, Spearman's rank correlation used to examine associations between patient characteristics and rehabilitation indices, and multiple regression models to identify predictors of rehabilitation indices.

Results

The mean age was 41.6 years, and LOS averaged 33.7 days. Patients demonstrated significant functional improvement, with MBI scores increasing from a mean of 45.8 at admission to 71.3 at discharge ($p < 0.001$). The average AFG was 25.5 points, with a mean REy of 0.83 and REs of 52.1%.

Correlation analysis revealed that gender was strongly negatively correlated with all RIIs (AFG: $r = -0.40$, $p = 0.04$; Efficiency: $r = -0.41$, $p = 0.05$; Effectiveness: $r = -0.47$, $p = 0.009$), indicating that males achieved greater rehabilitation indices. Age showed no significant correlations with rehabilitation indices. Regression analyses showed that gender was a significant predictor of rehabilitation efficiency ($p = 0.03$) and effectiveness ($p = 0.006$), while LOS negatively impacted efficiency but did not significantly predict AFG.

Conclusion

The notable improvements in RIIs observed amongst GBS patients post-intensive rehabilitation. Male factor as a predictor for rehabilitation effectiveness and efficiency in GBS.

EP196

THE PAIN UNPLUGGED: TACKLING CHRONIC NEUROPATHIC PAIN IN SPINAL CORD INJURY

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Background and aims

Chronic neuropathic pain (CNP) is a prevalent and debilitating consequence of spinal cord injury (SCI), affecting SCI individuals and impacting their quality of life (QOL). Despite its widespread occurrence, chronic pain management in SCI remains challenging due to the limited efficacy and side effects of pharmacological treatments making long-term management difficult. The burden of untreated or poorly managed CNP contributes to depression, anxiety, and a decrease in the overall QOL.

Methods

This is a retrospective case report. A 68 years old gentleman with multiple comorbidities was presented with sudden onset of right lower limb neuropathic pain in February 2024. Imaging done showed lumbar degenerative disc disease and underwent surgery. Despite surgery and medications such as C.Tramal 50mg ON, T.Paracetamol 500mg/Codene phosphate 8mg II/II OD, C.Pregabalin 75mg BD and C.Celebrex 200mg OD, his neuropathic pain persisted prompting admission to spinal ward Hospital Rehabilitasi Cheras (HRC) for pain management. His medications were discontinued upon admission and individualized medications were restarted leading to an improvement in patient's symptoms coupled with physical modalities and hydrotherapy.

Results

Polypharmacy is a common challenge in elderly patients with multiple comorbidities, as it may lead to drug interactions and worsening of symptoms. The decision to halt all medications was aimed at reducing the burden of polypharmacy and selecting appropriate drugs for optimal pain control. A tailored approach to medication management was initiated, focusing on the most effective treatments for his CNP. Additionally, the use of non-pharmacological treatments should not be underestimated, as they can play a vital role in improving pain management and functional recovery.

Conclusion

This case highlights the importance of a multidisciplinary approach in managing patients with CNP. The combination of appropriate medication management, physical therapy, and hydrotherapy can lead to improvements in pain control and functional outcomes. Future strategies should focus on integrated pain management and personalized care based on individual needs and conditions.

EP197

SILENT DEFICIENCY: HYPOVITAMINOSIS D IN SPINAL PATHOLOGIES

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Background and aims

Vitamin D, commonly referred to as ‘sunshine vitamin’ is vital in maintaining robust health through its involvement in various biochemical processes. It supports bone health and is vital for immune system regulation, metabolism, and the maintenance of brain, heart, and skin health. It binds to Vitamin D receptors (VDRs) throughout the body, modulating immune responses, reducing inflammation, alleviating pain, and promoting tissue healing.

In spinal pathologies, hypovitaminosis D is closely associated with conditions such as osteoporosis, degenerative disc disease, chronic back pain, and an increased risk of fractures. Additionally, its deficiency can impact neural recovery whilst contributing to neuropathic pain, muscle weakness, mood and overall mobility and function. These factors collectively impair the patient’s rehabilitation outcomes and overall quality of life.

Methods

This single-center retrospective study investigated hypovitaminosis D in spinal pathology within the Rehabilitation Medicine Unit, Department of Orthopedic and Traumatology, at Hospital Canselor Tuanku Muhriz. The study period spanned from 2020 to 2024, encompassing demographic data, underlying disorders, neurological levels, vitamin D levels, and other pertinent biochemical markers to evaluate their impact on patient outcomes.

Results

Among the 95 persons tested for vitamin D levels, 58.94% had hypovitaminosis D of which 69.64% were non-traumatic spinal pathologies. Demographically, 57.14% were males of Malay ethnicity (73.21%) with their average hospital stay being 23.73 days. Clinically there was more cervical involvement (35.84%) and 51.78% underwent major surgeries. Higher incidences of complications such as pressure injury (21.42%), UTI (14.28%) as well as comorbidities (60.71%) such as diabetes mellitus, dyslipidemia, chronic kidney disease, or ischemic heart disease were noted in the vitamin D deficient group.

Conclusion

Hypovitaminosis D seems to be a significant problem among those with spinal pathologies especially with preexisting comorbidities. Emerging evidence indicates the need to adequately manage vitamin D deficiencies to prevent complications and support recovery.

EP198

FUNCTIONAL RECOVERY IN GERIATRIC BELOW-KNEE AMPUTATION PATIENT WITH MULTIPLE COMORBIDITIES AND COMPLICATIONS: A COMPREHENSIVE REHABILITATION APPROACH

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Background and aims

Lower limb amputation in elderly diabetic patients is often associated with long-standing diabetes and complications such as peripheral vascular disease and neuropathy. These conditions result in reduced functional capacity, impaired mobility, decreased cardiovascular endurance, and increased fall risk. This case report explores the rehabilitation of a geriatric patient with multiple comorbidities following unilateral below-knee amputation (BKA). The aim is to present rehabilitation strategies and outcomes, particularly when prosthetic rehabilitation is delayed.

Methods

A 62-year-old female with 17 years of diabetes, atrial fibrillation, hypertension, bilateral retinopathy, and ischemic stroke, underwent left toe amputations twice, followed by a standard left BKA. She was wheelchair-bound, unable to stand, classified as KO on Medicare K-level, moderate to severe dependence, severe frailty, possible depression, moderate risk for pressure ulcers, and high risk of sarcopenia and falls. Rehabilitation, initiated 4 weeks post-BKA, included exercises aimed to manage comorbid particularly diabetes and hypertension, balance exercises with auditory cueing, and environmental modifications. A multidisciplinary team, including various specialists and family, was involved.

Results

No significant improvement was observed during the first two months of follow-up, primarily due to severe visual impairment and uncontrolled comorbidities. Emphasis was placed on the home exercise program and patient education. By the 5th-month follow-up, following eye surgery and well-controlled comorbidities, patient exhibited functional improvements, including independent standing and walking 10 meters with walker, achieving K1 mobility level, mild to moderate dependence, moderate frailty, no depression, low risk for pressure ulcers, and moderate fall risk. Prosthetic rehabilitation was deferred due to patient's inability to meet prosthetic requirements and financial constraints.

Conclusion

An individualized and comprehensive rehabilitation approach is crucial for enhancing the quality of life in geriatric below-knee amputation patients with multiple comorbidities and complications, even in the absence of prosthetic rehabilitation.

EP199

THERAPEUTIC POTENTIAL OF PRP FOR TMJ DISORDERS: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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Background and aims

To investigate the therapeutic effects of platelet-rich plasma (PRP) injection on pain and mandibular movement in patients with temporomandibular joint disorder (TMJD).

Methods

Data Sources: A literature search was performed in the PubMed, Embase, and Cochrane Library databases to identify relevant studies published before August 31, 2024.

Study Selection: Prospective studies comparing the outcomes of PRP with other interventions in patients with TMJD.

Data Extraction: The quality of the included randomized controlled trials was assessed using Cochrane Risk of Bias 2.0 tool. The quality of nonrandomized controlled trials was assessed using the Risk of Bias in Non-Randomized Studies of Interventions I. The mean difference (MD) or standardized mean difference (SMD) was determined as the effect size for continuous outcomes, and outcome accuracy was determined by calculating 95% confidence intervals (CIs).

Results

This meta-analysis included 31 studies involving 1,359 patients.

Compared to arthrocentesis (AC), PRP demonstrated significant pain reduction in the sixth month (MD: -1.56, 95% CI: -2.68 to -0.44). It also improved mandibular movement in the third month (MD: 2.16, 95% CI: 0.30 to 4.02) and sixth month (MD: 2.56, 95% CI: 0.76 to 4.35).

Compared to hyaluronic acid (HA), PRP demonstrated significant pain reduction in the third month (MD: -2.18, 95% CI: -3.70 to -0.66) and improved mandibular movement in the sixth month (MD: 3.67, 95% CI: 1.26 to 6.07).

Compared to corticosteroid (CS), PRP showed significant pain reduction in the first month (MD: -0.41, 95% CI: -0.81 to -0.02), third month (MD: -2.18, 95% CI: -3.70 to -0.66), and sixth month (MD: -1.25, 95% CI: -1.52 to -0.97). It also improved mandibular movement in the sixth month (MD: 1.46, 95% CI: 0.27 to 2.64).

Conclusion

PRP injection may be an effective and safe treatment for patients with TMJD.

EP200

CHALLENGES IN MANAGEMENT OF ORTHOSTATIC HYPOTENSION IN MULTIPLE SYSTEM ATROPHY CEREBELLAR TYPE: A CASE REPORT

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Introduction

Multiple System Atrophy (MSA) is a rare adult-onset progressive neurodegenerative disease, characterised by a combination of parkinsonism, cerebellar and autonomic dysfunction. Orthostatic hypotension (OH) is the main clinical feature of autonomic failure in MSA. This case report highlights the challenges in managing an MSA patient with severe OH.

Case Description

A 56-year-old gentleman with MSA was admitted and treated for Aspiration Pneumonia. He was placed on Nasogastric tube (NGT) feeding to aid in nutrition. Further history revealed that patient experienced frequent syncopal attacks upon being positioned upright, which resulted him being mostly bedridden in nursing home. The diagnosis of OH was confirmed with recorded blood pressure (BP) in the ward which revealed significant postural drop of more than 20mmHg during lying to sitting. Initial intervention included oral fludrocortisone, together with abdominal binder and compression stockings usage. Despite the interventions and good motor power of all four limbs; he was unable to perform functional activities due to significant hypotension. A personalised structured gradual bed profiling was designed and performed with strategies including isometric exercises and bed head elevation by 15 degrees in 30-minute intervals with concurrent BP monitoring. These strategies enabled the patient to sit upright safely without significant BP drop. FEES was successfully performed and confirmed him to be safe for oral feeding. NGT was removed subsequently. He was also able to perform functional activities e.g. feeding at seated position.

Conclusion

This case highlights the severe functional limitation caused by OH in MSA. Hence, it is important that the management of OH should not be overlooked. Management goals should be individualised, achievable and designed to enhance daily functioning while improving overall quality of life.

EP201

RELATIONSHIPS BETWEEN SPATIOTEMPORAL PARAMETERS BETWEEN TREADMILL AND OVERGROUND WALKING IN STROKE HEMIPLEGIC PATIENTS

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Background and aims

Previous studies have reported differences in spatiotemporal parameters between treadmill (TM) and overground (OG) walking in stroke hemiplegic patients. However, the relationships between these parameters remain unclear. This study aimed to investigate the relationships between spatiotemporal parameters between TM and OG walking in stroke hemiplegic patients.

Methods

Eighty-three stroke hemiplegic patients who used an ankle-foot orthosis (AFO) and a cane during OG walking were included. Three-dimensional motion analysis was conducted using KinemaTracer®. For OG walking, eight CCD cameras were positioned along the central 5 m section of the walking path, whereas TM walking, cameras were placed around the treadmill (sampling rate: 60 Hz, TM measurement duration: 20 s). Walking speed was set at a self-selected comfortable speed for OG walking and matched accordingly TM walking. The same AFO settings were applied for both walking conditions, and handrail use was permitted as a substitute for the cane during TM walking. The analyzed parameters included gait ratio, cadence, stride length, double support time, and the paretic side's swing and single support time. Differences between TM and OG walking were evaluated using the Wilcoxon signed-rank test, whereas relationships between parameters were assessed using Spearman's rank correlation coefficient. Significance level was set at $p < 0.05$.

Results

Compared to OG walking, TM walking exhibited a significantly lower gait ratio, higher cadence, shorter double support time before the paretic side, and longer single support time on the paretic side. A significant negative correlation was observed between the difference in gait ratio between TM and OG walking and the double support time before paretic side.

Conclusion

These findings suggest that in stroke hemiplegic patients, an increased double support time before the paretic side during OG walking may lead to a lower gait ratio and a cadence-dominant walking pattern during TM walking.

EP202

BREAKING DEVELOPMENTAL BARRIERS: MULTIDISCIPLINARY REHABILITATION APPROACH FOR A CHILD WITH GOLDENHAR SYNDROME

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Background and aims

Goldenhar syndrome is a rare congenital condition characterized by craniofacial anomalies, medical complications such as respiratory distress and feeding difficulties resulting in developmental delays. We present a boy with Goldenhar syndrome, who, despite significant medical challenges, demonstrated notable developmental progress through early and intensive rehabilitation.

Methods

An eight-month-old male infant with Goldenhar syndrome experienced global developmental delay following a hypoxic event, requiring a tracheostomy, percutaneous endoscopic gastrostomy (PEG) tube, and bowel resection due to intestinal volvulus. The bowel resection led to short bowel syndrome, and due to insufficient nutrient intake, total parenteral nutrition (TPN) was initiated to support growth. Multidisciplinary rehabilitation strategies were implemented, involving:

1. Paediatric surgeons, Paediatricians, and Rehabilitation specialists
2. Physical therapists
3. Occupational therapists
4. Speech therapists
5. Nurses
6. Dieticians
7. Pharmacists
8. Counsellors
9. Medical Social workers

All team members collaborate to support his motor development, play skills, communication, and growth, while assisting his parents in effectively managing his TPN adherence, catheter and stoma care, as well as financial and disability-related challenges.

Results

Initial assessment using the Denver Developmental Screening Test (Denver II), revealed significant delays in his developmental milestones:

1. Gross motor: Limited to raising his head up to a 45-degree angle. (equivalent to 2 months)
2. Fine motor: Grasping toys and following midline (3-4 months)
3. Social skills: Spontaneous smiling and reaching for toys (4 months)
4. Language: Responding to sound (3 months)

By discharge, he achieved sitting unsupported, stand with minimal assistance, and demonstrated improved motor skills. At 14 months, he started cruising, briefly standing unaided, transferring objects between hands, jabbering, and smiling in response to his name.

Conclusion

Children with Goldenhar syndrome may develop complex medical issues resulting in significant development delays. This case highlights the significance of early, multidisciplinary rehabilitation, emphasizing the importance of timely intervention.

EP203

PREVALENCE OF PAIN IN PATIENTS WITH COMPLETE SPINAL CORD INJURY DURING INPATIENT REHABILITATION

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Background and aims

Neuropathic pain significantly impacts the quality of life of individuals with spinal cord injury (SCI). There is a relative paucity of research investigating its prevalence and contributing factors in patients with acute SCI, particularly those undergoing rehabilitation. We aim to investigate the prevalence of neuropathic pain, and the factors associated with neuropathic pain in patients with acute incomplete spinal cord injury undergoing inpatient rehabilitation.

Methods

This is a cross-sectional observational study, conducted in a standalone inpatient tertiary rehabilitation center. 25 patients with complete SCI, defined as American Spinal Injury Association Impairment Scale A were recruited from February 2020 to November 2021. Neuropathic pain of patients was evaluated with the LANSS (Leeds Assessment of Neuropathic Symptoms and Signs) Pain Scale. Numerical rating scale (NRS) was used to measure the severity of pain. Variables including clinico-demographic data, lower limb spasticity, Lower Extremity Muscle Score (LEMS), Functional Independence Measure (FIM) motor score on admission were collected. Stepwise multiple regression analysis was used to identify the factors that were significant for neuropathic pain.

Results

The mean age of participants were 43.6 ± 12.1 years. The prevalence of neuropathic pain was 42.3%. The mean NRS was 5.35 ± 2.12 . On regression analysis, presence of neuropathic pain was associated with a lower Functional Independence Measure on admission ($\beta = 0.483$; CI = 0.415-0.744; $p=0.036$).

Conclusion

Our findings highlight a high prevalence of neuropathic pain among patients with complete spinal cord injuries in a rehabilitation setting. It suggests that function capacity is associated with neuropathic pain. Further research is needed to explore additional factors and develop targeted interventions to improve rehabilitation outcomes and pain in individuals with SCI.

EP204

LOW VITAMIN D IN BRAIN PATHOLOGY: IS IT SIGNIFICANT?

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Background and aims

Vitamin D deficiencies are well-documented in the general population and specific illness categories. However, its prevalence amongst patients undergoing rehabilitation for brain pathology is lacking. This study investigates the prevalence of vitamin D insufficiency among brain pathology rehabilitation patients whilst exploring potential associations with underlying illnesses. Identifying vitamin D insufficiency in this population may provide valuable insights into the potential impact of vitamin D on rehabilitation outcomes and recovery times. Additionally, the study aims to highlight whether specific comorbidities or rehabilitation-related factors contribute to the risk of deficiency, ultimately helping to inform more targeted treatment strategies.

Methods

This cross-sectional retrospective study covers the period from 31st July 2020 to 10th November 2024. Records of seventy-nine patients tested for vitamin D were retrieved and reviewed.

Results

Total of 79 reports were reviewed of which 49.36% had vitamin D deficiency, of which 53.84% were males. The median age group was 58.5 years old. Most of the brain pathology consists of vascular 59.49% followed by traumatic brain injury 21.51%, tumor 16.45% and infection 2.53%. Among those who are deficient, 79.48% of them had comorbidities (hypertension, dyslipidemia, diabetes mellitus etc). A distinct association between low vitamin D and clinical complications such as pneumonia, pressure injury and spasticity were noted. Vitamin D levels were significantly lower in those with vascular pathologies and tumours. However no significant relationship was noted between vit D levels and GCS scores.

Conclusion

Vitamin D deficiency is treatable and its distinct association with underlying comorbidities in the brain pathology cohort may warrant further attention as it plays important biochemical role in neural recovery and possibly in preventing related complications.

EP205

NEGLECTED SPONTANEOUS EXTENSOR TENDON RUPTURE FOLLOWING A CHRONIC INFECTION DUE TO ANIMAL BITE – A CASE REPORT OF UNUSUAL SEQUEL AND REHABILITATION PROGRAM

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Background and aims

Multiple extensor tendon rupture after a cat bite is rare, but it can occur. One of the most frequent injuries observed in emergency rooms is cat bites. The nature of the human hand and the shape of feline teeth mean that even seemingly harmless surface bites can cause infections in deeper hand structures which can have negative consequences. We describe a rare neglected multiple extensor tendon rupture complication that happened after superficial infection.

Methods

A 65-year-old male arrived at the emergency room worried about being infected after being bitten by a cat to the proximal wrist of his left hand 2 months ago. Initially there was a wound and swelling on his left hand. The patient underwent wound care. After two months, the swelling did not improve, the pain worsened, and there was weakness in the fingers of his left hand. It was discovered that the patient's left extensor's digitorum tendon had ruptured spontaneously.

Results

It was discovered that the patient's left extensor's digitorum tendon had ruptured spontaneously. The patient had extensor tendon exploration, reattachment tenoplasty, and surgical debridement. Following a term of rehabilitation therapy, the patient resumed his regular activities with good left-hand function.

Conclusion

This case report aims to summarize the current research and therapy for hand injuries caused by feline bites, as well as to detail the clinical history of a patient who experienced the uncommon consequence of multiple extensor tendon rupture following a cat bite. To assist prevent complications, we advise patients who have bitten by a cat and have a suspected infection to come in as soon as possible for a medical evaluation, early appropriate empirical antibiotic therapy, and early surgical debridement when necessary.

EP206

EXPLORING DEVELOPMENTAL DELAYS AND ASSOCIATED FACTORS IN CHILDREN WITH DOWN SYNDROME: A RETROSPECTIVE STUDY

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Background and aims

Down syndrome is associated with comorbidities and developmental delays. Understanding the relationships between comorbidities and development can help predict outcomes and guide early intervention. This study explores factors related to developmental delay.

Methods

We conducted a retrospective cohort study of children with Down syndrome who underwent developmental evaluations between January 2017 and December 2024. Birth history, comorbidities, and social factors were analyzed in relation to developmental outcomes. Correlation analysis and linear regression identified variables associated with developmental delay.

Results

We enrolled 26 children with Down syndrome (53.8% male). Comorbidities included hearing (30.8%), visual (61.5%), cardiac (73.1%), hypothyroidism (30.8%), obstructive sleep apnea (26.9%), and hip dysplasia (23.1%). A total of 54 evaluations were collected (mean age: 37.2 months). Delays were observed in motor (90.7%), language (44-48%), cognitive (88.9%), and social-emotional (11.1%) domains. Cardiac disorder was weakly correlated with fine motor ($r=0.289$, $p=0.034$) and expressive language delays ($r=0.288$, $p=0.035$). In longitudinal follow-up, age was negatively correlated with language and cognitive developmental quotients. Multiple regression showed age ($B = -0.612$, $p < 0.001$) and cardiac disorder ($B = -10.598$, $p = 0.007$) were associated with lower expressive language developmental quotient.

Conclusion

Cardiac disorders may be a risk factor for developmental delay in Down syndrome, and increasing age correlates with a widening gap in language and cognitive abilities compared to peers.

EP207

EARLY INITIATION OF CONTINUOUS REHABILITATION IN TRAUMATIC SPINAL CORD INJURY: A CASE REPORT

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Background and aims

Traumatic spinal cord injury (TSCI) is a life-altering condition that can lead to significant motor, sensory, and autonomic dysfunction. Early and continuous rehabilitation plays a crucial role in optimizing recovery outcomes. We present a case of a 27-year-old male who sustained a cervical spinal cord injury after hitting his head on the pool floor while diving. The patient arrived at the emergency department two hours post-injury with quadriparesis and respiratory distress. A CT scan revealed multiple vertebral fractures and a disc bulging from C3-4 to C6-7, causing spinal canal compression. He was subsequently intubated due to respiratory failure and underwent urgent posterior decompression and cervical stabilization surgery for a C4/C5 fracture-dislocation.

Methods

This study is a case report that describes the clinical course, management, and outcomes of a patient with traumatic spinal cord injury (TSCI). It highlights the role of early and continuous rehabilitation in improving motor and functional recovery following cervical spinal cord injury.

Results

During hospitalization, the patient underwent sensory stimulation, passive physiotherapy to improve range of motion, chest physiotherapy, speech therapy with a tracheostomy, occupational therapy, and orthotic-prosthetic therapy until he was able to use a wheelchair. After 48 days of hospitalization, he was discharged and continued outpatient physiotherapy, showing gradual and progressive recovery over time.

Conclusion

Early and continuous rehabilitation following TSCI plays a crucial role in enhancing functional recovery. This case emphasizes the importance of a multidisciplinary approach, including early surgical intervention, respiratory management, and rehabilitation, in optimizing outcomes for patients with cervical spinal cord injuries.

EP208

LANCE-ADAMS SYNDROME POST-CARDIAC ARREST –TIMELY DIAGNOSIS AND REHABILITATION LEADING TO FAVOURABLE OUTCOME- A CASE REPORT

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Background

Lance-Adams Syndrome (LAS) is a rare condition of chronic post-hypoxic myoclonus that can develop days to years after cardiac arrest following successful cardiopulmonary resuscitation (CPR).⁽¹⁾ It is characterized by multifocal action myoclonus, often accompanied by dysmetria, dysarthria, and ataxia, with relative preservation of higher cognitive functions.⁽²⁾ If left untreated, LAS can lead to significant morbidity and limit functional capability.

Case Presentation

We report a case of a 16-year-old female who experienced cardiac arrest secondary to premature ventricular contraction (PVC) cardiomyopathy, requiring 50 minutes of CPR. Post-arrest, she was intubated and tracheostomised due to poor Glasgow Coma Scale (GCS) recovery. She also sustained hypoxic multiorgan injuries, necessitating temporary inotropic support and dialysis. She underwent catheter ablation and implantable cardioverter-defibrillator (ICD) insertion.

After one month, her hemodynamic and biochemical parameters stabilised. Following extubation and sedation weaning, she developed generalised myoclonus involving all limbs and trunk. CT brain was unremarkable, and EEG showed diffuse background attenuation. A clinical diagnosis of LAS was made based on the characteristic presentation. She was started on sodium valproate and clonazepam and transferred to the rehabilitation ward. She demonstrated significant functional improvement, with resolution of myoclonus, achieving independent ambulation with supervision and performing basic activities of daily living with minimal assistance, though cognitive impairment, dysmetria, and mild ataxia persisted.

Discussion

LAS diagnosis remains clinical, as imaging is often unremarkable, and EEG may show nonspecific findings such as diffuse slowing.⁽³⁾ Although non-fatal, LAS can severely impact quality of life due to persistent myoclonus and associated symptoms like dysmetria and ataxia. Early recognition and intervention are critical to minimizing long-term disability.⁽⁴⁾ While no standardized treatment exists, various anti-epileptic medications and physical therapy are found to be effective.⁽⁵⁾⁽⁶⁾

Conclusion

This case highlights the importance of early suspicion and diagnosis of LAS in post-hypoxic myoclonus to facilitate timely treatment and optimize rehabilitation outcomes.

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EP209

CASE REPORT: TAILORED NEUROREHABILITATION WITH CARDIAC PRECAUTIONS IN ACUTE STROKE SECONDARY TO AORTIC DISSECTION

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Background and aims

Both acute aorta dissection (AD) and ruptured aorta aneurysm are prominent causes of death in cardiovascular diseases. The frequency of developing stroke in aortic dissections is reported to be between 2 to 8%. Rehabilitation process can be challenging to avoid secondary insult and mortality while aiming to achieve optimal physical and functional recovery. Tailored neurorehabilitation with cardiac precautions should be developed to obtain maximum benefit for the patient.

Case Presentation

A 41-year old man with underlying young hypertension, ischemic heart disease and atrial fibrillation presented with sudden left sided body weakness during cardiology clinic visit. Imaging studies revealed acute right middle cerebral artery (MCA) infarct with incidental finding of extensive thoracic aortic dissection. Patient was treated conservatively but developed worsening left sided body weakness 10 days later. On examination, he had dense left hemiparesis, mild dysarthria with intact cognition. Repeated CTA brain showed right MCA infarction with hemorrhagic transformation causing mass effect, generalized edema, midline shift, uncal and subfalcine herniation. Rehabilitation was initiated with cardiac precaution to improve mobility and function.

Discussion

Rehabilitation of stroke patients due to spontaneous coronary artery dissection (SCAD) or AD should be tailored to their cardiac risk stratification. Isometric exercise is a relative contraindication to this patient as it may increase heart rate, systolic and diastolic blood pressure. This may also exacerbate the AD. Strengthening exercises are generally not recommended. He had slight motor recovery but able to achieve good functional outcomes after 2 weeks of inpatient rehabilitation.

Conclusion

Stroke patients with complex cardiac issues must undergo risk stratification prior to exercise testing and prescription. A personalized exercise programme will ensure that patients receive optimal rehabilitation while ensuring their safety.

EP210

TRANSCRANIAL DIRECT CURRENT STIMULATION COMBINED WITH ROBOTIC-ASSISTED THERAPY IN STROKE RECOVERY: A CASE SERIES

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Background and aims

Transcranial Direct Current Stimulation (tDCS) is a non-invasive neuromodulation technique that enhances neuroplasticity and may improve motor function. When combined with robotic-assisted therapy, tDCS may augment stroke recovery outcomes. This case series evaluates the effects of combined tDCS and robotics on motor function, spasticity, balance, gait, endurance, and cognitive function in post-stroke patients.

Methods

Three male patients with stroke-related motor impairments underwent 10 sessions of anodal tDCS over the lesioned motor cortex (C4) at 1.5 mA for 20 minutes, three times per week, combined with AnkleMotus™ robotic-assisted therapy, a device designed for lower limb rehabilitation. Outcome measures assessed pre- and post-treatment included muscle strength (Medical Research Council Scale), handgrip strength, Berg Balance Scale, Modified Ashworth Scale for spasticity, 10-Meter Walk Test, 6-Minute Walk Test, Fugl-Meyer Assessment (FMA), Motor Assessment Scale, Modified Barthel Index, Lawton Instrumental Activities of Daily Living, and Montreal Cognitive Assessment (MoCA).

Results

All patients demonstrated improvements in motor function, balance, and gait speed. Muscle strength in the affected limb improved by at least one MRC grade in most muscle groups. Hand grip strength increased, particularly in one patient from 2kg/f to 10.7kg/f. BBS scores improved across cases and gait speed increased in the 10MWT, with one patient improving from 0.4 m/s to 0.6 m/s. Endurance gains were observed in the 6MWT, with one patient increasing walking distance from 172.5 m to 232.5 m. FMA scores showed motor recovery progression. Spasticity remained stable or improved, particularly in upper limbs. Cognitive function (MoCA) improved in two cases.

Conclusion

tDCS combined with robotic-assisted therapy demonstrated promising benefits in post-stroke rehabilitation, enhancing motor recovery, balance, gait speed, endurance and cognitive function.

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Table: Pre- and Post-tDCS & Robotic-Assisted Therapy Outcomes for Stroke Recovery

Outcome Measures	Patient 1	Patient 2	Patient 3
Muscle Strength (MRC Scale) (Affected side: Left)	Improved in all muscle groups	Improved in all muscle groups	Improved in all muscle groups
Hand Grip Strength (kg/f) (Affected side: Left)	Right: 40.7 → 40.0 Left: 0 → 0	Right: 51 → 54 Left: 2 → 10.7	Right: 54 → 54.7 Left: 37.3 → 42
Balance (Berg Balance Scale)	46 → 50	56 → 56	55 → 56
Spasticity (Modified Ashworth Scale) (Affected side: Left)	Decreased in UL & LL	Decreased in UL & LL	No spasticity
Gait Speed (10-Meter Walk Test) (m/s)	0.4 → 0.6	1.05 → 1.13	1.41 → 1.45
Endurance (6-Min Walk Test) (m)	172.5 → 232.5	285 → 375	412.5 → 420
Fugl-Meyer (Upper/Lower Extremity)	UE: 15 → 18 LE: 23 → 23	UE: 17 → 31 LE: 34 → 34	UE: 65 → 66 LE: 34 → 34
Function (Motor Assessment Scale)	32 → 34	36 → 45	32 → 54
Modified Barthel Index	95 → 95	100 → 100	95 → 100
Lawton Instrumental ADL	6 → 6	6 → 6	8 → 8
Cognitive (MoCA Score)	28 → 29	24 → 29	28 → 30

EP211

PREVALENCE OF POSTURE RELATED PAIN IN A COHORT OF PATIENTS WITH UNILATERAL MASTECTOMY

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Background and aims

Following treatment for breast cancer, patients experience loss of upper limb range of motion (prevalence 2–51), decreased strength (prevalence 17–33%), and decreased ability to perform activities of daily living. Pain associated with these impairments reduces quality of life by negatively impacting physical autonomy, psychological well-being, and social relationships.

Women following mastectomy displayed several postural and biomechanical alterations as well. The major problem in women after mastectomy, besides upper limb dysfunction, are disorders in the trunk area, especially the thoracic kyphosis, which has an influence on the formation of functional disorders in the median part of the spine.

Postural changes caused by mastectomy can be prevented with rehabilitation training. It is important for medical staff to comprehensively understand the impact of mastectomy on body posture because it is the starting point for planning proper rehabilitation training programs for such patients.

Aim and objectives

To study the prevalence of posture related pain in a cohort of patients with unilateral mastectomy by using the “Poster Zone” app and by the effect on pain as measured by the Visual Analogue Scale.

Methods

Study design: Longitudinal observational study.

Study setting: Department of Physical Medicine and Rehabilitation, Department of Surgical Oncology and Department of Medical Oncology at MVR cancer centre and research institute.

Study population: Patients undergoing mastectomy at MVR cancer centre and research institute after obtaining informed written consent prior to the study.

Study period: 1 year

Sample size: 100

Women whose age is between 18 – 55yrs undergoing mastectomy at MVR cancer centre and research institute after obtaining informed written consent prior to the study.

Sample size: 100

Formula for obtaining sample size: $4pq/d^2$

Results Awaited

Conclusion Awaited

EP212

DRY-MND: DIRECTED RELIEF OF SIALORRHEA WITH CHEMODENERVATION IN MOTOR NEURON DISEASE

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Background and aims

Motor neuron disease (MND) is a progressive neurodegenerative condition that can cause dysphagia, limb weakness, dysarthria, emotional lability and respiratory failure. Dysphagia-related salivary pooling and sialorrhea, often lead to distress and inconvenience. While various medications exist, their effectiveness is often limited by side effects. Botulinum toxin-A has shown potential benefits in managing sialorrhea in MND patients. This case series highlights clinical improvement in two MND patients receiving focal chemo denervation to manage drooling.

Methods

Single institution descriptive case report of two individuals with drooling issue in MND.

Results

Case 1: A 76-year-old gentleman presented with slurred speech since 2023 and worsening limb weakness, requiring wheelchair ambulation by February 2024. He had sialorrhea with severity score of 4 and frequency score of 4. Sublingual atropine was not suitable as he developed tachycardia. Botulinum toxin-A injection reduced salivation and pooling, improving his drooling severity and frequency scores to 2.

Case 2: An 80-year-old gentleman with bulbar onset MND since 2023 had dysphagia, requiring percutaneous endoscopic gastrostomy (PEG) placement early in his diagnosis. He had sialorrhoea with severity score of 3 and frequency score of 3. It persisted despite sublingual atropine, necessitating bib/cloth changes 3–4 times daily. Focal chemo denervation with Botulinum toxin-A reduced his drooling severity and frequency to 2.

Conclusion

Botulinum toxin-A chemo denervation effectively reduced sialorrhea severity and frequency in both MND patients, improving comfort and quality of life. This case report supports that Botulinum toxin-A as a treatment option for persistent drooling in MND patients. Further studies are needed to optimize dosing and long-term efficacy.

EP213

OUTCOMES OF HYBRID ASSISTIVE LIMB® (HAL®) INTERVENTION IN PATIENTS WITH INCURABLE NEUROMUSCULAR DISEASES

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Background and aims

In Japan, short-term effects of gait training using the Hybrid Assistive Limb® (HAL®) have been verified for 10 incurable neuromuscular diseases, and insurance coverage for HAL® has been accepted since 2017. We initiated gait training using HAL® for these patients in April 2017. However, long-term effects of using HAL® have not been clarified, and there are no reports on quality of life (QOL). The purpose of this study was to investigate the actual utilization of HAL® in our hospital.

Methods

We recruited patients who underwent gait training using HAL® at our hospital from 2017. The training consists of nine sessions, with each session lasting 40 minutes. Functional evaluations were conducted before and after each course; a 2-minute walking distance, 10-m walking time, and Timed Up-and-Go test. The values at the initial evaluation of the first course and at the final evaluation of the final course were adopted. QOL evaluation was introduced from the mid-2017. The EQ-5D-5L and EQ-VAS were used for QOL evaluation.

Results

Since April 2017, 11 participants (mean age:54.3 years) have taken part in the study. Each patient completed an average of 8.5 courses. Most patients generally maintained motor function. However, QOL outcomes varied among participants.

Conclusion

With continued HAL® intervention, we observed a suppressive effect on disease progression and a general maintenance of motor function in the subjects. As for QOL, we observed differences among subjects, suggesting that factors other than HAL® may have influenced the outcomes. Further research is needed to identify these factors and to optimize HAL® intervention for improving QOL in patients with incurable neuromuscular diseases.

EP214

EXPLORING THE EFFECT OF ACUPUNCTURE ON THE EXCITABILITY OF THE CORTICOSPINAL TRACT IN PATIENTS WITH STROKE BASED ON TRANSCRANIAL MAGNETIC MOTOR EVOKED POTENTIALS

Zhuqing Chen, Wenjing Cai, Wentao Xie, Care Alliance Hospital of Wuxi

Objective

Recovery of motor function after stroke primarily depends on the integrity of the corticospinal tract. The amplitude and latency of motor evoked potentials (MEPs) induced by transcranial magnetic stimulation are crucial neurophysiological indicators for evaluating corticospinal tract excitability. This study aimed to investigate the effect of acupuncture on corticospinal tract excitability in patients with stroke by analyzing MEP parameters.

Methods

Ten patients with stroke (aged 34–75 years, with a disease duration of 9–17 weeks) at Brunnstrom stages II–IV were included. Each patient underwent two motor evoked potential (MEP) testing sessions on separate days, with a 2-day interval between sessions. In one session, MEPs were measured without prior acupuncture (control condition), and in the other session, MEPs were measured within 30 minutes following an acupuncture treatment. The order of these sessions was randomized. During each MEP testing session, ten stimulations were performed to record MEP amplitude and latency. The Wilcoxon signed-rank test was employed to analyze changes in MEP amplitude between the control and post-acupuncture conditions.

Results

The Wilcoxon signed-rank test indicated that MEP amplitude after acupuncture increased significantly compared to the control condition ($p = 0.0008$); however, individual responses varied. Specifically, 6 patients exhibited increased MEP amplitude ($p = 0.009$), while 4 patients showed decreased amplitude ($p < 0.001$).

Conclusion

Acupuncture can significantly affect MEP amplitude in patients with stroke, suggesting a modulatory effect on corticospinal tract excitability. However, due to the small sample size ($N = 10$), considerable individual variability (40% of patients exhibited decreased amplitude), and the lack of functional recovery data, the generalizability of these findings is limited. Future studies should expand the sample size, control potential confounding factors, and further explore the relationship between acupuncture and MEPs.

EP215

INFLUENCING FACTORS OF POST-STROKE HAND EDEMA AND THE MODULATORY EFFECT OF C-REACTIVE PROTEIN LEVELS ON ACUPUNCTURE EFFICACY

Chuanzhen Qian, Tongyue Rong, Xinping Tong, Care Alliance Hospital of Wuxi

Objective

Post-stroke hand edema is prevalent among patients with stroke, potentially hindering functional recovery. This study aims to investigate the factors influencing post-stroke hand edema, particularly focusing on how C-reactive protein (CRP) levels modulate the efficacy of acupuncture in treating this condition.

Methods

A total of 180 post-stroke patients were enrolled in this study. Logistic regression analysis was performed to assess the impact of variables such as age, gender, stroke duration, serum albumin, CRP levels, and acupuncture treatment on the occurrence of hand edema. The interaction between CRP levels and acupuncture efficacy was examined, and a stratified regression analysis based on CRP levels (CRP < 10 mg/L vs. CRP ≥ 10 mg/L) was conducted.

Results

Acupuncture treatment was associated with a significant reduction in the risk of hand edema (odds ratio [OR] = 0.41, $p = 0.046$). Notably, CRP levels significantly influenced the efficacy of acupuncture ($p = 0.043$). In patients with low CRP levels (CRP < 10 mg/L), acupuncture reduced the incidence of edema (OR = 0.41, $p = 0.046$). Conversely, in patients with high CRP levels (CRP ≥ 10 mg/L), acupuncture was associated with an increased risk of edema (OR = 5.49, $p = 0.036$).

Conclusion

The efficacy of acupuncture in treating post-stroke hand edema appears to be modulated by CRP levels. Acupuncture effectively reduces edema in patients with low CRP levels but may be ineffective or potentially harmful in those with high CRP levels. Therefore, CRP levels could serve as a biomarker for personalizing acupuncture treatment strategies. Future research should explore combining anti-inflammatory interventions with acupuncture to enhance rehabilitation outcomes in stroke patients.

EP216

EXPLORING THE RELATIONSHIP BETWEEN SERUM ALBUMIN LEVELS AND ACTIVITIES OF DAILY LIVING IN PATIENTS WITH STROKE

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Objective

Serum albumin is an important biomarker reflecting nutritional status and is considered to potentially affect the functional recovery of patients with stroke. This study aimed to explore the association between serum albumin levels and activities of daily living (ADL) in patients with stroke.

Methods

This retrospective analysis included 180 stroke patients (101 males and 79 females, with a mean age of 68.92 ± 13.36 years) hospitalized from March 2023 to March 2025. Data collected encompassed patients' ADL scores (range: 0–100), serum albumin levels (mean: 38.32 ± 3.89 g/L; range: 26.5–53.1 g/L), and stroke duration (mean: 7.55 ± 7.22 months). Spearman's rank correlation was employed to assess the relationship between serum albumin levels and ADL scores. Subsequently, multiple linear regression analysis adjusted for confounding factors such as age, gender, and stroke duration.

Results

Spearman's correlation analysis revealed a weak to moderate positive correlation between serum albumin levels and ADL scores ($\rho = 0.3154$, $p < 0.001$). However, after adjusting for age, gender, and stroke duration, multiple linear regression analysis indicated no significant association between serum albumin levels and ADL scores ($p = 0.591$). Conversely, age emerged as the only significant predictor of ADL scores ($p = 0.038$), while gender and stroke duration were not statistically significant ($p > 0.05$). The regression model accounted for only 8.79% of the variance in ADL scores.

Conclusion

This study did not find an independent predictive effect of serum albumin levels on the ADL abilities of stroke patients, suggesting that serum albumin may not be a major factor affecting functional recovery. Future research should investigate other factors influencing ADL recovery or increase sample size and verify causal relationships through prospective studies.

EP217

COMPARATIVE EFFICACY OF PLATELET-RICH PLASMA VERSUS NON-SURGICAL INTERVENTIONS IN LOW BACK PAIN: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and aims

Platelet-rich plasma (PRP) has been increasingly utilized as a regenerative therapy for low back pain (LBP) associated with discogenic and herniated disc pathology. However, its comparative efficacy against conventional non-surgical interventions remains unclear. This meta-analysis aims to evaluate the relative effectiveness of PRP compared to saline placebo, corticosteroid injections, and bone marrow concentrates (BMCs) in LBP management. The primary outcome measure was pain reduction assessed via the Visual Analog Scale (VAS), with the Oswestry Disability Index (ODI) as a secondary functional outcome.

Methods

A systematic review and meta-analysis were conducted in accordance with PRISMA guidelines. Randomized controlled trials (RCTs) comparing PRP with saline control, corticosteroids, and BMCs for discogenic or herniated LBP were retrieved from PubMed, Embase, and the Cochrane Library up to [latest date]. Standardized mean differences (SMD) were computed for VAS and ODI scores. Heterogeneity was assessed using the I^2 statistic, and methodological quality was evaluated using the Cochrane Risk of Bias tool.

Results

PRP vs Saline Control: PRP yielded a statistically significant improvement in VAS at 1 month (SMD: 0.30, $p=0.01$), although no significant differences were observed at subsequent time points. ODI scores were comparable between groups.

PRP vs Corticosteroids: PRP demonstrated superior pain reduction at 1 month (SMD: 10.04, $p=0.007$) and 6 months (SMD: -14.54, $p<0.00001$) compared to corticosteroids. ODI scores also favored PRP at 6 months (SMD: -12.55, $p=0.002$), indicating sustained functional improvement.

PRP vs BMCs: No statistically significant differences were detected in VAS at 3 or 6 months. Similarly, ODI scores remained equivalent across both interventions, suggesting comparable efficacy.

Conclusion

This meta-analysis provides a comprehensive evaluation of PRP as a therapeutic modality for LBP. PRP demonstrated superior long-term analgesic efficacy compared to corticosteroids but exhibited no significant advantage over BMCs. These findings support the selective use of PRP in clinical practice while underscoring the need for further high-quality RCTs to elucidate its long-term therapeutic potential.

EP218

BILATERAL HIPPOCAMPAL LESIONS AFTER INADVERTENT INTRATHECAL INJECTION OF TRANEXAMIC ACID: A CASE REPORT

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Background and aims

Tranexamic acid (TXA) is widely used to control surgical, obstetric, and traumatic hemorrhage. However, intrathecal injection of TXA is a severe medication error, leading to refractory seizures, neurotoxicity, and a 50% mortality rate. This case report presents serial MRI findings and the neurological findings of a patient who survived intrathecal TXA administration.

Case presentation

A 67-year-old woman was transferred to the neurological intensive care unit(NICU) due to generalized tonic-clonic seizures. She had undergone hemorrhoid surgery a week earlier at a local hospital. Onset day she returned for postoperative bleeding control and was given intrathecal TXA in medical error. After two hours, she developed nausea, progressive mental deterioration, and myoclonus. Immediately, she was injected propofol (10 mg) for control of the seizure. She underwent two weeks of coma therapy and intrathecal saline lavage on post-onset day 4 at the NICU. By week 2, she was extubated and followed one-step commands but exhibited chorea affecting all extremities during daytime as well as sleep time, requiring six anticonvulsants.

Results

Serial brain MRI revealed bilateral hippocampal hyperintensities on diffusion-weighted imaging (DWI) at onset day and day 4. By week 3, FLAIR imaging showed lesion progression to the mesiotemporal lobes. At week 5, she was transferred to rehabilitation due to global functional dependency, dysphagia, and aphasia. On neurological examination, her muscle strength on left and right extremities was grades as 4/5 and 4/5 with chorea at respectively. By week 7, she could speak two words, recognize family members, and sit unsupported for 30 seconds.

Conclusion

This case highlights the neurological consequences of intrathecal TXA toxicity. Serial MRI may help assess lesion progression in such cases, guiding treatment and rehabilitation strategies.

	Post-onset week 4	Post-onset week 8
Cognition Mini-mental status examination(0~30)	0	3
Speech Aphasia severity rating scale (0-5)	0	1
Manual motor grade (0-5) Upper extremity (right / left) Lower extremity (right / left)	3/4 3/4	4/4 4/4
Hand function Modified brunnstrom classification(1-5)	3/4	4/4
Functional level Head control score (0-4) Sitting with back unsupported (0~4)	0 0	3 2

Table 1. Clinical Manifestations

EP219

INTEGRATION OF MC-KENZIE EXERCISE ALONG WITH MULTI-MODAL PHYSICAL THERAPY IN CERVICAL RADICULOPATHY; A CASE REPORT WITH THREE MONTHS OUTCOME ANALYSIS

Avijit Sarker Jyoti

Introduction and importance

Cervical Radiculopathy is a condition of cervical spine with a compression or irritation in cervical nerve roots leading to pain, weakness, numbness, or tingling in the shoulder, arm, or hand. It is commonly caused by herniated disc, degenerative changes (spondylosis), stenosis (narrowing of spinal canal), trauma or injury. Clinical Practice Guidelines of neck pain published by the American Physical Therapy Association does not support McKenzie exercises for treating cervical radiculopathy solely, but emphasizes a multimodal physical therapy approach for the management of cervical radiculopathy. Here, we report a case of cervical radiculopathy due to cervical stenosis and spondylosis and the purpose of our case is to exemplify the patient outcome while utilizing McKenzie centralization exercises within a multimodal physical therapy approach with a three months follow-up period.

Case presentation

A 26 years old male patient presented with subacute neck pain radiating to left shoulder and rhomboid region for two months that was consistent with cervical radiculopathy. Physical examination, co-morbidity assessment and investigation was done to rule out the differentials. The patient went through a multimodal physical therapy approach with McKenzie cervical retraction exercises, thoracic manipulation, rib mobilizations, manual cervical traction, scapular retraction with postural exercises along with conservative management by medications. The patient received four visits over a twelve-week with an emphasis on patient education and independence. There was a significant improvement in neck disability index and pain score over time.

Discussion and conclusion

McKenzie exercise might cause pain centralization, improves cervical mobility and posture, decompress the neural structure, enhances the patient self-management and reduces the hospital dependency. Although These exercises are not supported by the Neck Pain Clinical Practice Guideline (CPG) in alone, adding these exercises to the multimodal physical therapy approach for cervical radiculopathy may be promising.

Keywords

McKenzie exercise, neck pain, cervical radiculopathy

EP220

EFFECTS OF MOBILITY TRAINING ON SEVERE BURN PATIENTS IN THE BICU

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Background and aims

Severe burn patients face significant functional impairments, yet early rehabilitation strategies in Burn Intensive Care Units (BICU) remain underdeveloped in Mainland China. This study evaluates the impact of mobility training versus passive training on clinical and functional outcomes for patients with $\geq 50\%$ total body surface area (TBSA) burns.

Methods

A retrospective cohort study analyzed 73 severe burn patients admitted to a BICU. Patients were divided into two cohorts: passive training ($n=49$; anti-contracture positioning, splinting, passive exercises) and mobility training ($n=24$; active exercises, transfer training, tilt table, ambulation). Outcomes included BICU/hospital stay duration, bed rest time, ventilator days, joint range of motion (ROM), Barthel Index (BI), and Functional Independence Measure (FIM).

Results

The mobility cohort demonstrated significantly shorter BICU stays (mean 39.3 vs. 65.5 days, $p=0.002$), hospital stays (100.8 vs. 184.4 days, $p=0.010$), bed rest time (29.4 vs. 57.4 days, $p<0.001$), and rehabilitation duration (26.3 vs. 44.0 days, $p=0.026$). ROM improvements were observed in shoulder abduction, wrist extension, hip flexion/abduction, knee flexion, and ankle dorsiflexion/plantar flexion ($p<0.05$). Ventilator dependency decreased non-significantly (2.7 vs. 5.5 days, $p=0.067$). No differences emerged in BI or FIM motor scores, though cognitive FIM scores were lower in the mobility cohort ($p<0.001$).

Conclusion

Mobility training in the BICU reduced critical care durations and enhanced joint mobility but did not improve activities of daily living (ADL) performance, likely due to environmental and procedural constraints. Findings underscore the feasibility of early mobility programs for severe burn patients and highlight the need for integrated ADL-focused interventions and standardized rehabilitation protocols in Mainland China.

EP221

USING ELASTOGRAPHY TO ASSESS POST-STROKE UPPER LIMB SPASTICITY AFTER BOTULINUM TOXIN INTERVENTION

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Background and aims

Post-stroke spasticity impairs motor function and quality of life, often requiring botulinum toxin injections. Traditional assessment tools, such as the Modified Ashworth Scale (MAS), are subjective and lack sensitivity. Shear wave elastography (SWE) offers a quantitative approach to evaluate muscle stiffness. This study aims to assess the effectiveness of SWE in measuring spastic muscle stiffness before and after botulinum toxin injection and its correlation with functional outcomes.

Methods

A single-blinded, prospective study included stroke patients with upper limb spasticity. Participants were divided into a treatment group receiving botulinum toxin injections in the biceps brachii and brachialis muscles and a control group receiving conventional rehabilitation. SWE was used to assess muscle stiffness at different elbow angles. Functional assessments included MAS, Tone Assessment Scale (TAS), Stroke Rehabilitation Assessment of Movement (STREAM), and the Barthel Index. Measurements were taken at baseline, four weeks, and twelve weeks post-treatment. Statistical analyses included Mann-Whitney U, Friedman, and Wilcoxon signed-rank tests.

Results

Data from 24 participants (treatment: 14, control: 10) were analyzed. SWE-derived muscle stiffness correlated significantly with MAS and TAS scores ($r=0.283$ to $r=0.603$, $p<0.05$). The treatment group showed significant reductions in brachialis stiffness post-injection during flexion ($p=0.006$) and extension ($p=0.002$). Between-group comparisons revealed significant differences in brachialis stiffness at four- and twelve-weeks post-treatment ($p=0.023$), indicating botulinum toxin efficacy.

Conclusion

SWE provides an objective assessment of post-stroke muscle stiffness and confirms the effectiveness of botulinum toxin in reducing spasticity. The findings support SWE as a valuable tool for monitoring treatment response and guiding rehabilitation strategies.

EP222

EFFECTIVENESS OF HOME-BASED ACTION OBSERVATION THERAPY ON UPPER EXTREMITY RECOVERY IN SUBACUTE STROKE PATIENTS: A RANDOMIZED CONTROLLED TRIAL

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Background and aims

Action Observation Therapy (AOT) is a rehabilitation method involving training movement skills by observing purposeful actions through videos and imagery or imitation the actions to develop movement skills. Evidence shows that AOT can stimulate brain plasticity and enhance motor skills in stroke patients. Currently, there is no evidence of applying the mechanism of AOT for the rehabilitation of subacute stroke patients who require intensive and continuous home-based rehabilitation. Therefore, the research aims to study the effectiveness of home-based action observation therapy compared to standard therapy on upper extremity recovery among subacute stroke patients.

Methods

Thirty-four patients (25 men, 9 women), with an average age of 54.15 ± 10.22 years and an average disease duration of 41.94 ± 18.34 days. The experimental groups received AOT through video-based training at home, and control groups received a standard home program. Both groups performed exercises daily for 30 minutes, twice a day, for 4 weeks (30 days). Subgroup analysis according to Brunnstrom recovery stage of the arm was performed. The outcomes were assessed using the Fugl-Meyer Assessment upper extremity part (FMA-UE), and Action Research Arm Test (ARAT), before and after the training program.

Results

At baseline 53% and 47% of participants had BRS-arm stage 3-4 and 5-6 respectively. After training, participants with BRS-arm stage 5-6 in the experimental group had significantly higher FMA-UE and ARAT scores than the control group ($P = 0.003$ and 0.001 , respectively).

Conclusion

Home-based AOT with guidance from an occupational therapist is beneficial for subacute stroke patients with BRS-arm stage 5-6. Training for 30 minutes, twice a day for 4 weeks, could significantly enhance motor and functional recovery of the hemiplegic hand and arm.

EP223

HABILITATION STRATEGY TO TRANSITION INTO EARLY ADOLESCENCE IN CHILDREN WITH DISABILITIES: A CASE REPORT

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Background and aims

Early adolescence, often considered as between the ages of 10 to 13, is characterised by the onset of puberty and significant physical, cognitive, and socio-emotional changes. Children with disabilities may experience additional challenges in adapting to these changes compared to normal developing children. This report emphasises the importance of an individualised habilitation strategy to address the unique challenges children with disabilities encounter during the transition to early adolescence.

Case presentation

An 11-year-old boy was born prematurely suffered from spastic diplegic cerebral palsy resulting from periventricular leukomalacia. He experiences significant motor and cognitive impairments, which make the transition into adolescence more challenging.

He is classified at Gross Motor Function Classification System (GMFCS) level IV, Manual Ability Classification System (MACS) level III, and Communication Function Classification System (CFCS) level I. He was admitted for habilitation with the goal of improving his independence in mobility and activities of daily living (ADLs).

Comprehensive assessments of his physical strength, fine motor skills, cognitive function (focusing on behaviour and attention), visual function, and social circumstances were conducted during the admission.

Tailored therapy with multidisciplinary approach involving rehabilitation physician, physiotherapist, occupational therapist, ophthalmologist, paediatrician, child psychiatrist, dietician and orthopaedic surgeon focused on improving mobility, self-care skills, and social integration to support the transition to early adolescence. Importance of transition therapy was reinforced to his caregivers (grandparents) ensuring post discharge therapy compliance.

After six months of habilitation, the child showed significant improvement in ADLs, with the Modified Barthel Index (MBI) increasing from 40 to 70, indicating enhanced functional independence.

Conclusion

The transition into early adolescence is often overlooked in habilitation for children with disabilities. Early identification, anticipation, and strategic planning are essential for addressing the physical, cognitive, and social changes associated with this developmental stage, ensuring children receive the support they need for a successful transition.

EP224

IMMEDIATE EFFECTS OF FOOT ROTATION DURING WALL-SUPPORTED MINI SQUATS ON PAIN AND FUNCTION IN MEDIAL KNEE OSTEOARTHRITIS: A CROSS-OVER STUDY

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Background and aims

With a high prevalence of 22-39%, knee osteoarthritis is a major public health issue. It is associated with altered tibial kinematics, including increased external rotation. Modifying foot position during functional activity with minor biomechanical adjustments may influence joint loading and therefore the pain and function.

Aim

To find and compare the immediate effect of internal and external foot rotation during mini squat on Timed Up-And-Go test (TUG) and Pain Pressure Threshold (PPT) in medial compartment osteoarthritis of knee.

Methods

In this cross-over study, after ethical clearance and informed consent, 62 participants (Age 57.45 ± 7.45 , Gender 19M:43F, Grade 2,3 according to Kellgren-Lawrence scale, VAS 2-6) were randomized into six sequences involving three intervention groups: Internal, External, and Neutral Rotation of foot. Each received all three interventions with a 48-hour washout period between them. Pre- and post-assessments were conducted for each intervention. In each session, ten repetitions of wall-supported mini-squats were given in three sets. PPT and functional outcomes through TUG test were assessed before and after each intervention to check the immediate effect.

Results

Pre and post-analysis for each intervention was done using Paired t-test and Repeated Measures ANOVA. A significant improvement was observed in the TUG test across all groups ($p < 0.001$). The Internal Rotation group showed the highest improvement (Mean Difference: 1.24 ± 0.57 , Effect Size: 0.908), followed by the External Rotation group (Mean Difference: 0.88 ± 0.45 , Effect Size: 0.89) and the Neutral Rotation group (Mean Difference: 0.57 ± 0.36 , Effect Size: 0.84). There was no significant improvement in the PPT across all three intervention groups as seen by the non-significant p-values (0.15, 0.61, and 0.97, respectively).

Conclusion

Wall-supported mini-squats with internal foot rotation were the most effective in improving performance followed by external and neutral foot rotations. However, there was no significant improvement in the PPT.

EP225

ULTRASOUND-GUIDED DIAGNOSIS AND MANAGEMENT OF GLUTEUS MINIMUS TENDON PATHOLOGY: A CASE REPORT

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Background and aims

Gluteus minimus tendon pathology is an underrecognized cause of lateral hip pain, often leading to misdiagnosis and suboptimal treatment. Ultrasound imaging plays a crucial role in evaluating tendon injuries, allowing for accurate diagnosis and targeted therapeutic interventions. This case report highlights the utility of ultrasound in identifying gluteus minimus tendon pathology and guiding appropriate treatment decisions.

Methods

This is a case report of a 50-year-old woman who presented with persistent severe left lateral hip and buttock pain following a fall from a height of approximately three meters. Clinical assessment, including physical examination and ultrasound evaluation, was conducted to determine the underlying pathology. Based on ultrasound findings, serial ultrasound-guided dextrose prolotherapy injections were administered to the affected tendon. In addition, a structured physical therapy program incorporating therapeutic exercises was introduced. The patient's response to treatment was monitored over time.

Results

Ultrasound examination identified heteroechogenicity with focal hypoechoic changes in the left gluteus minimus tendon, as well as an anechoic layer between the gluteus maximus and gluteus minimus tendons at the level of the left greater trochanter. These findings were consistent with a partial tear of the gluteus minimus tendon accompanied by greater trochanteric bursitis. The conjoint tendon at the left ischial tuberosity remained intact. Following serial ultrasound-guided dextrose prolotherapy injections, the patient reported significant symptom relief. Functional improvements were further achieved through physical therapy interventions.

Conclusion

Ultrasound is a valuable imaging modality for diagnosing gluteus minimus tendon pathology and differentiating it from other causes of lateral hip pain. Additionally, ultrasound guidance enables precise administration of therapeutic injections, contributing to effective symptom management. This case demonstrates that ultrasound-guided dextrose prolotherapy, in conjunction with physical therapy, can be a beneficial treatment strategy for patients with gluteus minimus tendon injuries.

EP226

A CASE OF A PARA-ATHLETE WHO WON A MEDAL BY EARLY REHABILITATION TREATMENT AFTER METATARSAL FRACTURE SURGERY

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Background and aims

Fractures of the proximal fifth metatarsal are one of the most common sports injuries. Surgical treatment is recommended for athletes, but it takes more than two months to return to sports after surgery. In this report, we describe a case in which a para-athlete won a medal at the Paris Paralympics within one month after metatarsal fracture surgery.

Methods

This is a case report of a male para-athlete in his 20s, who had autism and was scheduled to compete in the Paralympics.

On July X, 2024, he twisted his left foot during squat training and was diagnosed with a fracture of the left fifth metatarsal. An osteosynthesis surgery was performed seven days after the injury. He was transferred to our hospital on the second postoperative day for postoperative rehabilitation to return to sports as soon as possible. In his rehabilitation, endurance training, joint range of motion training and muscle strengthening training were emphasized in consideration of athletic performance, with pain was well controlled with analgesics.

Results

He was able to walk unassisted on the 8th postoperative day and was discharged from our hospital. On the 11th postoperative day, he left for Paris to participate in the Paris Paralympics, and on the 27th postoperative day, he won a bronze medal in swimming.

Conclusion

In this case, early postoperative rehabilitation considering of athletic performance and pain control enabled an early return to sports.

EP227

EFFICACY OF GAIT EXERCISE ASSIST ROBOT AND WELWALK FOR GAIT REHABILITATION IN PATIENTS WITH STROKE: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective

To examine the efficacy of Gait Exercise Assist Robot (GEAR) and Welwalk in gait independence among individuals with stroke.

Literature Survey

Randomized controlled trials (RCTs), randomized crossover trials, and cluster RCTs until September 2023 were researched through CENTRAL, MEDLINE, EMBASE, PEDro, CINAHL, and REHABDATA databases. Studies reporting on GEAR and Welwalk use to improve gait independence, activities of daily living (ADL), walking ability, and balance and reports of adverse events in individuals with stroke were included.

Methodology

Two independent reviewers extracted the data and assessed the risk of bias. The certainty of evidence was assessed using the Grading of Recommendations, Assessment, Development, and Evaluations approach. Synthesis: Five trials (including two unpublished trials) that enrolled individuals with stroke and compared GEAR or Welwalk and without were included.

Results

Compared with GEAR or Welwalk, conventional gait training could increase the chance of walking independently (Odds ratio, 2.19; 95%CI 1.13–4.25; $p < 0.001$; $I^2 = 0\%$; low-quality evidence). Furthermore, the use of GEAR or Welwalk in gait rehabilitation for people after stroke increased activity of daily living (standardized mean difference, 0.35; 95%CI, 0.05–0.65; $p = 0.020$; $I^2 = 0\%$; low-quality evidence). No study had reported adverse events.

Conclusions

Our findings suggest that people who use GEAR and Welwalk after stroke are likelier to achieve independent walking than those who receive gait training without these devices.

EP228

COMPARISON OF THE EFFICACY AND STRUCTURAL CHANGES OF INTRA-ARTICULAR ADALIMUMAB VERSUS INTRA-ARTICULAR HYALURONIC ACID IN PRIMARY OSTEOARTHRITIS OF THE KNEE: A RANDOMIZED CONTROLLED TRIAL

Shiv Lal Yadav

Objective

To Compare the Efficacy of a Single Ultrasound - Guided Intra - Articular Injection of Adalimumab with a Single Ultrasound Guided Intra - Articular Injection of Hyaluronic Acid using VAS for pain intensity and KOOS(Knee Injury and Osteoarthritis Outcome Measure).

Methods

40 consecutive patients of unilateral osteoarthritis of the knee (Grade 2 or Grade 3 according to the Kellgren Lawrence Scale) were randomly allocated to either the Adalimumab group (10mg) or the Hyaluronic Acid group (90mg/3ml). They were put on Tablet Paracetamol 500 mg on an SOS basis in addition to strengthening exercises of the Quadriceps and Hamstrings, Stretching exercises of the Hamstrings and Joint Protection Techniques. The patients were subsequently followed-up at 4 weeks and at 12 weeks and evaluated using the VAS and KOOS scale. Ultrasonographic evaluation of the distal femoral cartilage, synovium, medial and lateral meniscus, medial and lateral collateral ligaments and vascularity using Doppler was also done at baseline and at the 12 weeks follow-up.

Results

The two groups were comparable at baseline for VAS ($p=0.07$), KOOS ($p=0.68$), as well as the ultrasonographic features. There was improvement in both groups at the 4 weeks interval, however, it was more in favor of the Adalimumab group ($p=0.02$). A similar trend was observed at the 12 weeks follow-up. It was statistically significant for the Adalimumab group on comparison of the two groups ($p=0.01$). There was no change in the parameters assessed on ultrasound at the 12 weeks follow-up in either of the two groups.

Conclusion

Adalimumab by a USG-guided intra-articular injection was more efficacious as compared to a USG-guided intra-articular injection of Hyaluronic Acid for both pain and quality of life. There were no structure-modifying effects noticed at the 12 weeks follow-up.

Keywords

Adalimumab, Hyaluronic Acid, Pain, Osteoarthritis Knee

EP229

HIP SURVEILLANCE OUTCOMES IN CHILDREN WITH CEREBRAL PALSY: ASSOCIATION WITH GROSS MOTOR FUNCTION

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Background and aims

Hip displacement and dislocation are significant musculoskeletal complications in children with cerebral palsy (CP), particularly among non-ambulatory children. This study aimed to evaluate the structured hip surveillance practice at Hospital Rehabilitasi Cheras (HRC), Malaysia, and assess the association between Gross Motor Function Classification System (GMFCS) levels and hip displacement.

Methods

A retrospective cross-sectional study was conducted at HRC, reviewing medical records of children diagnosed with CP, aged below 18 years, who attended the Paediatric Rehabilitation Specialist Clinic between January 2018 and December 2021. Data collected included demographics, GMFCS level, pelvic radiographs, and hip migration percentage (MP). Hip displacement was defined as MP >30% and dislocation as MP >90%. Data were analyzed using SPSS version 22, with only descriptive statistics presented.

Results

A total of 200 medical records were reviewed. The prevalence of hip displacement increased with GMFCS level: 5.6% (GMFCS I), 16.7% (GMFCS II), 31.1% (GMFCS III), and 41.7% (GMFCS IV and V). Hip dislocation was observed in 2.8% (GMFCS II), 4.9% (GMFCS III), 11.8% (GMFCS IV), and 26.2% (GMFCS V). Most children in GMFCS IV (88.2%) and GMFCS V (73.8%) had not yet developed dislocation, indicating a critical window for preventive interventions.

Discussion & conclusion

This study demonstrated a clear correlation between higher GMFCS levels and the risk of hip displacement and dislocation, consistent with previous literature reporting up to 90% hip displacement rates among GMFCS V children. Early identification through structured hip surveillance is crucial to enable preventive measures, potentially averting progression to dislocation, which can lead to pain, difficulties in sitting, hygiene challenges, and reduced quality of life. These findings highlight the necessity of structured hip surveillance, particularly for non-ambulatory CP children, to facilitate early detection and reduce long-term complications.

EP230

ALTERED LUMBAR STABILIZER THICKNESS DYNAMICS DETECTED BY REHABILITATIVE ULTRASOUND IMAGING IN CHRONIC NONSPECIFIC LOW BACK PAIN

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Background and aims

Impaired activation patterns of lumbar multifidus (LM) and transverse abdominis (TrA) are hypothesized to contribute to lumbosacral instability in chronic nonspecific low back pain (CNLBP). This study investigates whether rehabilitative ultrasound imaging (RUSI) can detect differences in LM and TrA thickness changes during contraction between CNLBP patients and asymptomatic controls.

Methods

Sixty participants (48 CNLBP and 12 healthy) subjects were recruited. B-Mode RUSI measurements of LM (L4-L5 level) and TrA thickness were performed at rest and during maximal volitional contraction tasks. Relative thickening rates [(contraction thickness - rest thickness)/rest thickness] were calculated. Diagnostic validity was assessed through ROC analysis, sensitivity, specificity, and likelihood ratios.

Results

CNLBP group demonstrated significantly lower thickness changes in both LM (at rest, $p < 0.05$; contraction, $p < 0.01$) and TrA compared to control group. While LM demonstrated significant reduced relative thickening rates ($p < 0.01$), TrA showed comparable thickening ratios across groups ($p = 0.84$). Contralateral LM thickness changes demonstrated moderate diagnostic accuracy ($AUC = 0.68-0.81$), whether TrA metrics showed non-diagnostic performance ($AUC = 0.12-0.32$).

Conclusion

RUSI-quantified LM contraction deficits may serve as potential biomarkers for evaluating CNLBP, thereby emphasizing the clinical utility of incorporating such assessments into rehabilitation protocols for CNLBP.

EP231

COMPARATIVE EFFICACY OF CAST IMMOBILIZATION VERSUS REMOVABLE BRACES IN PATIENTS WITH ANKLE FRACTURES: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and aims

Determining an effective and appropriate method to support the ankle joint optimally is particularly important during the healing phase of ankle fractures. The purpose of this review was to assess the functional outcomes, ankle-related quality of life, and associated complications of cast immobilization versus removable braces for the treatment of adult ankle fractures.

Methods

Studies comparing cast immobilization and removable braces after ankle fracture were included by systematic searches of PubMed/MEDLINE, Web of Science, Scopus, and EMBASE databases according to PRISMA (Preferred Reporting Items for Systematic Evaluation and Meta-Analysis Statements) guidelines. Primary outcome measures included early to mid-late Olerud Molander Ankle Score (OMAS). Secondary outcomes were ankle dorsiflexion and plantarflexion, swelling, pain, time to return to work, calf muscle atrophy, and complications. Subgroup analysis was performed. Risk of bias was assessed in both randomized controlled trials and cohort studies.

Results

Eleven studies including 1485 patients met the eligibility criteria. The fracture types of the study included Weber A/B/C and Lauge-Hansen supination external rotation (SER), supination-adduction (SA), pronation-external rotation (PER) and pronation-abduction (PA). The results of the meta-analysis showed that removable braces had better early (mean difference (MD) -2.14; 95% confidence interval (CI) -4.26, 0.00) and mid-term functional outcomes (MD -5.81; 95% CI -10.35, -1.27) after ankle fracture compared with cast immobilization. In addition, removable braces caused significantly more wound breakdown (Odds ratio (OR) 0.39; 95% CI 0.17, 0.90) and wound infections (OR 0.32; 95% CI 0.17, 0.58) than cast immobilization.

Conclusion

Compared with cast immobilization, removable braces had better functional outcomes in the early and mid-term periods after ankle fractures and were less likely to result in deep vein thrombosis (DVT). Overall, the removable brace is a comfortable ankle fracture option that may improve functional outcomes.

EP232

EARLY VERSUS DELAYED WEIGHTBEARING ON POSTOPERATIVE ANKLE FRACTURES: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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Background and aims

The aim of this meta-analysis was to determine the clinical effectiveness of early weightbearing strategy (walking 2 weeks after surgery) compared with delayed weightbearing strategy (walking 6 weeks after surgery) on postoperative ankle fractures.

Methods

Four databases were systematically searched to include randomized controlled trials (RCTs) on early weightbearing for postoperative ankle fracture. Outcomes included Olerud-Molander Ankle Score (OMAS), the time to return to work/life and complications. After literature screening according to the eligibility criteria, data extraction, and quality evaluation, meta-analysis was performed using Revman 5.3 software. The review was conducted in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines.

Results

10 RCTs and 1276 patients were included in the study. Compared with the delayed weightbearing (DWB) group, the early weightbearing (EWB) group showed greater improvement in OMAS in the early stage (6 weeks postoperatively) [MD=5.86, 95% CI = (3.64, 8.08), $P<0.001$] and middle stage (12 weeks to 4 months postoperatively) [MD=3.17, 95% CI = (0.84, 5.50), $P=0.008$]. However, there was no significant difference between the EWB group and the DWB group in OMAS in the late stage (12 months postoperatively) [MD=1.86, 95% CI = (-0.50, 4.22), $P=0.12$]. The EWB strategy also shortened the average duration of returning to work/life [MD=-1.75, 95% CI = (-2.52, -0.98), $P<0.001$]. There was no significant difference in complication rates between the EWB group and the DWB group [RR=1.34, 95% CI = (0.96, 1.86), $P=0.08$].

Conclusion

The results showed that the EWB strategy is safe and effective in improving ankle function and quality of life among patients with ankle fractures. The EWB is expected to be a more promising strategy for patients after ankle fracture surgery.

EP233

ASSESSMENT OF PARTICIPANT'S THOUGHT ABOUT CLIMATE CHANGE ON SCI AND DISASTER REHABILITATION: FEEDBACK FROM GLOBAL REHABILITATION HEALTH WORKER

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Background and aims

Attending Global cross-country conference are incredibly valuable in the field of health sector and extension of opportunities for researchers. They offer a chance to share research and preliminary findings, receive feedback, and improve an ongoing work. ASCON 2024 was an assemble of diverse participation of healthcare professional and allied, social worker, volunteers, spinal cord injured patients. 17 different countries 117 participants were attended three days long conference containing several scientific sessions, inauguration of new society, workshops, poster presentations, lectures, free paper session. One of session was by BSPMR about climate change on spinal cord injury following disaster and action plan. 26 participants were present there to hear about climate change, we gathered some points to have an idea about basic concept of climate change on SCI among health care professionals and their allied in order to develop and integrate proper action plan. Objective: Persons with disabilities are disproportionately impacted by extreme weather disasters and climate change especially pSCI are at risk due to inability to control their body temperature and mobility concerns. We surveyed thought of rehabilitation professionals in the field of SCI and climate change to determine their experiences and educational needs regarding natural disasters, climate change and inclusion in action policy at low resource setting.

Methods

The survey was developed by the authors and conducted during conference. It was distributed among various international health care professional those who associated with SCI treatment. Descriptive statistics and chi-square test for association were performed using Microsoft Excel 2022. Result: 62.5% were female and 37.5% were male, 93.8% thought climate change is a global threat and role of health care professional on climate change, 81.3% wanted to learn more about climate change. Access to services, assistive devices, medicines, Inaccessibility for provision of rehab services, evacuation of persons with SCI were prime issues detected by participants.

Conclusion

Most respondents acknowledged a need for more information related to the disasters, climate change, and disability. Though climate change education started extensively national agenda can develop and talk, symposium, post graduate curriculum inclusion can be game changing following these.

EP234

TRENDS IN GLOBAL MUSCULOSKELETAL REHABILITATION NEEDS FROM 1990 TO 2050: A SYSTEMATIC ANALYSIS OF THE GLOBAL BURDEN OF DISEASE STUDY 2021

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Background and aims

Musculoskeletal disorders (MSDs) are a major cause of global disability, affecting quality of life and socioeconomic systems. This study aims to analyze MSD prevalence trends, gender and age disparities, and health inequalities to improve prevention and treatment strategies.

Methods

This study analyzed the epidemiological trends and health inequities of seven MSDs (osteoarthritis, rheumatoid arthritis, low back pain, neck pain, fractures, amputations, and other MSDs) across 1990 to 2021 using GBD data. Joinpoint regression and ARIMA models were employed to evaluate historical trends and project future burdens to 2050. Gender, age and SDI differences in MSD burden were further analyzed.

Results

From 1990 to 2021, the prevalence and years lived with disability (YLDs) rates of most MSDs showed an upward trend globally. By 2050, osteoarthritis and rheumatoid arthritis are projected to rise steadily, while low back pain and fractures exhibit sex specific declines. Women consistently carried higher burdens for most MSDs, with the exception of amputations and fractures. Age-related risks intensified for osteoarthritis, fractures, and low back pain, peaking in older adults. SDI analysis revealed higher MSD prevalence and YLDs in high SDI regions, with notable health inequalities for fractures, osteoarthritis, low back pain, and rheumatoid arthritis. Conversely, low SDI regions experienced increased YLDs due to amputations. And health inequalities regarding overall MSDs and rheumatoid arthritis worsened.

Conclusion

This study highlights the escalating burden of MSDs, driven by aging populations, lifestyle changes, and unequal access to healthcare. Enhancing the quality and coverage of rehabilitation services in primary care, particularly in low SDI regions, and addressing gender and age specific risk factors are crucial for mitigating the global impact of MSDs.

EP235

BURDEN OF REHABILITATION NEEDS IN BRICS COUNTRIES: A SYSTEMATIC ANALYSIS OF THE GLOBAL BURDEN OF DISEASE STUDY 2021

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Background and aims

The BRICS countries (Brazil, Russia, India, China and South Africa) have a major impact on the global rehabilitation burden due to their large share of the global population. However, the rehabilitation needs of BRICS countries remain unknown. This study aimed to explore the rehabilitation needs of the BRICS countries from 1990 to 2021 and predict the trend of rehabilitation needs over the next 15 years.

Methods

The data of health conditions needing rehabilitation were obtained from the Global Burden of Diseases (GBD) 2021 study. The joinpoint regression models were used to calculate average annual percentage changes (AAPCs) to quantify trends in age-standardized rates. The autoregressive integrated moving average (ARIMA) models were used to predict rehabilitation needs until 2036.

Results

The number of prevalent cases of all conditions requiring rehabilitation increased from 634 million (95% uncertainty interval [UI] 608-664) in 1990 to 1.093 billion (1.056-1.135) in 2021, an increase of 72.2%. The years lived with disability (YLD) counts of all conditions increased from 79 million (60-101) in 1990 to 147 million (112-189) in 2021, an increase of 85.6%. Since 1990, the age-standardized prevalence of total rehabilitation needs has been decreasing in all BRICS countries. The number of people needing rehabilitation will continue to grow, with 1.469 billion people in BRICS countries requiring rehabilitation services by 2036. The highest contribution to the need for rehabilitation in BRICS countries was musculoskeletal disorders with about 676 million people (630-716) in eight condition categories, and hearing loss with 232 million people (205-260) among 27 individual conditions.

Conclusion

The need for rehabilitation in BRICS countries has increased substantially over the past 32 years and will continue to increase until 2036. Rehabilitation services meeting rehabilitation needs, especially for musculoskeletal disorders, are recommended to be integrated into the primary care systems of countries.

EP236

IMPACT OF MULTI-DISCIPLINARY REHABILITATION ON QUALITY OF LIFE: INSIGHTS FROM A ONE YEAR EQ-5D-5L ANALYSIS

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Background and aims

Quality of Life (QOL) assessment is essential for evaluating treatment effectiveness. The EQ-5D-5L, a widely used tool introduced by the EuroQol group, measures health across five key dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. This study aimed to evaluate the impact of multi-disciplinary rehabilitation on QOL of patients receiving treatment in an Ambulatory Rehabilitation Centre.

Methods

Baseline and post-treatment EQ-5D-5L QOL data from 305 patients who received multi-disciplinary rehabilitation at IHT Ambulatory Rehabilitation Centre between January and December 2024 were collected. Changes in scores across the five health dimensions, as well as mean health index score (indicative of overall QOL) and Visual Analogue Scale (VAS, representing perceived QOL) were analyzed.

Results

Statistically significant improvements were observed across all five EQ-5D-5L dimensions: mobility (2.58 to 2.02), personal care (1.87 to 1.46), usual activities (2.49 to 1.86), pain and discomfort (1.93 to 1.66), and anxiety and depression (1.67 to 1.31). The mean health index score also increased significantly from 0.47 to 0.67 while mean VAS score improved from 66.9 to 84.3

Conclusion

This analysis demonstrates the efficacy of multi-disciplinary rehabilitation in improving patients' QOL, with significant improvements across different health dimensions, health index scores, and perceived health. These findings supported the critical role of structured rehabilitation in promoting long-term functional recovery and enhancing overall patient well-being.

EP237

PRELIMINARY EXPLORATION MUSCULOSKELETAL HEALTH CARE BASED ON ICOPE AND BONE DENSITY ASSESSMENT IN NORTH TAIWAN

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Background and aims

Taiwan will enter a super-aged society in 2025. The musculoskeletal health care of the elderly is becoming important. Osteoporosis and sarcopenia known as the invisible killers of the elderly, are inseparable from aging. Through ICOPE (Integrated Care for Older People), bone density screening and fracture risk assessment tools, Individualized and complete health care recommendations are given to community elders, as well as early intervention for high risk cases.

Methods

In August 2023, screening activity was held in Taipei clinic with a total of 64 participants, 10 male and 54 women. Age distribution: 2 people (3.1%) under the age of 50, 26 people between the ages of 50~64(40.6%) and 36 people (56.3%) over the age of 65, with an average age was 65.8. The mobile DXA bus is used for the bone density screening, and the FRAX is used for the fracture risk assessment tool

Results

Analysis of high-risk groups with fracture risk in ten years: 6 people (9.4%) had major osteoporotic fracture; 24 people (37.5%) had hip fracture.

There are 14 people (21.9%) whose bone density T-score is less than -2.5, and those who are over 65 years old account for 71.4%. The screening for locomotion function was mainly based on the lower limb muscle endurance test (Five Times Sit to Stand Test), with an average time of 10.26 seconds, there are 14 people (21.9%) in the risk group of frailty or sarcopenia.

Conclusion

It is recommended to combine bone density examination with screening of frailty/sarcopenia and fracture risk in order to prevent osteoporotic fractures early. Pharmacological and Non-pharmacological interventions were suggested by medical professionals and perform individualized exercises prescription to improve muscle endurance and balance, thereby reducing the risk of fractures caused by falls. Provide more comprehensive musculoskeletal health care for the elderly in the community.

EP238

A SCIENTOMETRIC ANALYSIS OF ARTIFICIAL INTELLIGENCE IN TELEREHABILITATION: RESEARCH HOTSPOTS AND TRENDS BASED ON CITESPACE

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Background and aims

Artificial intelligence (AI) has emerged as a transformative tool in telerehabilitation, enhancing personalized treatment, real-time monitoring, and rehabilitation outcomes. This study aimed to conduct a scientometric analysis of AI applications in telerehabilitation over the past decade (2014-2024), focusing on research trends, key developments, and collaborative networks in the field.

Methods

The study utilized CiteSpace for bibliometric analysis, examining articles published between 2014 and 2024 from the Web of Science Core Collection (WoSCC). A total of 161 articles were included, and a visual knowledge map was generated to identify research hotspots and emerging trends. The analysis covered publication trends, country and institution collaborations, keyword co-occurrence, and citation patterns.

Results

The results indicated a significant increase in publications, particularly from 2019 onward. Key research areas included stroke rehabilitation, virtual reality (VR), deep learning, and wearable sensors. The United States, Italy, and China were the leading contributors to the field. Co-citation and keyword analysis revealed a growing emphasis on AI-driven remote monitoring, personalized rehabilitation therapies, and the integration of deep learning technologies.

Conclusion

AI applications in telerehabilitation have rapidly evolved, with significant advancements in technologies such as VR, deep learning, and wearable sensors. Future research should focus on broadening the scope of AI applications across different rehabilitation contexts, including chronic diseases and neurological conditions. Interdisciplinary collaborations and a focus on global accessibility will be key to the continued development and implementation of AI in telerehabilitation.

EP239

INCIDENCE AND RISK FACTORS OF FALLS IN A REHABILITATION WARD: A THREE-YEAR RETROSPECTIVE REVIEW

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Background and aims

Falls are a significant concern in rehabilitation wards due to patients' mobility and functional impairments. Understanding fall incidence and associated risk factors is crucial for prevention. This study aims to determine the incidence of falls in a 10-bedded rehabilitation ward and identify contributing factors over a three-year period.

Methods

A retrospective review of fall incidents was conducted in the rehabilitation ward of Hospital Kuala Lumpur from 2021 to 2023. Fall incidence was calculated per 1,000 patient-days. Data on patient demographics, primary diagnoses, time of falls, and associated risk factors were collected and analyzed.

Results

A total of 25 falls were recorded over 10,950 patient-days, yielding an incidence rate of 2.28 falls per 1,000 patient-days. Most falls occurred in patients with neurological conditions, particularly post-stroke and spinal cord injury. Falls predominantly occurred during transfers or ambulation, with peak times in the early morning and late evening. Common contributing factors included muscle weakness, impaired balance, cognitive dysfunction, and polypharmacy. No major injuries were reported, though minor bruises and psychological distress were common.

Conclusion

The incidence of falls in our rehabilitation ward is relatively lower than some published rates but remains a critical concern. Identifying high-risk patients and implementing targeted interventions, such as supervised mobility training, medication review, and environmental modifications, may help reduce fall rates. Further research is recommended to assess the effectiveness of these preventive strategies.

EP240

DETERMINANTS OF THE USE OF PHYSICAL THERAPY SERVICES AMONG INDIVIDUALS WITH PARKINSON'S DISEASE LIVING IN SOUTHEAST OF IRAN

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Background and aims

Physical therapies have been recommended physical therapy for people with PD soon after diagnosis to provide education, physical activity advice, and individualized interventions. However, physical therapy is under-utilized in the southwest of Iran. The aim of this study is to identify the factors affecting the use of physical therapy services among individuals with PD living in southwest of Iran.

Methods

278 individuals with PD, at any stage of the Hoehn & Yahr (HY) scale, in south west of Iran were recruited from April 2022 to April 2024. For the creation of the logistic model, the association of the dependent variable "physical therapy" with the independent socioeconomic and clinical variables: age, education, family income, time of PD since onset, HY, fatigue symptoms, fear of falling, freezing gait, history of falls, physical activity level were tested. Ten semi structured interviews performed with twenty neurologists to explore barriers to access to physical therapy in early PD.

Results

The participants had a mean age of 62.2 ± 9.8 years, 84% were in the HY I-III stages and only 22.3% were under physical therapy treatment. The analysis identified two determinant variables related to the use of the physical therapy service: level of education (OR = 2.13) and socioeconomic situation (OR = 0.91). Financial and insurance resources were the main barrier for participants to fully commit to a long-term, ongoing physical therapy program. There are no support structures for Parkinson's patients and awareness of the disease is low. People with early-stage of PD have better social support and higher incomes, but there are few referrals to long-term physical therapy among these individuals.

Conclusion

This study shows that people with Parkinson's disease living in south-east Iran have limited access to physical therapy services. The Iranian public health care (PHC) system and insurance companies need to target PD patients to improve their access to physical therapy services.

EP241

A NON-LINEAR ASSOCIATION BETWEEN FALLS AND AMBULATION ABILITY IN STROKE SURVIVORS

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Background and aims

Falls are a significant health issue for stroke survivors, with a high incidence, morbidity, and even mortality. Impaired ambulation and balance are important risk factors; however, studies have reported that stroke patients with moderate function, as assessed by the modified Rankin Scale, are at the greatest risk of falls. Despite this, limited research has explored the contribution of other medical or stroke-related factors. The goal of this study is to survey the prevalence of falls in community-dwelling stroke survivors and analyze the contributing factors

Methods

This cross-sectional survey was conducted as part of a longitudinal follow-up study, recruiting participants aged 50 years or older, diagnosed with stroke, and living in the community. Participants completed a survey that included chart reviews, questionnaires, and assessments of physical function. Their fall history over the past year was reported retrospectively.

Results

The study recruited 113 participants aged 50 and older (mean age: 69.8 ± 20.7 years). A fall prevalence of 28.6% was reported over the past year. Fall prevalence varied significantly according to their ambulation ability, as measured by the Functional Ambulation Category (FAC). The highest fall prevalence was observed in stroke patients with FAC III (50.0%), followed by FAC I-II (42.9%), FAC IV (24.0%), and FAC V (13.3%), with balance ranking from FAC I to FAC V. Additionally, the participants reported the highest fear of falls among the four groups. Stroke-related factors did not appear to contribute to the fall history.

Conclusion

Community-dwelling stroke survivors with moderate ambulation ability are more likely to experience falls and fear of falls, even though their balance is not necessarily the poorest. These results help identify high-risk groups and facilitate the development of function-specific fall prevention strategies.

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EP242

INTERNET DEPENDENCY AMONG HEALTHCARE PROFESSIONALS IN HOSPITAL REHABILITASI CHERAS

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Background and aims

Internet dependency or internet addiction refers to an excessive use of the internet that can impact various aspects of life, including personal relationships, work performance, mental and even physical health. With the global concern regarding internet use, this study aims to determine the prevalence of internet dependency among healthcare professionals in Hospital Rehabilitasi Cheras.

Methods

Cross sectional study using online surveys which were distributed towards all healthcare staff in Hospital Rehabilitasi Cheras from January 2024 to April 2024. The self-administered questionnaire consists of 3 parts, sociodemographic, internet activity and Chen Internet Addiction Scale (CIAS).

Results

A total of 172 respondents took on this survey. The data encompass 22.1% male and 77.9% female with the mean age of 34.7 years old. Majority are of Malay ethnicity (79.7%) followed by Chinese (9.3%), and Indian (7.6%). The designation is composed of nurses (46.5%), medical officer/specialist (20.3%), allied health professionals (11.6%), pharmacists (5.8%) and others. 91.3% of them use smartphones to access the internet with an average of 3.7 hours of online activity per day which include activities such as social networking, shopping, gaming, video streaming and reading news/articles. Based on the CIAS, 17.4% (n=30) have possible internet addiction.

Conclusion

This study is mainly to screen these particular demographics on their internet activities and level of dependencies. Results showed that the possibility of internet addiction in our setting is almost the same with other studies. The cause can be multifactorial and may be influenced by various psychological, social, or environmental aspects. More research is required to look into this subject with continuous effort from relevant parties to manage this issue within the healthcare environment.

EP243

ANALYSIS OF STANDARDIZED DEVELOPMENT OF INFORMATION SYSTEM-BASED WHOLE-PROCESS PRECISION REHABILITATION ASSESSMENT IN REHABILITATION MEDICINE DEPARTMENTS

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Background and aims

To explore the implementation of comprehensive and precise rehabilitation assessment processes within the information system framework of the rehabilitation medicine department in a tertiary general hospital, and to provide feasible insights for achieving information-based operations

Methods

The Rehabilitation Medicine Department of the First Affiliated Hospital of University of South China has developed and refined a clinical full-process precision assessment model and workflow based on an information system. This model standardizes the rehabilitation assessment process for key clinical conditions such as stroke, spinal cord injury, degenerative spinal and joint diseases, post-fracture surgery, and sports injuries. Additionally, in alignment with the requirements of clinical rehabilitation case quality inspections and medical flight inspections, the department has implemented information-based and standardized documentation for rehabilitation treatment. The department also integrates various advantageous resources to combine qualitative and quantitative assessments, as well as quantitative and semi-quantitative evaluations, thereby enhancing the objectivity and precision of rehabilitation assessments. Quality control and evaluation of rehabilitation assessments are comprehensively implemented

Results

The department has encountered several challenges in the development of rehabilitation assessment practices, including varying levels of education and experience among therapists, confusion in the application of assessment scales, and the need for improvement in the holistic evaluation of common diseases. In response, the department has actively implemented countermeasures: establishing a full-process rehabilitation assessment system, adjusting and optimizing clinical and rehabilitation teaching practices, selecting scales with high reliability and validity, comprehensively assessing patients' overall functionality, implementing dual measures for quality control and evaluation of rehabilitation assessments, and achieving precision in rehabilitation assessments to promote the coordinated development of clinical teaching and research

Conclusion

The full-process rehabilitation assessment work based on an information system is a significant reflection of the comprehensive development of the rehabilitation medicine department in a general hospital and contributes to the high-quality development of hospital medical management and service levels

EP244

DAYCARE REHABILITATION IN ACTION: INSIGHTS FROM HOSPITAL RAJA PERMAISURI BAINUN, IPOH

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Background and aims

Daycare rehabilitation program (DRP) has been established in Hospital Raja Permaisuri Bainun (HRPB) from April 2021 till present. DRP plays a crucial role in optimizing patient recovery by providing structured, interdisciplinary rehabilitation without the need for inpatient admission. This program allows patient accessibility to more intensive interdisciplinary therapy sessions with limited healthcare resources. DRP is conducted three times per week for 3 hours per session with a team of rehabilitation clinician, nurse, physiotherapist, and occupational therapist. Each session has a maximum of 6 patients with individualized therapy. This study was conducted to describe patient's characteristics in DRP.

Methods

This observational study was conducted at the daycare rehabilitation unit of HRPB from April 2022 till December 2024. Data were collected from patient's records, attendance log, and direct observation to assess the scope of services provided and patient utilization patterns. Key variables analyzed included the patient's demography and service utilization. Descriptive statistics were used to summarize the data, providing insights into the trends of daycare rehabilitation services.

Results

This descriptive study examines the characteristics of patients attending DRP at HRPB. A total of 177 patients were included, with a mean age of 51.35 years (± 17.98) with age range from 4 - 82 years old. The majority were males (61.6%), while females accounted for 38.4%. The mean number of therapy sessions attended was 9.9 (± 6.56). The types of therapy provided to patients were categorized into five categories with the most common being neuromuscular rehabilitation (49.7%) followed by amputee rehabilitation (36.7%) and spinal cord injury rehabilitation (11.3%). These findings provide insight into the demographic and clinical profile of patients utilizing daycare rehabilitation services, adding in future service planning and optimization.

Conclusion

Further study can be conducted to compare the efficacy between conventional outpatient therapy and DRP.

EP245

“LEADERSHIP IN NURSING EXCELLENCE” INVOLVING OF A SPINAL CORD INJURY CENTER

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Background and aims

Nursing and the healthcare system in general are also facing major challenges not only in the DMGP (Deutschsprachige Medizinische Gesellschaft für Paraplegiologie / German Speaking Medical Society for Paraplegiology) countries Austria, Germany and Switzerland but also across the globe to ensure excellent patient care through continuous process and outcome improvements. It is therefore crucial to create a resilient and adaptable organization that attracts and retains highly professional nursing staff.

Methods

Our flagship project regarding “Leadership in Nursing Excellence” is to be the first hospital in Germany to become a “Magnet” hospital and to implement the US “Magnet” principles. This includes organizing and conducting an international Nursing Summer School that deals with concepts and evidence in the organizational context of nursing practice, and a nursing management congress that illustrates what it means to learn from the best and to promote excellence in nursing and healthcare.

Results

That is where our spinal cord injury center comes into play with its interprofessionalism and flat hierarchy to support and thereby accelerate “the journey” to becoming a Magnet hospital. The highlight so far was the participation of our Magnet representatives at the ANCC (American Nurses Credentialing Center) National Magnet Conference in New Orleans in October 2024 with over 15,000 (!) participants.

Conclusion

Have a look on the magnificent steps of this journey to understand what it means to become a leader in nursing excellence.

EP246

CHARACTERISTICS OF JAPAN'S KAIFUKUKI REHABILITATION WARD: AN INTERNATIONAL COMPARATIVE ANALYSIS

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Background and aims

Japan's Kaifukuki Rehabilitation Ward (KRW) is a unique system providing structured rehabilitation after acute care. This study examines its key characteristics and evaluates strengths and challenges through international comparison.

Methods

Public data and existing literature were analyzed to evaluate the structural and operational aspects of KRWs in Japan. Furthermore, rehabilitation systems in the United States, the United Kingdom, Germany, France, and Singapore were examined to identify key institutional differences and assess how Japan's approach compares to international models.

Results

Three key features of KRWs were identified:

1. **Seamless Transition** – Many KRWs are integrated within or located adjacent to acute hospitals, allowing for a smooth and coordinated transition of patients. In contrast, separate rehabilitation facilities in other countries often lead to care disruptions. However, KRW bed allocation may be influenced by hospital logistics rather than patient needs.
2. **Standardized System Design** – Japan's nationwide reimbursement system ensures that KRWs follow uniform standards, minimizing regional disparities and maintaining consistent care quality. This framework provides patients with reliable access to rehabilitation services but limits flexibility in adapting to regional needs.
3. **Longer Hospital Stays** – Due to Japan's universal health coverage, KRWs allow extended hospitalization for rehabilitation, with patients permitted to stay for up to 180 days (average 60) depending on their condition, significantly longer than in other countries. While this supports functional recovery, it raises concerns over rising healthcare costs and unnecessary hospitalization.

Conclusion

Japan's KRW system offers substantial benefits, particularly in ensuring continuity of care, maintaining standardized service quality, and providing extended rehabilitation periods to maximize patient recovery. However, to ensure the long-term sustainability of KRWs, ongoing policy refinements and structural improvements are essential. Learning from international models will be crucial in optimizing Japan's approach to post-acute rehabilitation.

EP247

DISEASE BURDEN AND PROJECTIONS OF EARLY-ONSET DEMENTIA IN CHINA FROM 1990 TO 2021: RESULTS FROM THE GLOBAL BURDEN OF DISEASE STUDY 2021

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Background and aims

As the global population ages, dementia has emerged as a rapidly growing public health challenge. However, there has been a lack of comprehensive research on early-onset dementia (EOD) in China. This study aims to quantify the disease burden of EOD and project its trends through to 2035 in China.

Methods

Drawing on data from the Global Burden of Disease (GBD) 2021 study, this research examined the incidence, prevalence, mortality, and disability-adjusted life years (DALYs) of EOD in China from 1990 to 2021, presenting both the case numbers and age-standardized rates (ASRs). The average annual percentage changes (AAPCs) for incidence, prevalence, mortality, and DALYs were estimated using segmented regression analysis. Furthermore, the Bayesian age-period-cohort (BAPC) model was employed to project the trends in incidence, prevalence, mortality, and DALYs of EOD in China from 2022 to 2035.

Results

In 2021, the case numbers of incidence, prevalence, mortality and DALYs for EOD in China were 453.09 thousand (95 %UI: 296.30, 639.31), 2410.83 thousand (95% UI: 1803.71, 3158.25), 20.97 thousand (95% UI: 4.03, 66.79), and 1123.83 thousand (95% UI: 507.11, 2613.29), respectively. These numbers represent a substantial increase compared to those in 1990. The AAPCs in age-standardized incidence rate (ASIR) and age-standardized prevalence rate (ASPR) were 0.44% (95% CI: 0.39–0.49) and 1.30% (95% CI: 1.13–1.47), respectively, indicating significant upward trends. In contrast, the AAPC for age-standardized mortality rate (ASMR) was -0.009% (95% CI: -0.01–0.008), suggesting a slight overall decline, while the AAPC for age-standardized DALY rate (AS-DALYs) was 0.03% (95% CI: -0.01–0.07), indicating a relatively stable trend. Additionally, females had higher case numbers and ASRs across all disease burden indicators compared to males. From 2022 to 2035, the case numbers of incidence, prevalence, mortality and DALYs for EOD in China are projected to initially increase and then decrease. However, the ASRs are expected to decline overall.

Conclusion

Given the growing burden of EOD in China, there is an urgent need to develop targeted strategies for prevention and effective rehabilitation methods.

EP248

BRIDGING GAPS IN REHABILITATION MEDICINE IN THE MALDIVES: CHALLENGES AND OPPORTUNITIES

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Background and aims

The Maldives, a small island nation within Indian Ocean, faces significant challenges in delivering accessible and equitable rehabilitation medicine services. With rising burden of non-communicable diseases (NCDs), disabilities, and an aging population, need for rehabilitation services is increasing. NCDs account for over 70% of deaths in Maldives, and the 2022 Census reports 6.1% of the population has a disability, highlighting urgent need for rehabilitation services. This study aims to identify challenges and explore opportunities to bridge gaps and improve rehabilitation medicine in the Maldives.

Methods

Data was collected through discussions with healthcare providers, policymakers, and patients, to assess availability of services, workforce and public awareness. Publicly available data and successful models from similar settings were also reviewed to identify best practices and potential solutions.

Results

The study revealed critical challenges, including limited rehabilitation infrastructure, with only few specialized centers located in urban areas and severe workforce shortages, with no rehabilitation medicine specialist in the country and only 2 physiotherapists and 1 occupational therapist per 10,000 population. Most healthcare services are concentrated in the capital, while 60% of individuals with disabilities live in rural islands, complicating access to care. The public has limited awareness of available services or benefits. However, opportunities exist to establish and improve rehabilitation services, beginning with development of specialized centers. Once the foundation is firmly established, expansion through Community-based rehabilitation (CBR) and decentralized regional hubs could be explored, similar to other small island nations.

Conclusion

Bridging gaps in rehabilitation medicine in Maldives requires investments in infrastructure, workforce, and communication. Establishing foundational rehabilitation services should be prioritized, followed by decentralization and CBR programs to improve accessibility. Policy reforms and international collaborations are important to secure funding and build a sustainable system, improving the quality of life for individuals with disabilities and chronic conditions.

EP249

PRELIMINARY OUTCOME OF ROAD TRAFFIC ACCIDENTS-RELATED TRAUMATIC BRAIN INJURIES AMONG MALAYSIAN SCHOOL-AGED CHILDREN

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Background and aims

Traumatic brain injury (TBI) from road traffic accidents (RTAs) is a major public health concern worldwide. RTAs remain a leading cause of paediatric TBI, with motorcycle-related accidents being the most common. This study aims to assess functional outcomes and factors associated with good outcome among school-aged children with RTA-related TBI in Malaysia.

Methods

A retrospective analysis of 542 medical reports from 2009 to 2019 was conducted. Participants aged 7–17 years with first-time TBI due to RTAs were included. Data on sociodemographic, injury details, complications and functional outcomes were extracted. Functional outcomes were evaluated using the Glasgow Outcome Scale-Extended for Paediatrics (GOSE-Peds), with scores categorised into good (1–2) and poor (3–8). Statistical analyses included descriptive statistics and multivariate logistic regression.

Results

The majority of participants were male (81.5%), with a mean age of 14.3 years at injury. Motorcycles were the predominant accident mode (76%). Overall, 27.5% of participants achieved a good functional outcome, with younger children (7–9 years) demonstrating the highest recovery rates (34.5%) however it was not statistically significant. Predictive modelling for older adolescents (15–17 years) identified TBI severity and tracheostomy requirement as significant predictors of outcome. Mild TBI cases were 2.5 times more likely to have good outcomes (OR 2.5, CI: 1.29–4.83), while tracheostomy was associated with a sevenfold lower likelihood of recovery (OR 7.02, CI: 2.06–23.93). 63–88% of children returned to education (RTE) post-TBI across different age-groups, however about 60% of these children faced academic challenges

Conclusion

Our preliminary study shows no statistically significant difference in functional outcome in different age groups. Mild TBI and absence of tracheostomy is associated with good functional outcome in older adolescent group. More than half of children who returned to education faced academic challenges.

EP250

EFFECTIVENESS OF A NEW MODEL OF POST-ACUTE CARE REHABILITATION WARD IN TAIWAN - IMPROVING TUBE REMOVAL, HOME DISCHARGE, AND COST EFFICIENCY

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Background and aims

The new rehabilitation ward at a regional hospital pioneers Taiwan's first skilled mixed care model in post-acute care (PAC), designed for patients with stroke, fragile fractures, and traumatic brain injury (TBI). This model integrates rehabilitation rooms, multifunctional training spaces, and a home environment simulation area within the ward, providing high-intensity rehabilitation and interdisciplinary teamwork to promote recovery and home discharge. This study evaluates its effectiveness in tube removal, home discharge, financial burden reduction, and long-term care integration.

Methods

This retrospective study analyzed data from patients in the PAC ward between January 1, 2023, and December 31, 2023, evaluating nasogastric tube and Foley catheter removal rates, home discharge rates, and the financial impact on both patients and the healthcare system.

Results

This study included 185 patients. The new PAC model achieved a 100% tube removal rate for stroke patients and an average home discharge rate of 91.5%, exceeding 88% in traditional PAC rehabilitation according to Taiwan's 2018 National Health Insurance data. Among 185 patients, 91 received the skilled mixed care model, showing functional improvements comparable to one-on-one care (discharge Barthel Index: stroke 77.5 vs. 76.3; fracture 64.4 vs. 61.8). This model also saved an average of NT\$103,155 per patient in caregiver's costs. Additionally, stroke patients had an average reduction of NT\$74,775 in healthcare costs during three months following discharge, compared to those in traditional rehabilitation.

Conclusion

This cost-effective PAC model improves tube removal and home discharge rates while reducing healthcare system costs. Patients receiving skilled mixed care showed functional improvements similar to those receiving one-on-one care. By integrating intensive rehabilitation, coordinated discharge planning, and long-term care, it enhances successful home discharges. Future efforts will expand interdisciplinary collaboration and innovative rehabilitation strategies to further optimize patient outcomes.

EP251

COST-EFFECTIVENESS ANALYSIS ACCORDING TO APPLICATION OF AUTOMOBILE PROTECTION PILOT PROJECT

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Background and aims

Rehabilitation support for road traffic accident patients plays an important role in reducing the socioeconomic burden on the country. To evaluate the effectiveness of the newly implemented automobile insurance pilot project in 2024, we conducted a cost-effectiveness analysis of patients admitted to the Korea National Traffic Rehabilitation Hospital (KNTRH), categorized into three groups: those covered by national health insurance, the rehabilitation medical institution pilot project, and the automobile insurance pilot project.

Methods

This study assessed the cost-effectiveness of the automobile insurance pilot project compared to other types of health insurance among patients aged 20 years or older who were admitted to KNTRH in 2024. In the cost-effectiveness analysis, medical effectiveness was defined by the patient's length of stay (LOS) and functional assessment scores, and the costs were calculated based on rehabilitation costs. Descriptive statistical analyses were performed to measure the costs relative to the effectiveness, using SAS.

Results

A total of 589 adult patients hospitalized at KNTRH in 2024 were included in the analysis. Among them, 143 patients (24.3%) were covered by national health insurance, 291 (49.4%) by the rehabilitation medical institution pilot project, and 155 (26.3%) by the automobile insurance pilot project. Patients under the automobile insurance pilot project incurred the highest medical costs, had the longest LOS, and showed the highest scores in LOS, Functional Ambulation Categories (FAC), Korean-modified Barthel Index (K-MBI), and Spinal Cord Independence Measure III (SCIM-III). The costs relative to the effectiveness of the automobile insurance pilot project group were the highest in LOS (\$302), FAC (\$38,999), mini-mental state examination-Korean (MMSE-K) (\$14,300), and SCIM-III (\$2,632).

Conclusion

Although the automobile insurance pilot group demonstrated relatively lower cost-efficiency, they achieved higher levels of medical effectiveness. These findings can serve as reference data for evaluating the appropriateness of rehabilitation treatment fees for traffic accident patients and for informing future policy development.

Disclosures

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Characteristics	Type of Health Insurance						Total	p-value
	National Health Insurance		Rehabilitation Medical Institution Pilot Project		Automobile Insurance Pilot Project			
	n	%	n	%	n	%		
Age								
Under 20 years old	9	6.3%	15	5.2%	5	3.2%	36	0.0095
20 to 29 years old	8	5.6%	15	5.2%	25	16.1%	53	
30 to 39 years old	11	7.7%	18	6.2%	13	8.4%	51	
40 to 49 years old	13	9.1%	3	10.3%	22	14.2%	72	
50 to 59 years old	23	16.1%	55	18.9%	26	16.8%	122	
60 to 69 years old	41	28.7%	71	24.4%	31	20.0%	166	
70 years old or older	38	26.6%	87	29.9%	33	21.3%	186	
Types of Rehabilitation Centers								
Musculoskeletal	40	28.0%	38	13.1%	94	60.7%	172	<.0001
Acquired Brain Injury	70	49.0%	172	59.1%	38	24.5%	280	
Pediatric Rehabilitation	5	3.5%	7	2.4%	0	0.0%	12	
Spinal Cord Injury	28	19.6%	74	25.4%	23	14.8%	125	
Total	143	24.3%	291	49.4%	155	26.3%	589	

Table 1. Patient Characteristics by Type of Health Insurance

Cost Type	Type of Health Insurance						<i>p-value</i>
	National Health Insurance		Rehabilitation Medical Institution Pilot Project		Automobile Insurance Pilot Project		
	Mean	SD	Mean	SD	Mean	SD	
Total Medical Cost	23,579	23,843	36,700	40,403	50,842	46,786	<.0001
Rehabilitation and Physical Therapy Costs	18,546	18,763	29,578	32,865	42,899	39,137	<.0001

Table 2. Total Medical Cost and Rehabilitation and Physical Therapy Costs by Type of Health Insurance (Unit: USD)

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Outcome Measure	Measurement Timepoints	Type of Health Insurance									p-value
		National Health Insurance			Rehabilitation Medical Institution Pilot Project			Automobile Insurance Pilot Project			
		n	Mean	SD	n	Mean	SD	n	Mean	SD	
LOS	Total	143	150.8	131.6	291	108.3	84.4	155	141.9	100.6	<.0001
FAC	Baseline	69	0.9	1.3	195	1.4	1.55	101	1.8	1.64	0.0013
	Final		1.3	1.5		2.4	1.73		2.9	1.72	<.0001
	Difference		0.4	1.0		0.9	1.21		1.1	1.44	0.0009
K-MBI	Baseline	48	23.5	26.7	133	41.2	30.05	37	43.1	28.97	0.0009
	Final		29.4	28.4		56.5	30.47		57.8	32.05	<.0001
	Difference		5.9	8.2		15.3	14.35		14.6	15.05	0.0002
MMSE-K	Baseline	44	11.7	10.6	119	18.5	9.58	28	18.2	9.22	0.0004
	Final		13.8	10.5		21.1	9.18		21.3	9.74	<.0001
	Difference		2.1	5.5		2.6	5.2		3.0	4.8	0.7456
SCIM-III	Baseline	23	32.7	22.8	58	30.7	21.52	47	44.0	24.83	0.0119
	Final		39.7	25.7		49.7	27.01		60.3	25.93	0.0080
	Difference		7.0	9.8		18.9	17.77		16.3	17.20	0.0149

Table 3. Results of Outcome Measure by Type of Health Insurance

Outcome Measure	Type of Health Insurance	Cost (USD)	Effectiveness	Cost/ Effectiveness
LOS	National Health Insurance	18,546	150.8	123
	Rehabilitation Medical Institution Pilot Project	29,578	108.3	273
	Automobile Insurance Pilot Project	42,899	141.9	302
FAC	National Health Insurance	18,546	0.4	46,366
	Rehabilitation Medical Institution Pilot Project	29,578	0.9	32,865
	Automobile Insurance Pilot Project	42,899	1.1	38,999
K-MBI	National Health Insurance	18,546	5.9	3,143
	Rehabilitation Medical Institution Pilot Project	29,578	15.3	1,933
	Automobile Insurance Pilot Project	42,899	14.6	2,938
MMSE-K	National Health Insurance	18,546	2.1	8,832
	Rehabilitation Medical Institution Pilot Project	29,578	2.6	11,376
	Automobile Insurance Pilot Project	42,899	3.0	14,300
SCIM-III	National Health Insurance	18,546	7.0	2,649
	Rehabilitation Medical Institution Pilot Project	29,578	18.9	1,565
	Automobile Insurance Pilot Project	42,899	16.3	2,632

Table 4. Rehabilitation treatment costs compared to the effectiveness by type of health insurance

EP252

LENGTH OF STAY (LOS) PREDICTION MODEL FOR PATIENTS IN REHABILITATION HOSPITAL

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Introduction

Predicting the patient's length of stay (LOS) in the hospital can facilitate early discharge through effective resource allocation. Clinical data of patients transferred to a regional rehabilitation hospital (Kowloon Hospital) were analyzed, and a prediction model was developed to answer the binary outcomes of non-LOS vs. long LOS in our rehabilitation unit.

Methodology

Two years of clinical data from CMS, including demographics, social background, diagnosis, physical function, and laboratory data, were retrieved. Random Forest (RF), Neural Network (NN), and Logistic Regression (LR) were used to predict the possibility of non-long LOS (≤ 21 days) vs long LOS (> 21 days)

Results

From 1/7/21 to 30/6/23, 15190 patients were transferred from Queen Elizabeth Hospital (QEH) to KH for rehabilitation or convalescent care. 9957 patients (65.5%) were discharged within 21 days, while 5233 patients (34.5%) were hospitalized more than 21 days. Possible LOS predictors, including principal diagnosis, age, sex, acute hospital LOS, accommodation, household members, employment status, smoking status, mobility status, number of assistances on mobility, malnutrition screening tool score, and laboratory results were analyzed through various predictive models (RF, NN, LR). LOS in acute hospital was strongly correlated with LOS in convalescent hospital. Some predictors were found to be disease-specific. For example, the mean LOS in all old-aged home (OAH) patients was 19.1, which was no different from the non-OAH patients of 21.6 days. However, in stroke patients, the mean LOS in OAH patients was 21.5 days which was significantly shorter than LOS in non-OAH patients 27.8 days ($p < 0.05$).

Random forest (RF) yielded the highest overall accuracy of 72.1% in predicting long LOS, with the positive predictive value of 66.8% (sensitivity = 32.7. %), the negative predictive value of 72.8% (specificity = 92.3%), the area under the curve (AUC) is 72.2% and F1 score 44.2.

Conclusion

Analysis results from this LOS prediction model provide a fundament basis for future machine learning model development for AI prediction of patient LOS in the rehabilitation unit

EP253

10 HZ RTMS COMBINED WITH INTENSIVE REHABILITATION FOR ALIEN HAND SYNDROME AFTER STROKE: A CASE REPORT AND LITERATURE REVIEW

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Background

Alien Hand Syndrome (AHS) is a rare neurological disorder characterized by involuntary, yet purposeful movements of one hand. These movements occur without the person's conscious control. AHS can result from conditions such as stroke, brain tumors, or neurodegenerative surgeries. It is typically classified into two clinical variants: frontal AHS and callosal AHS. Currently, there is no standardized treatment for AHS. Most treatment approaches are based on existing research into cognitive therapies.

Aims

To evaluate whether combining 10Hz Repetitive Transcranial Magnetic Stimulation (rTMS) with intensive rehabilitation can accelerate recovery from AHS.

Methods

Report a case of a 74-year-old female with frontal-type AHS following an acute ischemic stroke in the territory of the right anterior cerebral artery.

Results

During therapy, the affected hand exhibits involuntary, repetitive movements, such as constantly rearranging the bedcovers or tugging at the bed curtain. However, when the patient is given an object to grasp, these movements tend to diminish. The treatment plan included intensive occupational therapy, incorporating mirror box therapy, bimanual tasks, and coping strategies, alongside 10Hz rTMS targeting the dorsolateral prefrontal cortex (DLPFC) region. After three months of treatment, there was a significant improvement in both the FIM (Functional Independence Measure) and MMSE (Mini-Mental State Examination) scores.

Conclusion

AHS is a rare neurological disorder, and current treatments are primarily based on case reports. No proven effective treatment for this condition has been established. Our case highlights the finding that combining 10Hz rTMS with intensive rehabilitation can alter the perception of self-controlled movements.

EP254

EFFECTS OF POSTOPERATIVE TELEREHABILITATION IN PATIENTS WITH ROTATOR CUFF TEAR: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and aims

Rotator cuff (RC) disorders are the most common cause of shoulder pain, with a prevalence that increases with age. RC tears significantly impact quality of life and contribute to substantial healthcare costs. While traditional in-person rehabilitation is effective, logistical challenges often limit patient access. Telerehabilitation, delivering services remotely, has emerged as a potential alternative, but its effectiveness for post-RC repair remains uncertain. This study aims to evaluate the efficacy of telerehabilitation in improving functional outcomes and pain management following RC repair.

Methods

A systematic review and meta-analysis were conducted following PRISMA guidelines. Comprehensive searches were performed in PubMed, EMBASE, MEDLINE, CENTRAL, CINAHL, and Web of Science for English-language publications up to July 1, 2024. Randomized controlled trials (RCTs) comparing telerehabilitation with traditional rehabilitation post-RC repair were included. Data were extracted on study characteristics, interventions, outcomes, and risk of bias. The primary outcome was the Constant-Murley Shoulder Outcome Score (CM score); secondary outcomes included the Disabilities of the Arm, Shoulder, and Hand (DASH) score and Visual Analogue Scale (VAS). Meta-analyses were conducted using a random-effects model.

Results

The search yielded 1387 articles, narrowed to 925 after removing duplicates and ineligible records. After screening, 33 full-text articles were reviewed, and 6 RCTs involving 388 participants met inclusion criteria. Telerehabilitation interventions included mobile applications, videotape, telephone calls, and gamification. PEDro scores ranged from 4 to 8. Risk of bias was assessed using the Cochrane Risk of Bias 2 tool, with two studies classified as high risk and four as having some concerns. Meta-analyses showed no significant differences between telerehabilitation and control groups in CM score, DASH score, or VAS.

Conclusion

Telerehabilitation is a viable alternative to traditional rehabilitation post-RC repair, demonstrating comparable outcomes in functional recovery and pain management. Standardized protocols and long-term evaluations are needed to optimize its implementation.

EP255

PROLOTHERAPY AND ACCURACY TARGET SITE OF INJECTION UNDER ULTRASOUND GUIDANCE IMPROVED KNEE JOINT PAIN AND INSTABILITY IN MYASTHENIA GRAVIS PATIENT

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Case Presentation

A 45-year-old woman, working as account officer, was diagnosed with Myasthenia Gravis presented with knee joint pain and instability while walking. The disease had been controlled with immunosuppressive therapy for several years. She experienced pain in both knees, with the dominant limb being more affected. The pain was particularly noticeable around the joint, especially when climbing stairs. She also reported episodes of falling due to knee weakness and instability. Physical examination suggested osteoarthritis, supported by a knee X-ray that categorized her right knee as Kallgren Lawrence grade 2. Bedside diagnostic ultrasound revealed hypoechogenicity over the right medial collateral ligament, lateral collateral ligament, and pes anserine. Under the ultrasound guidance, ligaments that were potentially seen as weak ligament were targeted for prolotherapy injection. Despite being on immunosuppressive therapy, the patient showed positive feedback to prolotherapy using buffered dextrose (10% for two sessions and 20% for one session, each a month apart). Her NRS score improved from 5/10 with frequent daily instability to 1/10 with no instability after the third prolotherapy session. She was able to climb stairs without difficulty and had no episodes of falling since the procedure.

Conclusion

Myasthenia gravis is a chronic autoimmune disease affecting the neuromuscular junction, leading to potentially life-threatening muscle weakness and impaired function. The hallmark of this disease is muscle fatigability and weakness, which significantly impacts a person's ability to work and perform daily activities. Concurrently, osteoarthritis of the knee exacerbates ambulation difficulties due to pain. Although theoretically, prolotherapy might not be effective due to the patient's immunosuppressive therapy, the outcome was surprisingly positive, with no adverse effects observed.

EP256

ULTRASOUND-ASSISTED IN INVESTIGATING RECURRENT ANKLE AND FOOT PAIN TREATED FOR PLANTAR FASCIITIS FOUND TO HAVE RETROCALCANEAL BURSITIS AND ACHILLES TENDINOPATHY WITH TEAR

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Case Presentation

Two different cases with chronic foot pain were diagnosed and initially treated for plantar fasciitis. The first case involved a 50-year-old Malay woman with chronic pain in the right plantar and posterior ankle, which worsened when standing and walking over the past three years. Radiographic imaging revealed a calcaneal spur, and she was treated for plantar fasciitis with steroid injections, which provided immediate pain relief. However, the pain recurred after one month. Despite several sessions of steroid injections and physical exercises, the pain persisted. She was referred to the Rehabilitation Medicine Clinic for footwear assessment. A bedside diagnostic ultrasound using a portable linear probe revealed a partial tear in the deep fibres of the Achilles tendon, with a bone pointing towards the tendon. Tendinopathy features were also present at the tendon insertion on the calcaneal bone, while the plantar fascia thickness was not significantly inflamed. The second case involved a 65-year-old housewife with a history of prolonged left ankle pain for over five years, experiencing similar pain when standing and walking. She was also referred to the Rehabilitation Clinic for footwear assessment for her plantar fasciitis. Available radiographic imaging of her left foot and ankle showed calcaneal spur and osteoarthritic changes of the ankle joint. A bedside diagnostic ultrasound revealed retrocalcaneal bursitis with a partial tear in the deep fibres of the Achilles tendon.

Discussion

Ultrasound is a simple and reliable tool to have in a clinic, aiding clinicians in ruling out other possible diagnoses and managing patients effectively. However, the lack of ultrasound availability and skills can delay proper diagnosis and management. While MRI is also a reliable diagnostic tool, it requires more space, specialization, and budget.

EP257

CLINICAL EVALUATION AND EFFICACY OF BOTULINUM TOXIN INJECTION IN MANAGING FREY SYNDROME SYMPTOM

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Case Presentation

A 40-year-old Malay male with Type II diabetes mellitus experienced swelling over the right mandible for three years, originating from the parotid gland. After undergoing a superficial parotidectomy, the patient developed intermittent discharge and later profuse sweating over the pre-auricular area after eating, which was distressing for his work and appearance. Physical examination revealed unilateral sweating and erythema over the left cheek and temple. The Minor's starch-iodine test confirmed the diagnosis of Frey Syndrome. The patient was treated with botulinum toxin injections over the affected area, resulting in a significant reduction in symptoms. Follow-up at one week, and six months revealed that repeated starch-iodine tests showed an absence of symptoms with no adverse effects. The patient reported an improved quality of life and was satisfied with the treatment outcome.

Methodology

Iodine solution is applied to the affected area, followed by a starch powder. Upon chewing, the area of gustatory sweating will turn black. The sweating area stained by iodine was mapped, and boxes measuring around 1x1 cm were drawn. Each of these boxes received about 2.5 to 10 units of botulinum toxin injection, depending on the size of the surface area.

Results

A follow-up at day 7 and 6 months post-injection was conducted. The Minor's starch-iodine test was repeated, and a longer duration was assessed. Up to 4 minutes of chewing, no sweating was observed.

Conclusion

Frey Syndrome is a notable example of a peripheral nerve disorder resulting from surgical or traumatic injury. While there is no definitive cure for Frey Syndrome, several treatment options can manage the symptoms effectively.

EP258

EFFECTS OF POSITIVE THINKING CANCER REHABILITATION TRAINING ON CANCER-CAUSED FATIGUE, PSYCHOLOGICAL STATUS, AND HOPE LEVEL IN OVARIAN CANCER PATIENTS DURING THE DAYTIME INTERVAL BETWEEN CHEMOTHERAPY TREATMENTS

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Background and aims

To analyze the effects of positive thinking cancer rehabilitation training on cancer-caused fatigue, psychological state, and hope level of ovarian cancer patients during the interval between daytime chemotherapy.

Methods

Sixty-nine cases of ovarian cancer patients undergoing daytime chemotherapy were divided into 35 cases in the observation group and 34 cases in the control group by lottery method. The control group implemented conventional post-chemotherapy care, and the observation group carried out positive thinking cancer rehabilitation training on the basis of the control group, using pre-recorded rehabilitation training content, and remote rehabilitation training twice a week through the WeChat platform, which was carried out by the researcher before the intervention, and after the intervention (at the completion of 8 weeks of intervention). The two groups were compared in terms of treatment adherence and pre-intervention and post-intervention levels of psychological distress, hope level (HHI), and post-intervention follow-up scores of 1-month and 3-month and 6-month cancer-caused fatigue (PFS).

Results

Comparison of cancer-caused fatigue scores between the two groups at post-intervention, 1-month and 3-month and 6-month follow-ups showed significant time effects, intervention effects and interaction effects ($P < 0.05$); scores of positive attitudes toward reality and the future, taking positive actions, and maintaining intimate relationships with others were higher in the observation group than in the control group after 8 weeks of intervention ($P < 0.05$); and the level of psychological distress was superior to that of the control group ($P < 0.05$); The treatment adherence rate of the observation group was 94.64% higher than that of the control group 82.13% ($P < 0.05$).

Conclusion

Positive thinking cancer rehabilitation training can effectively alleviate the cancer fatigue of ovarian cancer patients in the intervals between chemotherapy, reduce the degree of psychological pain, and improve the patients' hope level and treatment adherence.

EP259

HYPERBARIC OXYGEN THERAPY AS AN ADJUNCT TO OUT-PATIENT REHABILITATION FOLLOWING HOSPITALIZATION FOR GUILLAIN-BARRE SYNDROME: A CASE STUDY

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Background and aims

Guillain-Barre Syndrome (GBS) is an acute, immune-mediated polyneuropathy characterised by rapidly progressive, symmetrical weakness and areflexia. The standard treatment for GBS includes intravenous immunoglobulin and plasma exchange, which aim to attenuate the immune response and promote recovery. However, many patients experience residual deficits such as foot drop, weakness in dorsiflexors, and impaired grip strength, requiring prolonged rehabilitation to regain functional independence.

Hyperbaric oxygen therapy (HBOT) has been explored as a potential adjunctive treatment for neurological conditions, including GBS. HBOT involves breathing 100% oxygen at pressures above atmospheric levels, enhancing oxygen delivery to hypoxic tissues and supporting the healing process. Research suggests that HBOT may reduce inflammation, stimulate angiogenesis, and promote neuroplasticity, which are critical for nerve recovery. In this case study, we report the first use of HBOT as an adjunct to outpatient physiotherapy following hospitalization in a patient with GBS.

Methods

A single patient case study was conducted with patient consent to trial HBOT as an adjunct to out patient physiotherapy. The patient completed 10 hours of HBOT along with 10 sessions of physiotherapy. Outcome measures were taken using dynamometry and force plates pre and post implementation of the treatment plan.

Results

The patient tolerated HBOT and physiotherapy well. There were significant improvements in post treatment upper and lower limb muscle strength, power, balance and grip strength.

Conclusion

Here we show that HBOT can be a well-tolerated adjunct therapy to outpatient patient physiotherapy following GBS hospitalization. HBOT may enhance physical/neurological recovery through hyperoxygenation, anti-inflammatory effects, and promotion of neuroplasticity. Continued research and clinical trials into this area and may further elucidate the full potential of HBOT in neurorehabilitation, paving the way for its broader application in clinical practice.

EP260

THE LEVEL OF PHYSICAL ACTIVITY AND THE FACTORS ASSOCIATED WITH QUALITY OF LIFE AMONG PERSONS WITH LOWER LIMB AMPUTATION

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Background and aims

Lower limb amputation (LLA) significantly affects physical, psychological, and social well-being, often leading to mobility restrictions, psychological distress, and diminished quality of life (QoL). Physical activity (PA) enhances health outcomes, yet persons with lower limb amputation (PwLLA) encounter barriers such as physical limitations, environmental challenges, and psychological factors, which exacerbate inactivity-related comorbidities. Limited research exists on PA and QoL in PwLLA within Southeast Asia, particularly Malaysia. This study evaluates PA levels and their association with QoL among PwLLA in Malaysia, aiming to identify determinants influencing these outcomes to inform culturally sensitive rehabilitation strategies.

Methods

This cross-sectional study was conducted at Hospital Rehabilitasi Cheras and Hospital Al-Sultan Abdullah, UiTM, Malaysia. A total of 141 PwLLA were sampled systematically. Inclusion criteria included adults aged ≥ 18 years with a history of LLA (Syme's, transtibial, transfemoral, or hip disarticulation) for ≥ 1 year. Exclusion criteria included cognitive, visual, or hearing impairments and multiple physical impairments. Data were collected through interviews from April to December 2024. Instruments included a 22-item demographic questionnaire, the International Physical Activity Questionnaire Short Form (IPAQ-SF) for PA, and WHOQoL-BREF for QoL across physical, psychological, social, and environmental domains. Descriptive and inferential analyses, including logistic regression, were conducted.

Results

Among participants, 53.2% were sedentary, 36.9% moderately active, and 9.9% highly active. The lowest QoL scores were in the physical health domain (49.6 ± 10.2), while the environmental domain scored highest (65.0 ± 8.9). QoL differed significantly across activity levels ($P < 0.05$), with highly active individuals scoring highest. Predictors of higher PA included male gender, advanced prosthetics, trauma etiology, pre-amputation activity, tertiary education, and higher income. Predictors of lower PA included age > 45 years, comorbidities, and sedentary pre-amputation status.

Conclusion

PA is a key determinant of QoL among PwLLA. Rehabilitation should address modifiable predictors, promote advanced prosthetics, and mitigate comorbidities to enhance PA and QoL through tailored interventions.

Keywords

Lower limb amputation, Physical activity, Quality of life, Rehabilitation, Malaysia

EP261

LEG STRENGTHENING AS AN ADJUNCT IN ADOLESCENT IDIOPATHIC SCOLIOSIS TREATMENT

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Background and aims

Adolescent idiopathic scoliosis (AIS) is characterized by spinal deformities, postural asymmetries, and muscle imbalances, with lower limb weakness and lumbo-pelvic instability commonly observed. This study aims to evaluate the impact of a targeted leg strengthening and lumbo-pelvic stability regimen in two adolescents with AIS.

Methods

Two AIS patient participated in a leg strengthening intervention targeting the hip abductors, quadriceps, hamstrings and gluteal muscles. Patient 1, presenting with a 24° Cobb angle (lumbar major type), and Patient 2, presenting with a 49° Cobb angle (thoracolumbar major type), both exhibited typical postural patterns, including reduced weight-bearing on the concave side of the curve, posterior pelvic tilt, and general lower limb muscle weakness, as assessed by manual muscle testing. Postural alignment and Cobb angle measurements were taken at baseline and post-intervention. The intervention combined scoliosis specific exercise with lower limb strengthening and lumbo-pelvic stability exercises.

Results

Both patients exhibited notable improvements in postural alignment, with a reduction in pelvic shift, enhanced symmetry in weight distribution. Additionally, Patient 1 demonstrated a reduction in the Cobb angle from 24° to 12° (a 12° decrease - 50% reduction), while Patient 2 showed a reduction from 49° to 27° (22° decrease - 45% reduction). Hip stabilizer strength with enhanced lumbo-pelvic control and stability was observed as well.

Conclusion

Targeted lumbo-pelvic stability and hip strengthening exercises appear to facilitate significant improvements in spinal alignment and postural symmetry in AIS patients. Both patients demonstrated a substantial reduction in the Cobb angle suggesting that incorporating leg muscle strengthening may be an effective adjunct to conventional scoliosis management. Further research is warranted to validate these findings and assess the long-term impact of leg strengthening on scoliosis progression.

EP262

NEUROMUSCULAR ELECTRICAL STIMULATION AS AN ADJUNCT IN COMPLICATED MUSCULOSKELETAL REHABILITATION CASES

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Introduction

An atrophic and poor quadriceps muscle strength may hinder return to functional recovery after an orthopaedic surgical procedure. Neuromuscular electrical stimulation (NMES) may be use as an adjunct to a standardize rehabilitation program to facilitate muscle recovery in complicated rehabilitation cases. We report the use of NMES in two different cases following orthopaedic surgical procedures for their rehabilitation program.

Case Report

The first case was a 48 years old gentleman who underwent 3 surgeries for his left neck of femur fracture which complicated with infection and implant failure. This cause him to sustain severe hip joint muscles atrophies. NMES was applied daily during his intensive physiotherapy session through out his last 2 weeks of ward stay before hospital discharge. He was able to weight bearing ambulation prior to discharge after 2 months of mobilizing with assistance.

The second case was a 17 years old athlete who sustained a right tibia tuberosity avulsion fracture following a sport injury. Surgery was done within a week to fix the fracture site and NMES was applied immediately post surgery to prevent muscle atrophy. He was able to return back to his sports training at 3 months after the surgery.

Conclusion

A focus and systematic rehabilitation program is essential to a achieve good functional recovery after any surgery. NMES may facilitate faster recovery when use as an adjunctive treatment to a standard physical therapy program.

EP263

ASSESSMENT OF NURSES' KNOWLEDGE ON THE IMPACT OF AN INTERNATIONAL DYSPHAGIA DIET STANDARDISATION INITIATIVE (IDDSI)-BASED TRAINING PROGRAM: A PRE- AND POST-STUDY

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Background and aims

Dysphagia, a condition characterized by difficulty swallowing, often requires food texture and liquid consistency modifications to ensure patient safety and adequate nutrition. The International Dysphagia Diet Standardisation Initiative (IDDSI) framework, introduced in 2013, aims to standardize food texture and liquid consistency modifications for individuals with dysphagia. This study aims to compare nurses' understanding of food texture and liquid consistency modifications before and after a training program using the IDDSI framework. The study is driven by a need for enhanced communication between healthcare professionals, address discrepancies in food texture and liquid consistency modifications, and improve safety for individuals with dysphagia during mealtimes.

Methods

Convenience sampling was used in a quantitative pre- and post-test study design. Nurses' knowledge was evaluated using a set of ten validated knowledge questions that focused on dysphagia and the IDDSI framework. Core team members from a variety of disciplines (dietitians, speech therapists, medical specialists, etc.) participated in the training program, which incorporated interactive learning, hands-on activities, and demonstrations. Participants' knowledge was evaluated before (pre-test) and after (post-test) the training.

Results

The training program significantly increased nurses' knowledge ($t = -8.43$, $df = 32$, $p < 0.001$), according to a paired samples t-test. This suggests that the training sessions effectively improved the nurses' understanding of the IDDSI framework.

Conclusion

The study reveals that nurses' understanding of modifications in food texture and liquid consistency has been significantly improved by the IDDSI training program. According to the findings, implementing this knowledge into practice can improve the care provided to individuals experiencing dysphagia by ensuring safer and more reliable food preparation techniques.

EP264

CASE REPORT: PRACTICAL ASSESSMENT AND INTERVENTION IN REFRACTIVE ERRORS AND VISUAL IMPAIRMENT IN CEREBRAL PALSY

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Background and aims

Visual impairment is common in cerebral palsy (CP) and may affect a child's neurodevelopment. This report aims to elucidate the improvement of cognitive visual function after visual-related corrective intervention.

Case presentation

An 11-year-old boy with spastic diplegia cerebral palsy was admitted to improve his mobility and self-care skills. He was born premature with periventricular leukomalacia. His Gross Motor Function Classification System (GMFCS) is level IV, Manual Ability Classification System (MACS) level III and Communication Function Classification System (CFCSS) level I.

He had a short attention and performed unsatisfactorily in colouring and matching puzzles. He had received a comprehensive visual assessment prior to this. Therefore, visual screening conducted by an optometrist which reviewed right eye myopia, left eye hyperopia with astigmatism and alternating exotropia. Corrective glasses were prescribed.

An assessment using Insight Inventory was performed pre and post visual intervention. This assessment is a structured clinician inventory completed by caregivers with lower scores indicating less impairment. A structured habilitation strategy is formulated upon completion of the assessment.

Out of 52 questions, only 39 questions were applicable for this patient. Each question response was scored either never (0), rarely(1), sometimes(2), often(3) and always(4). His score dropped from 79 to 31 from the questions that were applicable highlighted the improvement of visual function following corrective glasses which translated to better tasks performance.

Conclusion

Visual function has improved after refractive errors correction, which is imperative to facilitate the habilitation process tailored to patient's needs in achieving optimal independence and better quality of life. Unrecognized visual disorders will negatively impact their performance in daily vision-related activities, developmental milestones and learning abilities. The insight inventory is easily accessible in various settings which can potentially be implemented as part of the routine screening procedure in order to execute appropriate ophthalmological examinations and effective intervention.

EP265

CASE REPORT: CHALLENGES IN PROSTHETIC RESTORATION IN AN ORANG ASLI CHILD

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Introduction

This case report highlights the challenges of prosthetic restoration in a 4-year-old Orang Asli girl with non-traumatic right below-knee amputation, emphasizing the importance of early restoration among paediatric amputees, uniquely in rural populations.

Case Presentation

Referred to us in 2022 at age two, she had undergone amputation following arterial thrombosis from an intraosseous line inserted during resuscitation for acute respiratory distress at Hospital Gua Musang. Postoperatively, she received pre-prosthetic training with an interim prosthesis, and her parents were educated on stump care. However, she defaulted follow-up for a year. With help from Klinik Kesihatan staff, she was traced and found to have developed a right knee flexion contracture and terminal overgrowth of the tibia and fibula. She was successfully restored with prosthesis after almost 2 years after amputation.

Discussion

Throughout this period, multiple challenges arose. First, parental mistrust and lack of collaboration led to non-compliance with therapy, disrupting follow-ups. Secondly, her preference for crawling over walking contributed to prosthesis non-compliance. Additionally, parental lack of insight and common cultural apprehension toward hospitals further complicated rehabilitation. Future challenges include prosthesis adaptation due to right knee flexion contracture and terminal bone overgrowth, which may cause pain and may necessitate future repeated surgical revisions on top of frequent prosthesis adjustments.

Conclusion

This case highlights the intricately interrelated challenges of early prosthesis restoration in a young Orang Asli amputee: geographical remoteness, cultural differences, parental poor insight, and the child's non-compliance, which led to complications such as knee flexion contracture. Additionally, terminal bone overgrowth presents another challenge. Overcoming these barriers requires multi-sectoral collaboration to ensure consistent care in early prosthesis restoration for paediatric amputees, improving long-term compliance and functional outcomes.

EP266

ACHIEVING FUNCTIONAL COMMUNICATION IN A PATIENT WITH LOCKED-IN SYNDROME: A MULTIDISCIPLINARY REHABILITATION APPROACH

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Background and aims

Locked-in syndrome (LIS) is a rare consequence of brainstem stroke, characterized by quadriplegia, anarthria, and preserved cognition with limited voluntary movement. Functional communication is essential for patient autonomy and quality of life (QoL). However, assessing and establishing preserved cognitive function in LIS is challenging due to its severely disabling nature. Establishing communication requires a structured, multidisciplinary approach integrating cognitive assessment, augmentative strategies, and assistive technologies. This case demonstrates how we creatively adapt in assessing preserved cognitive function and implement a stepwise approach to establishing functional communication, ranging from the use of low-tech strategies to the adaptation of high-tech technologies in LIS patients.

Methods

A 50-year-old male presented with classical locked-in syndrome (LIS) following a bilateral brainstem ischemic stroke. Despite quadriplegia and anarthria, preserved cognition was evident through vertical and horizontal eye movements.

Rehabilitation began with cognitive function assessment to determine appropriate assistive communication strategies. A modified cognitive assessment method was used, followed by a graded communication approach that started with low-tech augmentative and alternative communication (AAC) utilizing eye movements, structured re-orientation, and cognitive exercises. A high-tech eye-tracking device was subsequently introduced as an AAC tool. Pharmacological interventions addressed pseudobulbar affect, which was hindering rehabilitation participation.

Results

Following intensive rehabilitation program, the patient established consistent yes/no responses via vertical eye movement and accurate object/person identification through tracking. The modified MMSE provided structured cognitive assessment, demonstrating preserved orientation and attention. Augmentative communication facilitated basic needs expression and social interaction, reducing psychological distress. Integration of eye-tracking technology showed potential for advanced functional communication.

Conclusion

This case highlights the importance of early, structured rehabilitation to achieve functional communication in LIS. The combination of AAC strategies, structured cognitive assessment, and assistive technologies is crucial for communication restoration. Future advancements in non-invasive BCIs and eye-gaze communication devices may further enhance autonomy and QoL in LIS patients.

EP267

HEALTH-RELATED QUALITY OF LIFE AMONG MALAYSIAN STROKE SURVIVORS: A NARRATIVE OVERVIEW AND FUTURE RESEARCH DIRECTIONS

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Background and aims

Stroke is the third leading cause of death in Malaysia, with an increase in prevalence year by year. Stroke survivors often experience a wide range of disabilities, ranging from mild impairments to severely debilitating conditions, which may affect their health-related quality of life (HRQoL). This review aims to provide a comprehensive narrative overview of existing studies on health-related quality of life HRQoL among Malaysian stroke survivors. It seeks to explicate the multidimensional impact of stroke on the survivors, thereby underlining key factors affecting recovery and potential research gaps.

Methods

A narrative overview was conducted on literature retrieved from electronic databases, focusing on the keywords “stroke,” “quality of life,” and “health-related quality of life.” This review thoroughly examined the methodologies and results presented in the studies.

Results

Thirteen stroke HRQoL studies in Malaysia, dated from 2008 to 2023, were retrieved. The existing literature consistently indicates that stroke survivors have lower HRQoL compared to the general population. The complex interplay of multiple factors from the biopsychosocial framework and stroke impairments influenced the difference in HRQoL, highlighting the multifaceted nature of recovery in the stroke population. All but one study utilized generic QoL measures that were not specific to stroke conditions, and the specific QoL measure was not translated or validated for our cultural setting.

Conclusion

The studies of HRQoL for stroke survivors in Malaysia are still exiguous, given that the prevalence of stroke patients is increasing by year, and their survival rate has increased due to advancements in acute stroke care. Future HRQoL research may focus on longitudinal studies to track stroke recovery, comparative studies between rural and urban stroke survivors, stroke-specific QoL measures for targeted assessment, and caregiver burden and strategies to improve caregiver well-being. Addressing these research gaps will enhance policy planning and improve HRQoL for stroke survivors in Malaysia.

EP268

WHEN OFFLOADING FAILS: A CASE SERIES ON SETBACKS IN PATIENTS WITH CHARCOT ARTHROPATHY AND DIABETIC FOOT ULCERS

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Background and aims

Charcot arthropathy and diabetic foot ulcers are severe complications of diabetes, often leading to significant morbidity. Despite the critical role of offloading in management, suboptimal practices and external hazards frequently hinder treatment success. This case series explores the impact of inadequate offloading and external factors on patient outcomes, emphasizing the need for personalized care strategies.

Methods

Two patients with Charcot arthropathy and diabetic foot ulcers were prospectively followed for 1 year. Clinical evaluations through wound assessments and adherence monitoring, identified complications arising from inadequate offloading and external hazards.

Case 1:

A 57-year-old woman with left Charcot arthropathy experienced multiple hospitalizations for non-healing ulcers and recurrent infections. Despite a recommendation for transtibial amputation, she opted for offloading with a pneumatic walker. However, a fall during early intervention exacerbated her wound and created challenges in obtaining appropriate footwear, delaying healing and impairing her mobility.

Case 2:

A 51-year-old man with a right Charcot arthropathy complicated by chronic diabetic foot ulcers was prescribed a pneumatic walker for offloading but could not adhere due to workplace demands. This led to reliance on inappropriate footwear, resulting in recurrent injuries, new ulcers, and infections, ultimately necessitating multiple amputations.

Results

Both cases demonstrated that suboptimal offloading compounded by footwear challenges, falls, and workplace demands, caused severe complications like chronic wounds, recurrent infections, and preventable amputations. These interconnected issues significantly delayed wound healing, impaired mobility and reduced quality of life.

Conclusion

This case series highlights the dire consequences of inadequate offloading and insufficient precautions against external hazards in patients with Charcot arthropathy and diabetic foot ulcers. It is imperative for clinicians to prioritize personalized offloading strategies tailored to individual patient needs and addressing external factors involved, rather than relying solely on standard approaches. A holistic approach, incorporating patient education and systemic support, is essential to optimize outcomes and alleviate the burden of this debilitating condition.

EP269

ENHANCING ROBOTIC EXOSKELETONS ADOPTION IN PUBLIC HOSPITALS THROUGH TARGETED EDUCATIONAL PROGRAMS

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Background and aims

Robotic exoskeletons represent a significant advancement in modern rehabilitation. However, their adoption in public hospitals is often delayed due to inadequate training, organizational challenges, and high costs. This study investigates the effectiveness of targeted educational programs in increasing rehabilitation therapists' acceptance of robotic exoskeletons, utilizing the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB) to identify key factors influencing their adoption.

Methods

A two-cycle action research approach was implemented with 62 rehabilitation therapists at Hospital Kluster Kedah Utara (HOKKU). In Cycle One, participants completed pre- and post-intervention surveys focusing on TAM constructs—Perceived Usefulness (PU) and Perceived Ease of Use (PEOU)—following a virtual webinar introducing robotic exoskeletons. Cycle Two involved structured interviews based on TPB, emphasizing Subjective Norms (SN) and Perceived Behavioral Control (PBC), supplemented by a hands-on workshop where therapists practiced operating and calibrating robotic exoskeletons in clinical settings.

Results

Quantitative analysis demonstrated significant increases in PU (3.88 to 4.11, $p = 0.003$), PEOU (3.44 to 3.90, $p < 0.001$), and intention to use (3.83 to 4.06, $p = 0.006$) after the educational interventions. Correlation analysis revealed strong relationships between effort-saving features ($r = 0.833$, $p < 0.001$) and SN ($r = 0.747$, $p < 0.001$) with therapists' willingness to adopt the technology. Thematic analysis identified ongoing barriers such as high costs, maintenance needs, and organizational logistics, despite improved familiarity and confidence post-training.

Conclusion

Targeted educational programs that integrate theoretical knowledge with practical training significantly enhance therapists' acceptance of robotic exoskeletons. To ensure sustained adoption, these programs should align with institutional policies and address financial and logistical barriers. This study provides valuable insights for healthcare administrators, policymakers, and technology providers aiming to facilitate the widespread implementation of robotic exoskeletons in public hospital rehabilitation services.

EP270

REHABILITATION AND SELF-MANAGEMENT SUPPORT FOR APHASIA AND COGNITIVE COMMUNICATION DISABILITY IN MALAYSIA

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Background and aims

Aphasia and cognitive communication disability are common consequences of stroke and traumatic brain injury, affecting social, emotional and physical wellbeing. While Malaysia has advanced in stroke and brain injury care, rehabilitation for aphasia and cognitive communication disability remain largely underexplored. This review aimed to explore the availability and accessibility of rehabilitation services and self-management supports for people with aphasia and cognitive communication disability in Malaysia, as well as the sociocultural factors influencing access.

Methods

A scoping review was conducted using frameworks from Arksey and O'Malley (2005) and the Joanna Briggs Institute. Five scholarly databases were systematically searched. Structured Google and targeted website searches followed the methodology by Godin et al. (2015).

Results

Overall, eleven scholarly texts were included, along with 579 Google searches and four targeted website searches. No scholarly texts addressed cognitive communication disability or included perspectives of people with lived experience. Early-emerging research in Malaysia is investigating AAC interventions, mobile applications for aphasia therapy, and transcranial direct current stimulation. Google searches identified 48 facilities that offered aphasia and cognitive communication disability rehabilitation services. These facilities were primarily located in Kuala Lumpur, Selangor and Penang. Only one aphasia support group was identified, offering aphasia peer support both in-person or online, educational resources, and advocacy. Key sociocultural barriers to service access included Malaysia's multilingualism, a limited speech-language therapy workforce, lack of aphasiology specialisation among Malaysian speech-language therapists, and financial constraints. However, health professionals showed positive attitudes towards technology-based interventions, presenting potential opportunities for innovation.

Conclusion

Rehabilitation services and self-management supports for people with aphasia or cognitive communication disability in Malaysia are inadequate and unevenly distributed. Future research and resource development is needed to improve community-based care for people with aphasia or cognitive communication disability that addresses the multiethnic, multicultural and multilingual Malaysian population.

EP271

EXPLORE THE LEVEL OF KNOWLEDGE ON REHABILITATION CARE AMONG NURSES USING A SINGLE FACETED KNOWLEDGE TRANSLATION INTERVENTION

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Background

Nurses and nursing care are core elements of rehabilitation¹. One factor determining the quality of care is the level and depth of rehabilitation knowledge among nurses who do not obtain advanced training in rehabilitation medicine². There is limited data available on the level of knowledge of rehabilitation care among general nurses of governmental and non-governmental healthcare facilities locally. Hence, this study aim to investigate knowledge of rehabilitation nursing care among general nurses.

Methodology

This cross-sectional study was conducted among 21 nurses from the medical ward of a university hospital in Malaysia to explore their level of knowledge before and after serial single-faceted knowledge translational intervention from January 2024 to December 2024. A total of 7 educational hands-on interactive training provided by experts from the rehabilitation department to these nurses. Each session conducted was face-to-face for 45 to 60 minutes. The experts were rehabilitation doctors, nurses, physical therapists, and occupational therapists. At the end of this serial training, the nurses filled up feedback forms on their pre-post knowledge level.

Results

Before the intervention, most participants (81.0%) had an average level of knowledge, while 14.3% had poor knowledge, and 4.8% had good knowledge. After the intervention, the majority of participants (61.9%) demonstrated good knowledge, followed by 28.6% with average knowledge, and 9.5% with poor knowledge. Based on the McNemar test, there was a significant improvement in participants' knowledge of managing patients admitted for rehabilitation before and after the intervention, with a p-value of 0.002. In the open-ended feedback section, participants expressed their interest in continuing this knowledge translational sessions.

Conclusions

The single-faceted knowledge translation intervention has significant positive implications on increasing the level of knowledge on rehabilitation care among general nurses. However, more intrinsic and extrinsic factors need to be explored to enhance the knowledge transfer.

EP272

'FUNCTIONAL OUTCOMES FOLLOWING SHORT TERM REHABILITATION PROGRAM IN HMG-COA REDUCTASE INHIBITORS (STATIN)- INDUCED NECROTIZING AUTOIMMUNE MYOPATHY: A CASE STUDY'

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Background and aims

HMG-CoA reductase inhibitors (statin), are widely used lipid-lowering medications that play a critical role in reducing cardiovascular morbidity and mortality. However, a subset of patients develops immune-mediated necrotizing myopathy (IMNM), a condition associated with autoantibodies against the HMG-CoA reductase enzyme. Statin-induced myopathy is characterized by severe muscle weakness, elevated creatine kinase (CK) levels, and myofiber necrosis. While symptoms often improve upon discontinuation of the medication, IMNM can result in persistent proximal muscle weakness, continued CK elevation, and long-term recovery challenges. The role of rehabilitation in improving outcomes for these patients remains an area of growing interest. This study aims to evaluate the impact of rehabilitation program on anti-HMG-CoA reductase inhibitors, particularly in the context of muscle strength, mobility, and functional recovery

Methods

A case study of a 50-year-old male with statin-induced necrotizing autoimmune myopathy (confirmed by elevated CK of 11,000 U/L and strongly positive Anti-HMG CoA Reductase antibodies) underwent a 4-week rehabilitation program. The patient initially presented with bilateral proximal muscle weakness and atrophy following one year of statin therapy. Following medical treatment with intravenous methylprednisolone and immunoglobulin, rehabilitation was initiated comprising progressive resistance exercises, core stability training, and task-specific ADL training. Functional outcomes were measured pre- and post-rehabilitation using Modified Barthel Index (MBI), Functional Ambulation Classification (FAC), Trunk Control Test (TCT), and Grip Strength.

Results

After 4-weeks of rehabilitation program, the patient demonstrated varying degrees of improvement across functional measures. The MBI increased by 6 points from 33 to 39 points out of 100, reflecting minimal improvement in daily living activities, personal hygiene and ambulation. The right-hand grip strength increased slightly by 3.5kg/F from 16kg/F to 19.5kg/F. The TCT increased by 24 points from 12 to 36 points out of 100, though this improvement, while notable, still indicates significant trunk control deficits. The FAC remained unchanged at level 1, indicating persistent dependence in ambulation ability.

Functional Outcome	Pre therapy	Post therapy
MBI	33	39
FAC	1	1
Right hand Grip Strength	16kg/F	19.5kg/F
Left hand Grip Strength	18kg/F	18kg/F
Trunk Control Test	12	36

Despite the improvement in TCT from 12 to 36, this score remains substantially below the threshold needed for functional ambulation (TCT < 61), indicating persistent core stability deficits. The unchanged FAC score further confirms this functional limitation. While there were mild improvements in grip strength and MBI, these gains were insufficient for achieving meaningful functional independence. These findings highlight two critical points: 1) The current rehabilitation duration is insufficient for achieving both basic ADL independence and functional mobility milestones, 2) The intensity and progression of both core stability and task-specific ADL training need modification to reach clinically meaningful independence scores. Future research should focus on developing targeted rehabilitation protocols that can be tailored to individual functional deficits in hoping to achieve more functional recovery.

Conclusion

Despite the improvement in TCT from 12 to 36, this score remains substantially below the threshold needed for functional ambulation (TCT < 61), indicating persistent core stability deficits. The unchanged FAC score further confirms this functional limitation. While there were mild improvements in grip strength and MBI, these gains were insufficient for achieving meaningful functional independence. These findings highlight two critical points: 1) The current rehabilitation duration is insufficient for achieving both basic ADL independence and functional mobility milestones, 2) The intensity and progression of both core stability and task-specific ADL training need modification to reach clinically meaningful independence scores. Future research should focus on developing targeted rehabilitation protocols that can be tailored to individual functional deficits in hoping to achieve more functional recovery.

EP273

COMPREHENSIVE CARE IN MANAGEMENT OF CHRONIC PRESSURE INJURY WITH OSTEOMYELITIS: CASE REPORT OF A LOCAL PERSPECTIVE

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Background and aims

Individuals with spinal cord injury (SCI) face an 85% lifetime risk of developing pressure injuries. If left untreated, one-third of stage 4 pressure injuries can progress to osteomyelitis; significantly impacting the patient's quality of life, emotional well-being, and creating financial and caregiving burden for both the patient and their family. This case report discusses the multimodal management of a chronic, non-healing stage 4 pressure injury from a Malaysian perspective.

Case Presentation

Mr. S is a 26-year-old man with traumatic T7 AIS A complete paraplegia since 2016. He was independent until 2020, when he developed sacral and greater trochanter (GT) pressure injuries following the Movement Control Order (MCO) during the COVID-19 pandemic. Since then, he had multiple hospitalizations from 2022-2024 for the non-healing wounds - including twice for septic shock and six admissions for wound management. Each admission lasted from 30 to 90 days. Osteomyelitis of the right hip joint developed from a stage 4 GT pressure injury. Multidisciplinary management with Orthopedic Surgery, Infectious Disease and Dietetic teams began in June 2022, while Plastic and Reconstructive Surgery (PRS) Team was consulted since January 2024. He underwent multiple wound debridement, blood transfusions and antibiotic treatments due to Multi-Drug Resistant Organism (MDRO) infections. His condition has affected his social participation, mood, and family dynamics, requiring psychiatric review.

Results

He underwent a right hip Girdlestone surgery followed by negative pressure wound therapy in January 2025, and is undergoing medical optimisation for rotational flap wound closure under PRS.

Conclusion

The management of chronic pressure injuries with osteomyelitis requires a multidisciplinary approach. It is essential for the Rehabilitation Medicine team to initiate and coordinate all involved teams to ensure the best outcomes for the patient.

EP274

STRUCTURED NURSING SIMULATION TRAINING FOR CAREGIVER: BUILDING CONFIDENCE AND COMPETENCE IN HOME-BASED CARE

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Background and aims

Caregivers play a crucial role in home-based care for individual with disabilities, yet many lack the skills to perform essential nursing tasks safely and effectively. Inadequate caregiver training can lead to preventable complications such as aspiration pneumonia, catheter-associated infections and other medical complications. This project aims to enhance caregiver confidence and competence through structured nursing simulation training.

Methods

A two-week training program was conducted with 20 caregivers to enhance their proficiency in essential nursing procedures, including nasogastric tube feeding, tracheostomy suctioning, intermittent catheterization, urinary catheter care, and bowel care. The program integrated theoretical instruction, hands-on practice in real-life scenarios, and supervised performance by qualified staff nurses. Caregivers received immediate feedback, and their competency and confidence were assessed using a checklist and self-rating forms both prior to and following the training.

Results

Post training evaluation indicate a significant improvement in caregivers' ability to perform nursing tasks correctly, with a reduction in common errors observed during post-training assessments. Caregivers exhibited increased confidence in providing essential care while patient satisfaction surveys also reflected positive feedback, suggesting improvements in the quality of home-based care provided.

Conclusion

Structured simulation nursing-based training has proven effective in equipping caregivers with essential home care skills. This initiative has enhanced caregiver confidence, competence and patient satisfaction. Further research could explore the impact of this program on the quality of life of individuals with disabilities whose caregivers have participated in the training.

EP275

EQUIPPING CAREGIVERS WITH LIFE-SAVING EMERGENCY SKILLS: A SUPPORT INITIATIVE FOR INDIVIDUAL WITH DISABILITIES

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Background and aims

Many rehabilitation patients have multiple underlying medical comorbidities, increasing their risk of life-threatening complications. Caregivers may encounter challenges in providing initial emergency support prior to transferring the individual to hospital. This training initiative equips caregivers with critical emergency response skills through specialized training in life-saving techniques, enhancing their ability to provide immediate care while awaiting medical assistance, ultimately aiming to improve patient survival and recovery outcomes.

Methods

A 3-day structured emergency management training program was developed to provide caregivers with practical, hands-on learning experiences. The training included simulated scenarios, hands-on practice, and interactive demonstrations facilitated by skilled staff nurses and medical assistants. Key topics covered included choking intervention, seizure first aid, stroke recognition, and Basic Life Support (BLS) adapted for lay responders. Participants underwent pre- and post-training evaluations to assess skill acquisition and confidence levels.

Results

This training initiative was conducted over a 6-month period, involving 48 caregivers. Post-training analysis indicated that caregivers showed significant improvements in emergency response accuracy and confidence. Evaluation results revealed a reduction in both response time and errors during medical crises. Caregivers also reported feeling more prepared to manage emergencies.

Conclusion

Enhancing caregiver confidence and emergency preparedness is important to ensure timely and effective response during critical situations, ultimately improving outcomes for patients with disabilities and preventing further medical complications arising from delays in initiation of care.

EP276

CATHETER-RELATED BLADDER DISCOMFORT (CRBD) IN NEUROGENIC BLADDER FOLLOWING SPINAL CORD INJURY

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Background and aims

Catheter-related bladder discomfort (CRBD) is a frequently overlooked complication following bladder catheterization, particularly among spinal cord injury (SCI) patients. In non-SCI populations, CRBD typically presents with a burning sensation originating in the suprapubic region and radiating towards the penis, accompanied by discomfort and urinary urgency—symptoms often mimicking those of an overactive bladder. Studies reveal a substantial incidence of CRBD in non-SCI patients undergoing catheterization (47–90%). The risk is amplified in SCI patients due to pre-existing neurological and morphological alterations within their lower urinary tract, significantly increasing the likelihood of complications like autonomic dysreflexia. This case report illustrates the potential consequences of delayed CRBD recognition in a high tetraplegic patient who experienced multiple secondary complications after SPC. This underscores the importance of early CRBD anticipation to mitigate the risks associated with this often-overlooked condition.

Methods

A 35-year-old male with C7 AIS B SCI (2010) faced recurrent catheter blockages, leakage, and frequent AD during catheter changes. Transitioning to SPC procedure led to suprapubic pain, lower limb spasms, bleeding, and AD-related hypertensive crises.

Management included:

- Neuropathic Pain: Gabapentin 300 mg TDS, Pregabalin 75 mg BD
- CRBD Relief: Tramadol 50 mg PRN, IV Butylscopolamine 20 mg
- AD Prevention: Prazosin 1 mg BD
- Bladder Spasms: Oxybutynin 5 mg BD

Results

Within one week, CRBD severity and AD episodes decreased significantly. Ongoing follow-up ensured bladder function stability and medication adjustments.

Conclusion

An integrated approach combining pharmacological and non-pharmacological strategies is crucial for effective CRBD management and the prevention of autonomic dysreflexia (AD) in SCI patients. Early CRBD detection is key to preventing AD and other secondary complications. A proactive, multi-stage preventative approach, encompassing pre-catheterization, intra-catheterization, and post-catheterization procedures, is necessary to mitigate risk.

EP277

NAVIGATING COMPLEX REHABILITATION: A CASE OF TRAUMATIC TETRAPLEGIA WITH BRACHIAL PLEXUS INJURY AND DELAYED INTERVENTION

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Background and aims

Spinal cord injuries (SCI) with concurrent brachial plexus injuries (BPI) present significant rehabilitation challenges, particularly when compounded by poor social support, recurrent infections, and delayed interventions. The combination of upper motor neuron lesions from SCI and lower motor neuron dysfunction from BPI significantly impacts functional recovery and independence. Studies suggest early intervention within 9 to 12 months post-injury is critical, but social and medical complications often result in delays and poor prognosis.

Methods

A 19-year-old female sustained a traumatic C4 ASIA A SCI and left brachial plexus injury from a motor vehicle accident. The absence of a primary caregiver following her mother's deceased, her father forming a new union, and poor support leading to missed opportunities for early rehabilitation consistent with prior research on delayed diagnosis and poor prognosis. As consequences of delayed spinal cord injury rehabilitation, she developed multiple infected pressure injuries, pulmonary embolism, severe deconditioning and loss of motivation.

By the time she resumed rehabilitation, her tetraplegia and brachial plexopathy rendered her inability to use a manual wheelchair, requiring motorized wheelchair prescription.

Her dominant right hand was graded (MRC 1/5 for C8-T1 myotomes), limiting fine motor tasks, with spasticity in the right FCU and FCR (MAS 1). Despite these challenges, she could maneuver the motorized wheelchair joystick using right palm.

Results

Following spinal cord injury rehabilitation program, patient attained a SCIM score of 7/100 and an MBI score of 27/100, reflecting high dependence in ADLs. Despite multiple setbacks, motorized wheelchair adaptation enhanced her mobility, though functional deficits, pain, and psychosocial challenges persist. This case underscores the importance of early intervention, assistive technology, and psychosocial support in SCI rehabilitation

Conclusion

For patients with tetraplegia and brachial plexus injury, early rehabilitation, motorized mobility solutions, and continuous psychosocial support are crucial for optimizing functional recovery.

EP278

COMPREHENSIVE REHABILITATION FOR MULTIPLE FRACTURES WITH NERVE DAMAGE: A CASE OF RECOVERY AND CHALLENGES

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Background and aims

Multiple fractures resulting from traumatic accidents, particularly pelvic and limb injuries, often lead to complex rehabilitation needs. This case study investigated the rehabilitation process of a 37-year-old female patient who sustained multiple fractures, including clavicle, humerus, radius, ulna, and pelvic ring fracture with suspected nerve damage resulting in the decrease of sensibility, right-arm muscle weakness, and voiding dysfunction, after a motor vehicle accident. The aim was to document the rehabilitation progress, identify key challenges in pain management, mobility, nerve damage management, and evaluate the multidisciplinary treatment approach.

Methods

The patient received a comprehensive rehabilitation program after receiving 3 times surgical interventions for her multiple fractures. Pain management strategies, muscle strengthening, flexibility exercises, electrical stimulation, and laser therapy were implemented to address hand function and mobility challenges. A nerve conduction study was also performed, and urological consultations were scheduled due to urinary retention. Physical therapy focused on gradually reintroducing weight-bearing activities, nerve stimulation, and muscle rehabilitation.

Results

At the 9-week follow-up, the patient showed significant improvements in mobility, with the ability to walk independently for up to one hour. Muscle strength in the right lower extremity and upper extremity improved, and urinary function also showed progress, with the patient able to urinate spontaneously after prolonged catheter use. However, the patient continued to face challenges in handling daily activities due to ongoing pain and muscle weakness.

Conclusion

A comprehensive and multidisciplinary rehabilitation approach in patients with multiple fractures is important for the best outcome, particularly for those with associated nerve injuries. The rehabilitation program effectively supported the patient's recovery, improving both functional outcomes and quality of life. Continuous monitoring and adaptation of therapy were essential for achieving these outcomes.

EP279

THE POTENTIAL OF AMANTADINE IN ENHANCING COGNITIVE RECOVERY AFTER HEMORRHAGIC STROKE: A CASE STUDY

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Background and aims

Amantadine, a neurostimulant commonly used in traumatic brain injury (TBI), has been explored for its potential benefits in non-traumatic acquired brain injury (ABI), including hemorrhagic stroke. Its mechanism involves dopamine modulation and NMDA receptor antagonism, which may promote cognitive and functional recovery. While it has demonstrated efficacy in TBI, its role in stroke rehabilitation remains unclear. This case report examines the effects of amantadine in a patient with hemorrhagic stroke, assessing its impact on neurorecovery and functional outcomes.

Methods

A 33-year-old male was diagnosed with a left basal ganglia hemorrhage and middle cerebral artery infarct secondary to hypertension. Following decompressive craniectomy, he exhibited persistent cognitive impairment, severe global aphasia, bilateral upper limb contractures, and total dependence on daily activities. Clinically, he was in a vegetative state, characterized by no awareness, no purposeful responses, and inability to obey commands. Given evidence supporting amantadine's role in neurostimulation, therapy was initiated at 50 mg twice daily and titrated to 200 mg twice daily over three weeks as part of a structured rehabilitation program focusing on cognitive and motor recovery.

Results

Over 3 weeks, the patient showed significant cognitive improvement, with his JFK Coma Recovery Scale-Revised (CRS-R) score increasing from 6 to 11. He transitioned from a vegetative state to a minimally conscious state, exhibiting intermittent eye contact, improved response to simple commands, and increased engagement in therapy. Caregivers reported improved interaction, attention span, and engagement, suggesting enhanced cognitive processing. However, motor function and independence in daily activities remained limited, necessitating continued rehabilitation support. No significant adverse effects were observed.

Conclusion

This case highlights the potential of amantadine in post-hemorrhagic stroke rehabilitation, demonstrating measurable cognitive improvements and consciousness recovery. The transition from a vegetative to a minimally conscious state suggests that amantadine may play a key role in early neurorecovery. While its role in TBI is well-established, further randomized controlled trials are needed to define its optimal use, dosing protocols, and patient selection criteria for stroke recovery.

EP280

OPTIMIZING PROSTHETIC REHABILITATION IN A PEDIATRIC BILATERAL TRANSTIBIAL AMPUTEE WITH KNEE VALGUS DEFORMITIES: A CASE REPORT

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Background and aims

Bilateral transtibial amputations in children are rare and pose significant rehabilitation challenges. While bony overgrowth is a common complication, valgus stump deformity is uncommon in transtibial amputations but can severely impact prosthetic fitting and mobility especially in a skeletal growing child. This case report highlights the rehabilitation journey of a growing child, emphasizing prosthetic restoration challenges, surgical intervention, and rehabilitation strategies.

Methods

A 8-year-old Malay boy with bilateral transtibial amputations following acute limb ischemia due to meningococcal septicaemia at the age of 3, presented with progressive bilateral valgus stump deformities (right: 20°; left: 10°) and knee extension lag (right: 15°; left: 20°), causing discomfort, pressure sores, and limited prosthetic usage (1–2 hours daily). Despite non-pharmacological interventions, including stretching, taping, and multiple prosthetic modifications, his symptoms persisted. In view of the progressive deformities, he underwent bilateral distal femoral 8-plate guided growth surgery in July 2024. Post-surgery, he received new prosthetic sockets and underwent structured amputee rehabilitation program.

Results

The surgical correction has improved stump alignment, enhancing prosthetic fit and comfort. His prosthetic use has increased to 10 hours daily, enabling independent mobility and self-care. The multidisciplinary approach of orthopaedic surgery, prosthetic customization, and targeted amputee rehabilitation program was key to his functional recovery.

Conclusion

Vigilant assessment and follow-up are crucial in paediatric amputees, although valgus stump deformity is uncommon in transtibial amputations but this complication may seriously impair the functional outcomes of these children. Growth-related changes must be regularly monitored to prevent worsening deformities and ensure long-term prosthetic success. A multidisciplinary rehabilitation approach integrating surgical correction, tailored prosthetic solutions, and specialized rehabilitation program significantly improves functional outcomes.

EP281

REHABILITATION TRIUMPHS OVER LEPROSY REACTIONS: RESTORING LIVES AND FUNCTION: A CASE REPORT

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Background and aims

Leprosy is a major cause of preventable disability, with stigma and impairments significantly affecting patients' quality of life. Leprosy reactions increase the risk of deformities, emphasizing the need for rehabilitation programs.

Methods

A 23-year-old male with multibacillary leprosy presented with acute right drop-foot and bilateral claw hands, alongside six years of progressive numbness in the plantar areas, palms, and skin patches. Examination revealed reduced muscle strength, sensory deficits, nerve enlargement, steppage gait, and poor posture. A multidisciplinary approach combined pharmacological treatment with rehabilitation program, including physical and occupational therapy, neuromuscular electrical stimulation, and leprosy nursing education. While assistive devices were declined, the focus remained on preventing complications, enhancing functionality, and improving the patient's quality of life.

Results

Following 12 months of rehabilitation, the patient showed significant improvement in muscle strength, hand function, and skin condition. This enabled him to perform daily activities independently and return to work. A multidisciplinary and comprehensive rehabilitation effectively prevented disability and restored functional roles. This case highlights the vital role of rehabilitation programs in enhancing functionality and supporting the reintegration of individuals with leprosy.

Conclusion

Leprosy is a significant contributor to preventable disabilities, and the associated stigma, which impacts patients' quality of life. Leprosy reactions further heighten the risk of disabilities and deformities. A multidisciplinary approach is essential to prevent and reduce disabilities, enhance quality of life, and facilitate the social reintegration of affected individuals.

EP282

PROPORTION OF STROKE PATIENTS ADMITTED FOR INPATIENT REHABILITATION IN A TERTIARY CENTRE: A RETROSPECTIVE ANALYSIS

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Background and aims

Inpatient rehabilitation plays a crucial role in stroke recovery, yet not all referred and eligible patients are successfully admitted. In tertiary centers that provide both hyperacute stroke management and rehabilitation, patients received the benefit of early rehabilitation referral, but as tertiary centres are always loaded by the acute care, rehabilitation services often compete with demands for critical care resources, potentially limiting admissions. Understanding the proportion of stroke patients referred for rehabilitation and successfully admitted can help assess service gaps and evaluate resource management to deliver an effective stroke rehabilitation service.

Methods

This retrospective cohort study analyzes hospital records from 2022 to 2024 at Hospital Kuala Lumpur. Data on stroke patients referred to rehabilitation were extracted, including demographic details, stroke type, referral source, and discharge or rehabilitation admission status. Descriptive statistics were used to calculate admission rates and admission characteristics, including duration from referral to admission, length of stay, and discharge destination. While trend analysis assessed variations over time. Factors influencing admission were analyzed using chi-square tests and logistic regression modeling.

Results

Preliminary analysis indicates that 14 % of referred stroke patients were successfully admitted with 9.76 % were directly transferred in, and 4.26% were discharged first and called for admission later. Another 3.38% of patients were outsourced to another inpatient rehabilitation facilities. Key barriers to admission include limited resources, patient unreadiness and poor social support. Trends over the past three years suggest a decrease in admission rates.

Conclusion

This study highlights the gap between referral and actual admission for stroke rehabilitation, particularly in a tertiary center. Findings improve inpatient rehabilitation accessibility for stroke survivors, through barriers identification and its appropriate management.

EP283

NOT JUST A SWOLLEN ANKLE: A DEEPER LOOK INTO BONE HEALTH IN SPINA BIFIDA

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Background and aims

Children with spina bifida (SB) are at risk for poor bone health, with a 11–30% incidence of fractures and lower bone mineral density values compared to age and gender matched typically developing children. 55% Malaysian children with SB have been reported to have vitamin D insufficiency and deficiency. Fractures may go unrecognized or diagnosed with a delay, as they do not exhibit typical pain responses. This case report highlights the challenges of diagnosing fractures in children with SB and emphasizes the importance of the awareness of pathological fracture risk in this population.

Methods

We report a case of a 12-year-old girl, QN, with lumbosacral myelomeningocele, independent walker but inconsistent usage of bilateral solid ankle-foot orthoses (AFO) with subacute ankle swelling during her routine outpatient clinic appointment.

Results

QN has been walking independently without AFO despite being advise to. She reported persistent right ankle swelling for three weeks without obvious history of trauma or fall but vaguely recalled her right ankle went into mild inversion while walking prior to the swelling. Her parents noticed the swelling, but since QN reported only having minimal discomfort and still able to walk, they did not seek further medical attention. Clinical examination revealed right ankle swelling with minimal tenderness. X-ray showed closed fractures of the right distal third tibia and fibula, Salter-Harris Type II. She was referred to paediatric orthopaedic team for further management.

Conclusion

This case highlights the importance of maintaining a high index of suspicion for unexplained swelling, deformity, or mobility decline in children with SB, as they have increased risk of pathological fractures and may sustain fractures without overt pain symptoms. Thus, SB patients and their caregivers, and healthcare professionals need to be aware of the high fracture risk. Early radiologic assessment is essential to prevent delayed diagnosis and complications.

EP284

PROSTHETIC RESTORATION IN A PEDIATRIC AMPUTEE: BALANCING GROWTH, COST-EFFICIENCY, AND RESOURCE LIMITATIONS

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Background and aims

Pediatric prosthetic rehabilitation is challenging due to frequent adjustments during growth, ill-fitting prostheses, and financial constraints, especially in resource-limited settings. It requires timely interventions to optimize gait development and functional independence. This report highlights the challenges and cost-effective strategies for pediatric transtibial prosthetic rehabilitation in a middle-income country, comparing them with approaches in high-income settings.

Methods

A six-year-old child, diagnosed postnatally with Amniotic Band Syndrome (ABS), underwent a left transtibial amputation on the second day of life. At one year old, he was referred for prosthetic evaluation and restoration. Initial assessment confirmed age-appropriate developmental milestones for prosthetic fitting, leading to training with an interim prosthesis made from low-technology thermoplastic material. This was later transitioned to a left transtibial modular prosthesis.

Results

Over five years, the child received three prostheses and underwent multiple socket modifications to accommodate growth-related anatomical changes. Challenges included length discrepancies between casting and final fitting, and terminal overgrowth, requiring surgical bone refashioning. Such complications are expected until skeletal maturity. Therefore, a modular prosthesis was prescribed, allowing minor adjustments without requiring a complete replacement along with shoe raise, making it a cost-effective and adaptable solution.

Compared to high-income countries, middle-income settings face prosthetic limitations due to cost, impacting mobility. While high-income countries offer advanced prostheses with frequent replacements, the cost-efficient modular with shoe modification approach reduced financial burden by prioritizing adjustments over full replacements. This ensured timely prosthetic restoration, facilitating gait development and successful community integration. In this case, the child adapted well to the prosthesis, achieving independent walking, running, and kindergarten participation alongside peers.

Conclusion

Timely intervention with a modular prosthesis proved to be an effective, cost-conscious solution for pediatric transtibial rehabilitation in a resource-limited setting. While high-income countries offer more advanced options, modular prostheses provide a practical, adaptable alternative, supporting mobility and quality of life through growth.

EP285

ENHANCING FUNCTIONAL RECOVERY USING REHABILITATION OF CRITICALLY OVERT TOWARDS RECOVERY (RE-C-OVE-R) INITIATIVE: A CASE REPORT ON EARLY ICU REHABILITATION IN AMSAN-GBS

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Background

Acute Motor Sensory Axonal Neuropathy (AMSAN) is a severe Guillain-Barré syndrome (GBS) variant associated with prolonged recovery and significant neuromuscular impairment. Patients often require long Intensive Care Unit (ICU) stays due to respiratory failure and severe weakness, increasing the risk of muscle loss, joint stiffness, and nerve damage. The Rehabilitation of Critically Overt towards Recovery (RE-C-OVE-R) initiative focuses on early, structured, multidisciplinary interventions to minimize ICU-related complications and enhance functional recovery. This case report highlights the benefits of RE-C-OVE-R in improving recovery and expediting independent mobility in an AMSAN-GBS patient.

Case presentation

A 42-year-old man initially presented with unsteady gait, dysphagia and voice changes which subsequently developed progressive limb weakness, leading to Type 2 respiratory failure requiring intubation. He was admitted into the ICU for 39 days during which he faced difficulties in weaning from both invasive and non-invasive mechanical ventilation support. The RE-C-OVE-R initiative applied a biopsychosocial, multidisciplinary approach, integrating pulmonary therapy, resistance training, multisensory occupational therapy, and coordinated nursing interventions. Rehabilitation physicians and critical care physicians ensured safe protocol implementation. Early tilt table verticalization was introduced to enhance neuromuscular activation and circulation. His Modified Barthel Index (MBI) improved by discharge from 0 to 78. Within two months, he achieved functional ambulation, and within a year, he resumed work and social activities with minimal job modifications.

Conclusion

Early ICU rehabilitation using the RE-C-OVE-R initiative significantly enhanced the functional recovery of an AMSAN-GBS patient, reducing ICU-related complications and expediting mobility. A structured, multidisciplinary approach including physiotherapy, occupational therapy, and medical management facilitated early mobilization, improved neuromuscular recovery, and promoted a faster return to independence.

EP286

THE IMPORTANCE OF INTERDISCIPLINARY APPROACH AND EARLY REHABILITATION IN SUPERIOR SAGITTAL SINUS THROMBOSIS PATIENT

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Background

Superior sagittal sinus thrombosis (SSST) is a rare condition with an incidence of 0.2 to 0.5 per 100,000 people per year. We report a case of SSST complicated by a right venous infarct and intracranial bleed, demonstrating recovery through an interdisciplinary approach.

Result

Madam H, a 44-year-old Malay woman with no known medical conditions, presented with a sudden headache and left-sided weakness. Examination revealed 0/5 power in the left limbs based on the Modified Research Council (MRC) scale for muscle strength, with intact speech and swallowing. She had recently taken oral contraceptive pills for two weeks. Rehabilitation was initiated in the acute medical ward via an Interdisciplinary approach involving rehabilitation doctors, physiotherapist and occupational therapist. CT brain imaging showed a dense cortical sign at the superior sagittal sinus, confirmed by CT angiogram/venogram to be SSST with a right frontal infarct and intraparenchymal bleed. Autoimmune screening revealed a positive anti-dsDNA, suggesting probable systemic lupus erythematosus (SLE). The patient was started on warfarin, subcutaneous heparin, and hydroxychloroquine, with intensive inpatient rehabilitation. Within three days, her limb strength improved to 3/5 and subsequently to 4/5 based on the MRC scale. She progressed from walking with a quadripod to unaided ambulation within two days. Her six-minute walk distance reached 200 meters, and her Modified Barthel Index improved from 42% to 82% within a week.

Conclusion

This case highlights the importance of early intervention and interdisciplinary care, alongside medical management in the initial phase, which is crucial in preventing complications such as shoulder subluxation, muscle tightness, atrophy, and contractures. Early intervention and timely transition to inpatient rehabilitation, once the patient is medically stable, facilitate the restoration of ambulation, gait, and functional abilities despite severe complications.

EP287

CHARACTERISTICS AND PROGNOSIS OF LANGUAGE IMPAIRMENT IN SUBCORTICAL APHASIA OF ACUTE STROKE PATIENTS

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Background

This study investigated the language impairment characteristics and prognostic outcomes of patients with subcortical aphasia following acute stroke. A new assessment tool, the Chinese Aphasia Language Battery-Naming Battery (CALB-NB), developed specifically for Mandarin-speaking populations, was utilized with the Western Aphasia Battery serving as a supplementary measure. The CALB-NB is rooted in cognitive neuropsychological models and integrates features of modern Chinese phonology, lexicon, syntax, and semantics.

Methods

A total of 34 patients with subcortical aphasia (16.0 ± 10.0 days post-stroke) were enrolled, classified by lesion location: Basal Ganglia (n=9), Deep white matter (n=17), Thalamus (n=3), and mixed lesions (n=5). Aphasia subtypes included Broca's aphasia (n=10), Wernicke's aphasia (n=4), anomic aphasia (n=16), conduction aphasia (n=1), transcortical sensory aphasia (n=1), and global aphasia (n=2). The CALB-NB evaluated 10 language features, and follow-up assessments were conducted via the Aphasia Severity Rating Scale (ASRS) from the Boston Diagnostic Aphasia Examination (BDAE) at one year.

Results

Significant differences were observed across the 10 language features, with the poorest performance in low-frequency word retrieval (median: 50.0, IQR: 33.0–80.0) and the best performance in tone decoding (median: 89.5, IQR: 69.0–100.0; $p < 0.0001$). Principal Component Analysis (PCA) identified two components explaining 77.34% of the variance. A composite score x was derived and showed a significant linear relationship with Aphasia Quotient ($R^2 = 0.31$, $p < 0.001$). At the one-year follow-up, 73.6% of patients achieved near-normal language function (ASRS scores 4–5), with five patients returning to work.

Conclusion

Subcortical aphasia is characterized by relatively mild language deficits, with pronounced impairment in low-frequency word retrieval. The Aphasia Quotient effectively assesses language impairment severity. Most patients exhibit favorable recovery, with some resuming normal activities.

EP288

TAPING AWAY THE TENSION: KINESIOTAPING FOR CERVICAL DYSTONIA – A CASE SERIES

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Background and aims

Cervical dystonia is a movement disorder marked by involuntary contractions in the cervical muscles leading to twisting and repetitive movements of the neck and head, which can also cause abnormal postures. This case series describes the use of kinesiotaping as an adjunctive treatment for cervical dystonia to improve head posture.

Case Series

Case 1: Mr J, 40 years old gentleman with GNAL dystonia since 2019. Over time, he experienced a gradual worsening of cervical dystonia, which significantly impacted his activities of daily living (ADL), requiring him to perform tasks more slowly to avoid triggering his symptoms. His interventions included oral pharmacological agents, intramuscular (IM) botulinum toxin injection and deep brain stimulation. At present, he presents with retrocollis, which not only affects his posture but also alters his walking pattern.

Case 2: Mr R, 74 years old gentleman with chronic multifocal infarcts since 2012 and underlying bilateral hearing impairment. He ambulates unaided and is independent in his ADL. However, he developed focal cervical dystonia as a result of prolonged abnormal head posture, which arose from his reliance on his right ear for hearing. This altered posture has led to multiple near-fall episodes and significantly affects his mobility, especially when he turns, during which he often relies on walls for support. Treatment with oral trihexyphenidyl and IM botulinum toxin A injections did not result in significant improvement of his cervical dystonia.

Both patients were given kinesiotaping as proprioceptive feedback—over bilateral sternocleidomastoid and trapezius for Mr J and right sternocleidomastoid for Mr R—and noticed improvement in their head posture, which improved their ambulation pattern and patient satisfaction.

Conclusion

Kinesiotaping may be considered an adjunctive therapy for patients with cervical dystonia. It offers potential benefits in improving head posture and consequently enhancing their overall quality of life.

EP289

CARDIAC REHABILITATION OUTCOMES IN AN ELDERLY WOMAN POST-CABG PATIENT WITH DEEP VEIN THROMBOSIS: A CASE REPORT

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Background and aim

Cardiac rehabilitation program (CRP) is essential for optimizing functional recovery post-coronary artery bypass grafting (CABG). However, complications such as deep vein thrombosis (DVT) require individualized rehabilitation strategies to ensure safety and effectiveness. Women are less likely to enroll and adhere to CRP. This case report highlights the outcomes of a structured CRP in a 70-year-old woman post-CABG complicated by extensive left lower limb DVT.

Case Study

A 70-year-old woman underwent CABG for three-vessel disease with critical left main stenosis. Post-operatively, she developed extensive left lower limb DVT(non-harvest site) on day 11, requiring an inferior vena cava filter insertion and femoral vein thrombectomy. She was started on a Direct Oral Anticoagulant and enrolled in CRP II six weeks post-surgery. Rehabilitation included aerobic exercise, strength training, activities of daily living, and patient education, with close monitoring for new DVT symptoms, pulmonary embolism, and bleeding risks. The target heart rate was determined using baseline six-minute walk test (6MWT) results, beginning with low intensity and gradually upgraded to moderate intensity as tolerated. Hemoglobin level was measured before CRP II.

Results

Pre-rehabilitation assessments showed reduced functional capacity (6MWT: 302m with 1 rest, METs: 3.7) and lower limb weakness (5xSTS: 17.53 sec). Upon completing CRP II, the patient demonstrated significant improvements: 6MWT increased to 427m without rest, METs to 4.8, and 5xSTS improved to 11 sec. Post-rehabilitation vitals remained stable, with no adverse events. She maintained independent ambulation, achieved moderate-intensity aerobic activity within target heart rate zones, and showed no signs of post-thrombotic syndrome.

Conclusion

CRP II resulted in substantial functional gains in this post-CABG patient with DVT. Transitioning to CRP III should focus on sustaining cardiovascular endurance, lower limb strength, and long-term adherence to home-based exercise. This case highlights the importance of personalized CRP and multidisciplinary team involvement in post-CABG rehabilitation.

EP290

DURATION OF REHABILITATION ADMISSION FOLLOWING ACUTE STROKE AT PUN HLAING HOSPITAL, MYANMAR

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Background and aims

Stroke is a leading cause of mortality and long-term disability worldwide, significantly affecting motor, sensory, cognitive, and swallowing functions. In Myanmar, where stroke prevalence is 1.5% among adults aged 40–99, rehabilitation services are underutilized due to misconceptions about stroke recovery, a shortage of trained healthcare professionals, and limited rehabilitation facilities. As a result, many stroke patients are discharged once medically stable, with minimal inpatient rehabilitation. This study aims to determine the duration of rehabilitation admission for stroke patients at Pun Hlaing Hospital and assess their functional improvements.

Methods

A prospective cohort study was conducted at the rehabilitation unit of Pun Hlaing Hospital. Acute stroke patients admitted for inpatient rehabilitation were included. Data on patient demographics, stroke characteristics, and rehabilitation admission duration were collected. Functional outcomes were assessed using the Modified Barthel Index (MBI) for activities of daily living.

Results

A total of **97** stroke patients were included, with a mean age of 63.59 (± 14.5) years (**64.5% male**). The average duration of inpatient rehabilitation admission was **7.14 days** (± 1.56 , **1-27 days**). Patients with hemorrhagic stroke had longer rehabilitation stays compared to those with ischemic stroke, though the difference was not statistically significant ($p = 0.3716$). Functional outcomes significantly improved, with **MBI scores increasing from 37.81 to 51.3** ($p < 0.05$).

Conclusion

The duration of inpatient rehabilitation varies by stroke severity, and type, with significant functional gains observed. Enhancing outpatient rehabilitation participation is crucial for sustaining recovery and improving long-term outcomes.

EP291

ADAPTING THE COGNITIVE-COMMUNICATION CHECKLIST FOR ACQUIRED BRAIN INJURY (CCCABI) FOR MALAYSIAN ACQUIRED BRAIN INJURY (ABI) PATIENTS

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Background and aims

Communication impairments resulting from acquired brain injuries (ABIs) significantly impact individuals' lives, affecting their families, communities, social interactions, academic pursuits, and occupational engagement. Often, the communication service needs of individuals with ABIs are underestimated, leading to delays or premature discharge from necessary treatments. A key issue is the lack of suitable screening and referral tools for cognitive-communication difficulties in Malaysia. This study aims to address this gap by translating and adapting the CCCABI into a Malay version, the BM-CCCABI.

Methods

The translation process involved two translators for forward-backward translations, ensuring linguistic accuracy. Six experts from multidisciplinary professions conducted content validation to assess conceptual, semantic, and contextual equivalence. Face validation was carried out with ten potential users of the checklist, evaluating the understandability and appropriateness of the items.

Results

Results revealed that the BM-CCCABI demonstrated excellent content validity, with an item-level Content Validity Index (I-CVI) of 0.95, and satisfactory face validity, with an item-level Face Validity Index (I-FVI) of 0.98. These results confirm the BM-CCCABI's accuracy and appropriateness for assessing cognitive communication skills among individuals with ABIs in the Malaysian population.

Conclusion

The BM-CCCABI is a valid screening tool for evaluating cognitive communication skills among Malaysian ABI patients. Its successful cross-cultural translation and adaptation address the need for an effective assessment tool, providing valuable insights for clinical practice and facilitating appropriate interventions for those affected by acquired brain injuries.

EP292

ADAPTATION AND VALIDATION OF THE BAHASA MALAYSIA VERSION OF THE SWALLOWING QUALITY OF LIFE QUESTIONNAIRE (BM-SWAL-QOL) FOR DYSPHAGIA REHABILITATION

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Background and aims

The effectiveness of dysphagia rehabilitation in Malaysia is currently limited by the lack of a culturally and linguistically appropriate patient-reported outcome measure (PROM) specific to dysphagia. To address this gap, this study aimed to adapt and validate the Bahasa Malaysia version of the Swallowing Quality of Life Questionnaire (BM-SWAL-QoL).

Methods

The adaptation process employed a rigorous forward-backward translation method to ensure cultural and linguistic equivalence. A panel of six healthcare professionals with expertise in dysphagia, along with ten potential users, participated in the validation process to assess content and face validity.

Results

The item-level content validity index (I-CVI) exceeded the recommended threshold of 0.83, demonstrating strong content validity. Similarly, the item-level face validity index (I-FVI) surpassed 0.83 for most items, with only two items requiring minor revisions for improved clarity. Psychometric evaluation was conducted with nine post-stroke dysphagia patients (mean age: 49.56 ± 14.42 years). The BM-SWAL-QoL exhibited high internal consistency, with a Cronbach's alpha of 0.850, and excellent short-term test-retest reliability, reflected by an intraclass correlation coefficient (ICC) of 0.986 across all domains.

Conclusion

Despite the small sample size, the findings indicate that the BM-SWAL-QoL is a valid and reliable tool for assessing dysphagia-related quality of life in the Malaysian population. This adaptation fills a critical gap in dysphagia rehabilitation by providing a culturally relevant instrument that enables more accurate patient evaluations and supports the development of informed, patient-centered rehabilitation strategies. Future studies with larger and more diverse samples are recommended to further validate the tool and explore its applicability across different clinical settings and patient groups.

EP293

PHARMACOLOGICAL MANAGEMENT OF AGITATION IN A SEVERE TRAUMATIC BRAIN INJURY PATIENT: A CASE REPORT

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Background

Traumatic Brain Injury (TBI) is the alteration in brain function, or other evidence of brain pathology, caused by external force. In 2009, the National Trauma Database Malaysia stated that 80% of traumas are caused by road traffic accidents (RTAs), 64% of which were related to TBI¹. Post-TBI agitation is characterised by excessive behaviours such as disorganized thinking, disinhibition and aggression. Agitation in TBI is prevalent up to 70% of rehabilitation units².

Method

This case study reports using a combination of pharmacological agents in the management of agitation in patients with severe TBI.

Clinical case

A 21-year-old male with no prior medical illness had an alleged RTA in May 2022. His Glasgow Coma Scale (GCS) on arrival was E2V1M5. His CT Brain showed acute subdural haemorrhage (SDH) over the left tentorium cerebelli and subarachnoid haemorrhage (SAH) at the vertex and left temporal lobe. He was conservatively managed under neurosurgical team and transferred to the inpatient rehabilitation ward for post-TBI management. His agitation behaviour scale (ABS) was 43 (severe agitation) and RANCHO Los Amigos (RLA) Score was IV despite on beta-blocker, oral propranolol 40mg bidaily (BD) and non-pharmacological interventions. He was further referred to the neuropsychiatry team for overt agitation. He was further commenced on oral olanzapine 2.5mg BD, oral lorazepam 1mg once a day at night (ON) and oral sodium valproate 200mg ON which were titrated up accordingly. Following 1 month of treatment, his agitation improved to a RLA score of V. During the outpatient follow-up 2-months post-discharge, he scored 27/30 on the Mini-Mental State Examination (MMSE) and achieved 87/100 (mild dependency) on the Modified Barthel Index (MBI).

Conclusion

A multidisciplinary approach should be adopted to manage post-TBI agitation. A short-term combination of pharmacological agents namely, beta-blockers, antipsychotics and anti-convulsants, can be considered in agitation management post-TBI.

EP294

FACTORS INFLUENCING QUALITY OF LIFE IN HEART FAILURE PATIENTS

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Background and aims

Quality of life (QoL), measured by the EQ-5D-3L, comprises five dimensions: mobility, self-care, usual activities, pain, and depression. This study investigated factors influencing QoL in heart failure (HF) patients.

Methods

Patients admitted for HF between May 2023 and December 2024 were enrolled. Exclusion criteria were inability to participate in rehabilitation or complete assessments due to any other medical conditions or mental issue. Cardiac fitness was assessed using 6-minute walk test (6MWT) and metabolic equivalents (METs). QoL was evaluated with the EQ-5D-3L. Demographic data, medical history, left ventricular ejection fraction (LVEF), and the Charlson Comorbidity Index (CCI) were recorded. Patients were categorized into “no problems” and “some problems or worse” groups for each QoL domain based on their self-perceived difficulties.

Results

Twenty-two patients (mean age 60.9 ± 11.68 years; 18 men) were included. Sixteen reported “no problems” in mobility; 17, 7, 9, and 15 reported “no problems” in self-care, usual activities, pain, and depression. Patients with “no problems” in mobility, self-care, and usual activities had superior 6MWT performance ($p=0.008$, 0.009 , and 0.035 , respectively) and higher METs ($p=0.008$, 0.009 , and 0.035). Additionally, HF patients with chronic kidney disease (CKD) ($n=7$) tended to report worse in usual activities (Pearson=7.58, $p=0.023$). Those with a history of cardiovascular disease or TIA ($n=3$) tended to perceived some problems or worse in all QoL domains (mobility: Pearson=10.678, $p=0.005$; self-care: Pearson=13.509, $p=0.001$; usual activities: Pearson=11.811, $p=0.003$; pain: Pearson=7.848, $p=0.02$; depression: Pearson=7.44, $p=0.023$). No significant differences were found regarding age, LVEF, smoking habit, CCI, or other comorbidities.

Conclusion

Cardiac fitness, CKD history, CVA or TIA history significantly affected self-perceived QoL, while LVEF does not. These results overall strongly support cardiac rehabilitation to improve fitness and QoL, especially for HF patients with CKD or CVA history. Future studies should further investigate additional strategies to enhance rehabilitation adherence.

EP295

TRAINING EFFICIENCY OF THERA-BANDS AND ANKLE MACHINE IN CHRONIC ANKLE INSTABILITY PATIENTS

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Background and aims

Chronic ankle instability (CAI) is a frequent sequela following an ankle sprain, leading to joint instability, reduced muscle strength, and impaired neuromuscular control. Two primary instruments used for strengthening in CAI patients are Thera-bands and ankle machines, like multiaxial ankle training system (MATS). However, there is limited information on the training effects of these two instruments on CAI patients. This study aims to compare the training efficiency of Thera-bands and the MATS to strengthen the muscles around the ankle in CAI patients.

Methods

Twelve CAI patients were enrolled and divided randomly into Thera-bands (n = 7) and MATS (n = 5) groups. Both groups underwent training twice weekly for six weeks by using the assigned instrument. Muscle strengths and functional abilities of the ankle, including the Y-balance test, single hop test, and six-meter hopping velocity, were assessed before and after the training. Mann-Whitney U test was used to compare the baseline differences and changes post-training between the groups.

Results

Baseline evaluations showed no significant differences in ankle strengths and functional performance between groups. After six weeks of training, the MATS group showed a significantly larger increase in the six-meter hopping velocity for both legs (sound side p = 0.018; affected side p = 0.019), with similar improvements in ankle strength, Y-balance test, and single hop test.

Conclusion

After 6-week training program, both Thera-band and MATS showed similar improvement in muscle strengths and functional abilities, while the MATS is further beneficial in the enhancement of the agility in the six-meter hopping test in CAI patients.

EP296

ENHANCING POST-STROKE RECOVERY AND RETURN-TO-WORK – INSIGHTS FROM STROKE LIFE SUPPORT PROGRAM

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Background and aims

Post-stroke needs often go unmet due to insufficient follow-up and inadequate information, leading to poor reintegration into society and delayed return to work (RTW). These challenges contribute to significant economic burdens on individuals and society, highlighting the need for structured care coordination and patient empowerment. The Stroke Life Support Central Health Alliance, Registry & Technology Enabled caRe (SLS CHARTER) Project addresses these issues by educating stroke patients and caregivers on use the Post Stroke Checklist (PSC) and providing care coordination through the Central Health Alliance in Stroke Enablement (CHASE) coordinators. This study aimed to 1) describe the frequency of PSC usage among SLS participants and 2) examine the association of sociodemographic factors and intervention status with RTW status.

Methods

Patients admitted to the Acute Stroke Unit at Tan Tock Seng Hospital between January and June 2023 with a diagnosis of either an ischemic or haemorrhagic stroke were recruited to the study. 206 SLS and 55 control patients were included for this analysis. Data on PSC usage, including the number of patients who utilised the PSC and the mean number of PSCs used per patient at 1- and 6-months post-stroke, were collected. RTW outcomes were assessed as the proportion of patients who returned to work by 6 months. Logistic regression was used to examine associations between socio-demographic factors, intervention status (SLS participants versus non SLS participants), and RTW outcomes, adjusting for age, gender, race, stroke type, and baseline Modified Barthel Index (MBI) severity category.

Results

PSC usage among SLS participants increased from 50.5% (n = 104) at 1 month to 86.9% (n = 179) at 6 months post-stroke. The mean number of PSCs completed per patient also increased over the 6-month period (1.76 ± 1.09 to 4.25 ± 1.09).

Among patients employed at baseline, 58.3% (n = 67) of SLS participants (n = 115) and 54.3% (n = 19) of control patients (n = 35) returned to work. After adjusting for age, gender, ethnicity, stroke type, and baseline Modified Barthel Index (MBI) severity category, no significant difference in RTW status was observed between SLS participants and non-SLS participants.

Sociodemographic factors such as occupation, education, and income strongly influenced RTW status. White-collar workers were four times more likely to RTW compared to blue-collar workers (95% CI: 1.6–10.1). Workers with secondary education or higher were 2.5 times more likely to RTW compared to those with primary education or lower (95% CI: 1.0–6.0). Workers with a monthly income $\geq \$4000$ were 6.5 times more likely to RTW compared to those earning $< \$4000$ (95% CI: 1.9–22.6).

Conclusion

The SLS CHARTER project demonstrated the feasibility of using the PSC to identify post-stroke needs and facilitate appropriate referrals. However, targeted interventions may be required to improve RTW outcomes among patients with lower income, lower education levels, and blue-collar workers.

EP297

THE EFFECTIVENESS OF EARLY DEVELOPMENTAL CARE AND REHABILITATION FOR EXTREMELY LOW BIRTH WEIGHT INFANTS

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Background and aims

This study reports on early rehabilitation for extremely low birth weight infants (ELBWIs) in our NICU and evaluates its effectiveness.

Methods

Positioning was determined based on posture and stress signs, followed by touching, holding, and stretching. To efficiently initiate rehabilitation, a simplified assessment is conducted using only five items from the Dubowitz score: Posture (P), Arm Recoil (AR), Arm Traction (AT), Leg Recoil (LR), and Leg Traction (LT).

The early rehabilitation group (Group A) included ELBWIs born before 28 weeks who started treatment at our hospital. The non-rehabilitation group (Group B) included ELBWIs transferred for retinopathy of prematurity treatment. Infants with cerebrovascular disease or congenital heart defects were excluded.

In Group A, the final assessment was conducted at the point when Dubowitz scores plateaued. In Group B, assessments were performed at transfer and again when scores plateaued after rehabilitation.

Results

Group A had 20 cases, and Group B had 21 cases. The gestational age at birth was 26[27-25] weeks for Group A and 25[25-23] weeks for Group B ($p=0.0004$). Birth weight was 818[933-667]g for Group A and 660[837-521]g for Group B ($p=0.01$). The corrected age at the start of rehabilitation in Group A was 30 [31-29] weeks.

The corrected gestational age at evaluation was 39[41-37] weeks for Group A and 40[42-36] weeks for Group B ($p>0.05$). Significant differences for AT: 3[2,4] in Group A and 2[1,5] in Group B ($p=0.01$), LR: 4[3,4] in Group A and 3[1,5] in Group B ($p=0.003$), and LT: 4[3,4] in Group A and 3[1,5] in Group B ($p=0.006$). After rehabilitation, Group B improved, but LT remained significantly lower than in Group A ($p=0.03$).

Conclusion

Early rehabilitation for ELBWIs infants at significantly improves limb muscle tone compared to non-rehabilitation. This suggests the effectiveness of early rehabilitation in ELBWIs.

EP298

EVALUATING OSTEOPOROSIS AND FRAGILITY FRACTURE RISK IN LOWER LIMB AMPUTEES: A CASE REPORT

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Background and aims

Osteoporosis characterised by compromised bone strength is common especially in postmenopausal women and those associated with other major risk factors. Amputees suffer from accelerated bone density loss regardless of their age are at an increased risk of fragility fracture, which are associated with limitation in ambulation, chronic pain, disability, loss of independence and reduced quality of life. Thus, recognising the risk factors, screening, fracture risk assessment and prevention are important in reducing the risk of fragility fractures among amputees.

Methods

Single case report.

Results

A 54 years old lady with the background history of type 2 diabetes mellitus, dialysis dependent end stage renal failure, right transfemoral amputation secondary to diabetic foot ulcer and left trans metatarsal amputation secondary to peripheral arterial disease. She has been ambulating indoors using right transfemoral prosthesis restoration and left solid ankle foot orthosis with the aid of walking frame. She had an alleged fall 6 months ago, with a complaint of left hip pain which imposed limitations in her mobility and physical therapy. Radiographic imaging of the left hip showed no evidence of fracture, however noted increased radiolucency with reduced cortical thickness suggestive of osteopenia. Fracture risk assessment using FRAX® (according to body mass index) estimates the 10-year probability of hip fracture and major osteoporotic fracture are 0.3% and 2.3% respectively.

Conclusion

The case report highlights the risk factors in lower limb amputees for developing osteoporosis-related fracture. Increased risk of falls and lack of physical activity, particularly weight bearing exercise constitute a challenge in the prevention of osteoporosis and fragility fracture.

EP299

ENHANCING JOINT MOBILITY: THE ROLE OF ULTRASOUND-GUIDED HYDRODISSECTION IN IMPROVING RANGE OF MOTION

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Background and aims

A common peroneal nerve palsy after total knee arthroplasty (TKA) can lead to foot drop which can progress to contracture and cause marked disability. Ultrasound-guided hydrodissection has been described for nerve entrapment, however there are limited studies on targeting fibrotic tissues. Hydrodissection is a minimally invasive procedure involving the use of saline or dextrose solution to separate the anatomic plane and expanding tissue spaces to improve localisation of injected solution.

Methods

Single case report.

Results

A 62 years old lady with the background history of bilateral knee osteoarthritis and underwent right TKA in July 2023. Post operatively complicated with right foot drop, where she presented with lower motor weakness of right foot. Physical examination revealed sensory loss and hyperesthesia over deep and superficial peroneal nerve distribution respectively, with decreased range of motion (ROM) in ankle dorsiflexion up to 35° plantarflex (knee flexion) and 10° foot inversion. Nerve conduction study showed right lower limb motor axonal neuropathy. She was referred to us for multiple contractures over right hip, knee and ankle. She had failed trial right above knee casting due to foot inversion, thus proceed with ultrasound-guided hydrodissection of right Achilles tendon and flexor hallucis longus. Procedure was performed under ultrasound guidance with 8cc dextrose 5% and 2cc lidocaine, using 10cc syringe and 21-gauge needle. Upon assessment two months later, revealed some improvement in ROM of right ankle dorsiflexion up to 25° plantarflex (knee flexion).

Conclusion

This case report demonstrates that ultrasound-guided hydrodissection is a safe, minimally invasive and may be an alternative in improving joint mobility, with regular stretching and ROM exercise.

EP300

CLINICAL EVALUATION OF HIGH-ENERGY SHOCK WAVE THERAPY FOR KNEE OSTEOARTHRITIS PATIENTS

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Background and aims

High-energy shock wave therapy (HESWT) is a novel non-surgical treatment for knee osteoarthritis (KOA) that has garnered attention for its potential to alleviate pain, improve joint function, and reduce inflammation. This study aimed to evaluate the clinical efficacy and safety of HESWT in non-surgical KOA patients.

Methods

A randomized controlled trial was conducted with 86 patients, randomly divided into the experimental group (HESWT) and the control group (conventional rehabilitation therapy). Both groups received four weeks of treatment, followed by a two-day washout period and an additional four weeks of crossover treatment. Outcome measures included pain assessment using the Visual Analog Scale (VAS), joint function evaluation via the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), quality of life assessment using the 36-Item Short Form Health Survey (SF-36), knee function scoring using the Knee Society Score (KSS), patient-reported outcomes (PROMs), infrared thermography, and laboratory inflammatory markers (e.g., CRP, IL-6). These assessments were conducted before treatment and at weekly intervals for eight weeks post-treatment.

Results

Statistical analysis revealed that HESWT significantly reduced pain (decreased VAS scores), improved joint function (increased KSS scores), and decreased inflammatory markers (e.g., CRP and IL-6) compared to conventional rehabilitation therapy. Long-term safety evaluations indicated that HESWT had minimal adverse effects, primarily mild pain, swelling, and redness at the treatment site, which resolved quickly and did not significantly impact patients' daily lives.

Conclusion

HESWT demonstrated significant clinical efficacy in relieving pain, improving joint function, and reducing inflammation in non-surgical KOA patients, with a favorable safety profile. However, further large-scale clinical trials and basic research are needed to confirm its mechanisms of action and long-term benefits.

EP301

WHEN THE BODY RESISTS RECOVERY: A CASE REPORT ON PUSHER SYNDROME'S IMPACT ON STROKE REHABILITATION

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Background

Pusher syndrome is a clinical disorder following left or right brain damage in which patients actively push away from the non hemiparetic side, leading to a loss of postural balance. Pusher syndrome appeared 10.4% in patient with acute stroke. This Syndrome important for rehabilitation as stroke patients with pusher syndrome take 3.6 weeks longer than stroke patients without pusher syndrome to reach same functional outcome level. This behavior is found to be present primarily in patients with right hemispheric lesions centered in the area of the posterolateral thalamus.

Case Report

The Patient 65 years old male, whose CT brain showed hypodensity at right corona radiata extending to right lentiform. On his 6th week of post stroke, noted patient will tilt towards hemiparetic side in sitting and standing, without vestibular and visual impairments. Initially thought that patient was poor in trunk control, but as time going noted patient tend to tilt and resist from non hemiparetic side, although strength of hemiparetic side got good recovery. Burke Lateropulsion Scale(BLS) was done on 6th week and score Supine: 2, Sitting: 2, Standing: 4, Transfers: 3 and Walking: 3 ; total score 14 out of 17. After noted patient got pusher syndrome, therapy with visual cues, verbal cues, physical prompting and proprioception exercise, patient able discharge on 8th week with BLS score of 8 out of 17.

Conclusion

This case report presents pusher syndrome in stroke patient. With early detection of pusher syndrome and focus treatment, will improve the syndrome and shorten length of hospitalization.

EP302

SURVIVAL AND SECOND CHANCES: THE ROAD TO RECOVERY

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Background and aims

Spinal cord injury (SCI) following a suicide attempt presents a complex interplay of physical, psychological and social challenges making recovery a multifaceted process. This case report highlights the complexities of SCI recovery process, particularly in patients with history of suicide attempt.

Methods

This is a retrospective case report. A 26 years old gentleman sustained a T11 incomplete SCI and polytrauma after jumping off an electrical transmission tower in October 2024. Despite having no prior medical or psychiatric history, he developed significant psychiatric symptoms during his acute phase of injury, ie auditory hallucinations, mood swings, and suicidal ideation. Initially, these symptoms were not addressed with psychiatric care, which led to apathy, resistance to therapy, and hindered progress in physical recovery. In November 2024, he was admitted for SCI rehabilitation programme at Hospital Rehabilitasi Cheras (HRC), where he was diagnosed with psychosis disorder, with differential diagnosis of schizophrenia by the psychiatric team. He was initiated on T. Risperidone 1mg ON. Initially, he displayed resistance to engagement, characterized by an apathetic mood and minimal interaction. However, with continued medication, his psychotic symptoms improved, leading to better participation in rehabilitation, social engagement and overall progress.

Results

Rehabilitation following SCI presents multifaceted challenges, particularly when compounded by psychiatric conditions. The absence of early psychiatric intervention led to further complications in his engagement with therapy. This highlights the need for early psychiatric evaluation and intervention in SCI patients, especially those with a history of suicidal attempts. Furthermore, the interplay between neurological recovery, psychological well-being, and social reintegration underscores the importance of a multidisciplinary approach.

Conclusion

Delayed recognition of mental health symptoms can hinder engagement in therapy, emphasizing the need for early multidisciplinary intervention. A holistic approach that integrates physical rehabilitation, psychiatric management, and social support is essential to optimize recovery, enhance participation in therapy, and improve overall quality of life.

EP303

SUPPORT FOR BRAIN-INJURED PATIENTS RETURNING TO WORK: DEVELOPMENT OF A REHABILITATION TOOL FOCUSED ON WORK READINESS

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Background and aims

Returning to work is a major goal for many patients after brain injury. However, depending on the severity of cognitive impairments, immediate reintegration into the workforce may not be feasible. Various institutions provide vocational rehabilitation support, yet both healthcare professionals and patients often struggle to determine the most appropriate facility. A structured approach to guiding this decision-making process is needed.

Methods

To address this challenge, we developed a decision-making flowchart based on the **Career Readiness Pyramid**. This flowchart assists in selecting the most suitable support institution for patients seeking to return to work after a brain injury. The Career Readiness Pyramid is a structured assessment of a patient's work readiness, considering cognitive, physical, and psychosocial factors. By integrating this model into a flowchart, we aimed to create a standardized and practical tool for guiding rehabilitation referrals.

Results

The implementation of this flowchart significantly improved decision-making for both healthcare professionals and patients. It provided a clear framework for selecting appropriate rehabilitation institutions, reducing uncertainty in the referral process. Additionally, using a standardized criterion facilitated smoother collaboration between medical teams, rehabilitation facilities, and patients. This structured approach enhanced communication and continuity of care, ensuring that patients received support tailored to their needs.

Conclusion

To our knowledge, no standardized method previously existed for selecting appropriate vocational rehabilitation institutions for brain-injured patients. By linking the Career Readiness Pyramid with a structured decision-making process, we developed a practical and effective tool to support healthcare professionals and patients. This approach enhances the efficiency and clarity of vocational rehabilitation pathways, ultimately improving patient outcomes and the coordination of rehabilitation services.

EP304

INSTRUMENTAL FINDINGS IN SILENT ASPIRATION AFTER PONTINE STROKE

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Background and aims

The brainstem plays a vital role in coordinating swallowing function. Silent aspiration frequently occurs in patients with pontine infarcts, increasing the risk of aspiration, dehydration, and malnutrition. This underscores the need for instrumental assessments such as the Videofluoroscopic Swallowing Study (VFSS) or Flexible Endoscopic Evaluation of Swallowing (FEES) to determine the safety of oral feeding. This study aims to determine the incidence of silent aspiration in patients with pontine stroke.

Methods

A study was conducted on 50 patients admitted to hospitals from 2021 to 2025 with acute pontine stroke. All pontine patients were referred for a clinical swallowing examination (CSE) by a Speech and Language Therapist. In this study, all acute pontine infarct patients underwent FEES before oral feeding or swallowing trials.

Results

Among the 40 patients with acute pontine stroke, most were over 40 years old and presented with mild to moderate NIHSS scores. Some had other brainstem involvement, including medullary or hemipontine areas. Of the 40 patients assessed by a speech therapist during CSE, 80% (32 patients) exhibited overt symptoms such as coughing or choking. All demonstrated absent anterior hyolaryngeal movement and reduced hyolaryngeal excursion. FEES, conducted before nasogastric tube (NGT) insertion, confirmed silent aspiration in these patients, with a Penetration-Aspiration Scale (PAS) score of 8 in all cases.

Conclusion

This study highlights the high incidence of silent aspiration in patients with acute pontine stroke, even in the absence of overt symptoms such as coughing or choking, though all presented with absent hyolaryngeal excursion. FEES identified silent aspiration in most patients, emphasizing the importance of instrumental assessments like FEES in evaluating swallowing safety and guiding appropriate feeding interventions. These findings stress the need for early detection and management of swallowing dysfunction in stroke patients to prevent complications like aspiration pneumonia, dehydration, and malnutrition.

EP305

FROM CLOT TO COMEBACK: FUNCTIONAL RECOVERY IN A YOUNG MALE WITH CHRONIC CEREBRAL VENOUS THROMBOSIS

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Introduction

Cerebral venous thrombosis (CVT) is a rare cerebrovascular disorder caused by thrombotic occlusion of the dural venous sinuses and cerebral veins, leading to increased intracranial pressure, venous infarction, and hemorrhage. It accounts for approximately 0.5% of all strokes, predominantly affecting individuals under 55 years, with a female predominance of 66%. While early diagnosis, anticoagulation therapy, and rehabilitation are critical for optimizing functional recovery, literature on long-term rehabilitation for chronic CVT remains scarce, necessitating further exploration.

Report

This is a case report of a 39-year-old man with IgA vasculitis who presented with headache and left hemiparesis. Imaging confirmed CVT with progressive intracranial hemorrhage and a deteriorating Glasgow Coma Scale (GCS), requiring urgent right decompressive craniotomy, hematoma evacuation, and dural venous sinus thrombectomy. Postoperatively, he developed epileptic seizures, purulent meningitis with cerebritis, hospital-acquired pneumonia, and pulmonary embolism, significantly limiting early rehabilitation. After three months of hospitalization, he was discharged in a bedbound state, fully dependent on a caregiver. At eight months post-stroke, he exhibited moderate cognitive impairment, dense left hemiplegia with spasticity, hemineglect, adjustment disorder, and severe functional dependence. However, after two weeks of intensive inpatient rehabilitation, he demonstrated remarkable functional recovery evidenced by improvement in various outcomes measures.

Conclusion

This case highlights the challenges of initiating early rehabilitation in medically complex CVT patients and underscores the potential for substantial functional recovery through intensive, long-term rehabilitation. It reinforces the importance of a multidisciplinary rehabilitation approach, even in chronic CVT cases, to optimize functional outcomes and quality of life. Further research is essential to establish evidence-based rehabilitation intervention for long-term CVT recovery.

EP306

ADAPTATION TO A SINGLE LUNG: REHABILITATION STRATEGIES IN A YOUNG POST-PNEUMONECTOMY PATIENT

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Introduction

Pneumonectomy is rare in young patients and is reserved for severe conditions such as carcinoid tumor. Postoperative challenges include respiratory adaptation, functional decline, and musculoskeletal deconditioning. This case highlights rehabilitation strategies to optimize recovery and endurance with a single lung.

Case Description

A 17-year-old male with a history of pulmonary tuberculosis underwent right pneumonectomy for a carcinoid tumor. Postoperatively, he experienced right chest pain and exertional dyspnea, limiting ambulation to 50 meters, worsened by activity and relieved with rest. Three months postoperatively, assessments showed a count test 12, chest expansion 1.5/1.5/2 cm, and Borg RPE scale 17/20. A submaximal test was not performed due to symptom limitations. He underwent structured rehabilitation, including breathing exercises, chest expansion exercises, ROM exercises, and endurance training. By five months, he showed remarkable recovery, with decreased pain and dyspnea, a count test 20, chest expansion 3/3/3 cm, and significant endurance gains, reflected by 6MWD of 406 meters and Borg RPE scale reduced to 13/20.

Discussion

Over 20 weeks of rehabilitation, the patient exhibited significant improvements in functional capacity and endurance. Dyspnea control improved, enabling ambulation beyond 100 meters with reduced fatigue, while upper limb strength and range of motion increased, enhancing overall functional abilities. After one month of therapy, he successfully performed the 5-STS with a score of 20. The following month, 6MWD improved to 78 meters, and by the fifth month, it further increased to 406 meters, demonstrating remarkable adaptation to a unipulmonary state and enhanced cardiopulmonary endurance. Importantly, he was able to return to school, attending second-floor classes, marking a significant recovery milestone and highlighting the effectiveness of a structured rehabilitation approach.

Conclusion

This case emphasizes the critical role of early rehabilitation and continuous care in optimizing function and adaptation in young patients with a single lung.

EP307

IMPROVEMENT OF 6-MINUTE WALK TEST DISTANCE IN PATIENTS ATTENDING CARDIAC REHABILITATION PROGRAMME IN HTAR

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Background and aims

The 6-Minute Walk Test (6MWT) is a widely used tool to assess functional capacity in cardiac rehabilitation patients.⁽¹⁾ It serves as a reliable measure of aerobic capacity, endurance, and overall cardiovascular fitness (2). The DASS-21 (Depression, Anxiety, and Stress Scale) is a widely used mental health screening tool that helps assess the severity of symptoms related to depression, anxiety, and stress in individuals. This study aims to evaluate the effects of a structured cardiac rehabilitation program on the improvement of 6MWT performance and mental health among cardiac rehabilitation programme participants.

Methods

19 patients (7 post-CABG, 9 post-PCI and 3 without intervention) enrolled in a 6 week outpatient cardiac rehabilitation programme. Baseline data were collected from the 6MWT conducted at Week 0, followed by follow-up assessments at Week 8, and 2 months. The rehabilitation program consisted of supervised individualized, aerobic exercise, strength training, mental health screening and education on cardiovascular health. Patients' distance walked in the 6MWT, heart rate (HR) recovery, mental health screening (DASS) and oxygen saturation were recorded at each time point.

Results

Among 19 patients enrolled in cardiac rehabilitation programme, all shows improvement in 6 minute walk test, in distance average % of improvement is highest in CABG group 144.12% followed by PCI 76.72% and the least improvement in heart failure patients 13.75% and the improvement sustained at 2 months post completion of programme, except for one patient who shows deterioration toward end of the programme due to limitation in medical conditions such as osteoarthritis. In terms of correlation between Ejection fraction and improvement in 6 minute walking test, patients with higher EF more than 50% tend to show significant improvements in their 6MWT (some even over 100%). Some patients with lower EF, less than 45% show less improvement or no improvement. The average improvement in 6MWT from Week 0 to Week 8 is 93.38%, and from Week 0 to 2 months is 147.12%. With regards DASS 21 score cardiac rehabilitation programme does not show any difference.

Conclusion

Majority of patient shows improvement in 6 minute walk test after joining the programme especially those with higher ejection fraction. DASS 21 does not show any significance difference after the programme.

EP308

A CROSS-SECTIONAL SURVEY OF KNOWLEDGE AND ATTITUDES AMONG HEALTHCARE PROVIDERS TOWARDS IMPLEMENTATION OF INTERNATIONAL DYSPHAGIA DIET STANDARDISATION INITIATIVE (IDDSI)

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Background and aims

Textured-modified diet (TMD) and thickened fluid (TF) are common intervention for individuals with dysphagia to improve swallow safety. International Dysphagia Diet Standardisation Initiative (IDDSI) provides universal standardised terminology and interpretations for TMDs and TFs. Studies suggests that attitudes toward the implementation of IDDSI are favourable but the adoption of IDDSI in many clinical settings is still lacking. The main challenges are the lack of understanding of IDDSI and insufficient training in TMD and TF preparation using IDDSI Framework. This study aims to assess healthcare providers' knowledge and attitudes toward the implementation of IDDSI and identify possible strategies for successful implementation.

Methods

The survey was conducted among healthcare providers in Hospital Kuala Lumpur using an adopted validated questionnaire. A total of 277 respondents were engaged in the study. The IDDSI knowledge levels were assessed by summing the correct answers with a total score of 8. The implementation barriers and the possible tailored strategies were identified.

Results

The majority of the respondents agreed that IDDSI can improve patients' food safety (79.4%) and improve quality of care (72.2%). However, their understanding of IDDSI is poor in which the mean score for IDDSI knowledge is 1.79 ± 1.59 . The hardest challenges to the implementation of IDDSI were found to be difficulty in reading, understanding, and remembering the IDDSI definitions and descriptions. Nevertheless, 81.3% of the respondents are interested in future education for the implementation of IDDSI and the majority of them choose seminars and workshops as the main channels of education.

Conclusion

Our study highlights the need to facilitate IDDSI implementation, particularly regarding IDDSI knowledge through tailored intervention strategies. Further study is required to evaluate the effectiveness of intervention in our facility.

EP309

ROLE OF REHABILITATION MEDICINE IN MANAGING RARE CASE OF SEVERE TETANUS: A CASE REPORT

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Background and aims

Tetanus is a serious bacterial infection caused by *Clostridium tetani*, leading to muscle stiffness, spasms, and potentially life-threatening complications like respiratory failure. The bacteria typically enter through deep wounds, cuts, or burns, releasing a neurotoxin that disrupts muscle function. This case report describes a rare instance of severe tetanus in a patient who missed the ATT vaccine, resulting in an infected wound requiring surgery and rehabilitation to restore function and mobility.

Case presentation

A 56-year-old man developed severe tetanus after a puncture wound on his right foot. He initially did not seek medical attention, leading to an infected wound with symptoms including lockjaw and neck stiffness. He eventually sought medical care, and an ATT vaccine was administered during his first visit after the trauma. The patient underwent surgery for his wound and required intensive care as his condition deteriorated, resulting in bacteremia. Rehabilitation intervention done included temporomandibular joint (TMJ) massage, limb muscle strengthening, bed mobility, and functional exercises, along with cognitive and orientation training.

Results

Despite experiencing significant initial deficits, he demonstrated gradual improvements in both motor and cognitive functions after physiotherapy and cognitive interventions.

Conclusion

In conclusion, this case underscores the importance of timely anti-tetanus treatment (ATT) to prevent severe outcomes. Although the patient missed the initial ATT injection, he showed significant recovery through rehabilitation, including physiotherapy and cognitive interventions. The gradual improvement in motor function, cognition, and trismus demonstrates the potential for recovery in severe cases. A comprehensive, multidisciplinary rehabilitation approach was essential in optimizing recovery, highlighting the need for early intervention and ongoing care in managing severe tetanus.

EP310

ANALYSIS OF SURGICAL OUTCOME IN PERIPHERAL NERVE TORSION

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Background and aims

We aimed to analysis of clinical outcome of peripheral nerve torsion in patients with neuralgic amyotrophy according to the degree of nerve torsion and surgical method, and to verify the appropriate time for surgery and type of surgical approach.

Methods

We retrospectively reviewed the history, neurological symptom and physical examinations, findings of ultrasonographic images and electrodiagnostic studies, and the surgical appearances including degree of the torsion in 9 patients with peripheral nerve torsion. Also, the clinical results of treatment were evaluated.

Results

Five patients had radial nerve or posterior interosseous nerve torsions and others had median nerve or anterior interosseous nerve torsions. All the torsions were located in the level above the elbow. Initial severe muscle weakness was found in the nerve torsion more than 180 degrees. Favorable recovery from severe muscle weakness was correlated with short duration from the symptom onset to the surgery.

Conclusion

In case of severe weakness due to the suspected peripheral nerve torsion, we suggest early surgical exploration to select appropriate surgery (neurolysis or neurorrhaphy) according to the nerve torsion degree.

EP311

THE IMPACT OF PROLONGED THERAPY ON THE QUALITY OF LIFE OF PATIENTS WITH DEGENERATIVE DISEASES AT IDAMAN HOSPITAL, BANJARBARU, SOUTH KALIMANTAN

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Background

Patient with degenerative disease refers to persistent, long-term pain that often worsening with activity and can significantly impact daily life and quality of life. They need to visit hospital regularly as routine patients in physical medicine and rehabilitation to get therapeutic modalities. Patients undergoing long-term therapy may experience challenges that impact their quality of life, potentially feeling burdened or not by the prolonged treatment process. This study aims to assess the quality of life in patients with chronic pain undergoing long-term therapy and to evaluate the effect of therapy on pain after treatment.

Methods

The data were collected through face to face interviews by used WHOQOL instrument and simple questioner about the participant feeling to do routine therapy.

Result

The results indicate that the individual has undergone therapy for a duration of 1 to 3 years, experiencing moderate pain levels. They are well-motivated to continue regular therapy, as the pain worsens when therapy is not maintained. The quality of life assessment shows that they have a fairly good quality of life while adhering to their therapy routine.

Conclusion

Over time, undergoing long-term therapy can significantly improve their quality of life by reducing pain, allowing them to perform daily activities more comfortably and maintain overall well-being.

Keyword

Degenerative disease, chronic pain, routine therapy, quality of life

EP312

PERINEURAL INJECTION THERAPY ACCELERATES RECOVERY AND SUPPORTS REHABILITATION IN POST-NEUROTIZATION BRACHIAL PLEXUS INJURY: A CASE REPORT

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Background and aims

A 24-year-old female with an incomplete brachial plexus injury underwent nerve transfer surgery to improve left shoulder abduction. Postoperatively, she experienced neuropathic pain, electric shock-like sensations radiating to the lower arm, and sensory disturbances, particularly in the left index finger and thumb. The aim of this study is to evaluate the effectiveness of Perineural Injection Therapy (PIT) combined with rehabilitation in alleviating neuropathic symptoms and improving motor function following nerve transfer surgery.

Methods

Two months post-surgery, PIT was initiated with targeted injections at the medial and lateral clavicular regions, the median nerve, and around the surgical scar. The protocol included weekly injections for four sessions, followed by bi-weekly sessions over three months. Conventional physiotherapy and occupational therapy were conducted twice weekly to facilitate functional recovery.

Results

Following PIT and rehabilitation, the patient reported **complete resolution of neuropathic pain**, significant reduction in sensory disturbances (now primarily in the thumb), and **improvements in muscle strength**:

- Shoulder abduction improved from **1/5 to 2/5**
- Shoulder flexion improved from **1/5 to 2/5**
- Elbow flexion remained **1/5**
- Elbow extension improved from **3/5 to 4/5**
- Hand function remained stable at **4/5**

These functional gains enabled greater participation in daily and challenging activities.

Conclusion

PIT, in conjunction with rehabilitation, was effective in reducing neuropathic symptoms and enhancing motor recovery following nerve transfer surgery. Further studies are warranted to explore its long-term impact and optimize treatment protocols for brachial plexus injuries.

EP313

NAVIGATING REHABILITATION CHALLENGES IN PREGNANCY WITH RELAPSE REMITTING MULTIPLE SCLEROSIS: A CASE REPORT

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Background

Pregnancy is a significant concern for individuals with multiple sclerosis. Pregnancy related issues such as urinary tract infection (UTI), fatigue, low back pain may worsen in MS and affect the disability trajectory. We report a case of relapse remitting multiple sclerosis (RRMS) in pregnancy, highlighting rehabilitation challenges, barriers and management.

Case Report

A 30-year-old gravida 2, para 1 woman with a history of (RRMS), diagnosed five years ago presented with bilateral lower limb weakness, neurogenic bladder, and bowel dysfunction. She had no prior experience with rehabilitation.

She was first referred to us during her second trimester due to worsening urinary incontinence, constipation, lower back pain, and increasing difficulty with mobility. She experienced frequent urinary leakage with a significant post-void residual urine volume ranging from 30% to 80%, despite negative urine cultures. She received focused training on clean intermittent self-catheterization (CISC) but struggled to perform it independently due to increased abdominal girth. Consequently, a shared decision was made with her spouse for him to assist with clean intermittent catheterization as her pregnancy advanced.

With intensive training, she demonstrated notable improvements in standing ability and transfer techniques, as objectively reflected in her Modified Rivermead Mobility Index (MRMI) score, which increased from 29/40 to 31/40. However, therapeutic ambulation using a walker revealed hyperlordosis and a waddling gait, further exacerbating her lower back pain. This limitation hindered the full optimization of her functional mobility through rehabilitation. Despite these challenges, her 6-Minute Walk Test performance improved from 10 meters to 30 meters.

Dietary and nutritional counseling, psychological support, and environmental modifications were amongst integral parts of the comprehensive care she received throughout rehabilitation.

Conclusion

This case underscores the rehabilitation challenges in pregnancy with RRMS. Early intervention, multidisciplinary approach and caregiver involvement were crucial in optimizing function.

EP314

SHORT TERM POST OPERATIVE OUTCOMES OF PATIENTS RECEIVING PREHABILITATION PRIOR TO PELVIC EXENTERATION

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Background and aims

Pelvic exenteration is a radical surgical procedure often required for locally advanced pelvic malignancies. While life-saving, its impact on post-operative quality of life (QoL) remains a concern. Prehabilitation aims to optimize patients' functional status pre-operatively to improve post-operative outcomes. This study evaluates post-operative QoL, functional status, and clinical outcomes of patients who underwent pelvic exenteration following a structured prehabilitation program.

Method

This is a retrospective descriptive study on patients who underwent pelvic exenteration in 2024 after prehabilitation. Four patients who successfully completed both prehabilitation and post-operative rehabilitation care were included. Post-operative data were gathered via phone interviews conducted after discharge. The study's measured outcomes comprise length of stay (LOS), post-operative complications (Clavien-Dindo Classification), Eastern Cooperative Oncology Group (ECOG) performance status at admission, discharge, and at 6 months post-operatively, as well as EuroQol (EQOL-5D-3L) scores.

Results

All four patients were male, with a mean age of 57.5 years. The mean hospital LOS was 41.75 days (range 22–94). At the time of admission, three patients had an ECOG score of 0, while one patient had an ECOG score of 1. Upon discharge, the ECOG scores of three patients decreased by 1 point, and one patient experienced a decline of 3. At the 6-month follow-up, functional status showed improvement: three patients returned to an ECOG score of 0, and one patient improved to a score of 1. Post-operative complications were observed in all patients, with 25% experiencing Grade I complications, 50% experiencing Grade II, and 25% experiencing Grade IIIb. The mean EQOL index score at the 6-month follow-up was 0.88, and none of the patients required readmission.

Conclusions

Patients who underwent pelvic exenteration following prehabilitation still demonstrated functional decline post-operatively but showed improvement over time. Although post-operative complications were frequent, none resulted in hospital readmission. These findings highlight the potential benefits of prehabilitation and post-operative rehabilitation in mitigating functional decline and enhancing quality of life. Further prospective studies are warranted to validate these findings and optimize rehabilitation strategies.

EP315

ATTITUDES TO PHYSICAL DISABILITY ASSESSMENT OF THE PERSONNEL OF A TERTIARY HOSPITAL IN THE PHILIPPINES USING FIL-ADS(D)

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Background and aims

People with disabilities have unequal access to health care services. In the Philippine General Hospital, a large number of patients being seen experienced or are experiencing disability. Thus, the importance of making all health services of the hospital disability-inclusive. This study determined the attitudes to physical disability of the current PGH personnel, and their correlation to selected sociodemographic factors.

Methods

This was an analytical cross-sectional study. Current PGH personnel, regardless of type of employment and nature of work, were invited to participate in the study using a non-probability quota sampling. Data were collected using the validated Filipino Attitudes to Disability Scale (Fil-ADS(D)).

Results

A total of 386 personnel participated in the study. The overall mean Fil-ADS(D) score was 3.46 ± 0.45 showing relatively positive attitudes towards physical disability. Mean scores per attitudes to disability domains indicated relatively positive attitudes as well, with inclusion and prospects domains having higher mean scores, while discrimination and gains domains having mean scores below 3.46. Mean scores for inclusion and prospects domains were significantly different across personnel strata. Total Fil-ADS(D) scores had positive correlations with educational attainment, financial situation, and self-perceived disability status.

Conclusion

Current PGH personnel generally had positive attitudes towards physical disability; this was reflected across all domains covered in the Fil-ADS(D). Personnel development plans may consider the study findings and target different domains as areas for improvement. This study adds to the local knowledge and understanding of Filipino attitudes towards physical disability.

EP316

MULTIDISCIPLINARY REHABILITATION APPROACH IN SUSPECTED METASTATIC SPINAL CORD TUMOR

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Introduction

Spinal cord injury (SCI) due to metastatic bone disease presents critical diagnostic and rehabilitative challenges, particularly in young patients with atypical presentations. This case underscores the importance of early surgical intervention and multidisciplinary rehabilitation in optimizing functional outcomes and neurological recovery.

Case Description

A 25-year-old female presented with progressive lower limb weakness, sensory deficits, and back pain over four months, culminating in paraplegia within two weeks. MRI revealed a suspected metastatic lesion at T3. The patient's history of fibroadenoma and mammary abscess raised concerns about an undiagnosed primary malignancy. Neurological examination confirmed complete motor and sensory loss below T3 (SCI AIS A). Urgent laminectomy at T8–T9 and tumor excision were performed, followed by a structured two-month rehabilitation program.

Discussion

6 Weeks post-surgical rehabilitation led to neurological improvement. Motor function in lower extremities increased (MMT L2-S1: 5/4 to 5/5), sensory recovery was observed from L3-S1, and reflex abnormalities stabilized. Spasticity reduced, proprioception remained intact, and patient demonstrated improved functional independence. This case challenges traditional prognostic limitations in metastatic SCI and highlights the pivotal role of early intervention. The structured rehabilitation program focusing on neuromuscular re-education, mobility training, and adaptive strategies proved essential in maximizing recovery potential.

Conclusion

This case reinforces the necessity of an integrated approach combining early surgical decompression with aggressive rehabilitation to improve outcomes in SCI from metastatic disease. Presenting this case in an international forum is crucial to advancing clinical protocols, refining rehabilitation strategies, and promoting global consensus on best practices for neurological recovery in oncological SCI cases.

EP317

CHALLENGES IN REHABILITATION OF A YOUNG ADULT WITH RIGHT TRANSFEMORAL AMPUTATION AND POLYTRAUMA: A CASE REPORT

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Background and aims

Amputations due to trauma can cause lasting impairment and functional challenges, particularly for adolescents and young adults. Successful amputee rehabilitation depends on various factors including age, level of amputation, comorbidities, rehabilitation intensity and psychology factors. This case highlights the challenges of optimizing functional independence in a patient with transfemoral amputation and multiple injuries and complications.

Methods

A young man involved in a boat collision sustained an open-book pelvic fracture, extraperitoneal hematoma, bilateral thigh compartment syndrome, right femur fracture, and vascular injury. These injuries led to multiple surgeries, including a right transfemoral amputation. Initially, he had limited left ankle range of movement (ROM) in plantarflexion and a stooped gait. After intensive rehabilitation, his ankle ROM improved, and his posture became upright. He progressed from household ambulation to functional community walking with bilateral elbow crutches. Left solid ankle foot orthosis was prescribed to achieve gait stability and nerve conduction study was arranged to rule out possible peripheral nerve injury. He also experienced discomfort while using pneumatic post-amputation mobility aid due to a right bony prominence at the stump end. Orthopaedic team was referred for stump refashioning to prepare for future prosthetic restoration.

Results

With rehabilitation, he demonstrated improvement in key outcome measures (manual muscle testing, functional independence measures, 6 minutes walk test, 10 meters walk test). He achieved Medicare Functional Classification Level of K2.

Conclusion

Early and comprehensive multidisciplinary rehabilitation for amputation is crucial to optimize functional independence and walking ability. Successful amputation rehabilitation requires an individualized approach and interdisciplinary collaboration to effectively manage polytrauma-related complications.

EP318

NEUROPHYSIOLOGICAL EFFECTS OF SALAT ON THE MUSCULOSKELETAL SYSTEM BASED ON THE INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH

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Introduction

The rituals of Salat (Muslim prayer) share similar physical positions with yoga (standing, bowing, prostration and sitting). The latter has been linked to physical, cognitive, emotional and psychological health benefits. The International Classification of Functioning, Disability, and Health (ICF) is a conceptual framework used to define health and health-related states.

Objective

To conduct a scoping review on the neurophysiological effects of Salat on the musculoskeletal system based on the ICF conceptual framework.

Methods

A literature review was conducted from February to April 2023 using PubMed, EBSCO, and the Scopus Library databases. Articles published between 2012 and 2023 were retrieved using the following keywords: “impact” OR “effect” OR “health benefit” OR “functional outcome” AND “shalat” OR “Muslim prayer” OR “Salat”. Inclusion criteria include full-text articles in English that explored the health effects of Salat on the musculoskeletal system. Articles unrelated to the impact or effect of Salat on the musculoskeletal system were excluded in the review. Health benefits of Salat were subsequently categorised into five domains of the ICF.

Results

A total of 622 articles were identified through PubMed (404), EBSCO (124), and Scopus (68). After eliminating duplicate entries, 455 titles were screened to assess their eligibility. Only 35 records were included in the review. Salat reduced low back pain (s7601), osteoarthritis of the knee (s770) and prevented osteoporosis (s798). Improvements in standing posture (d4154), muscle tone (b735), range of motion (s75001), balance (b7600), coordination of movements (b7602) and joint stability in the trunk (s7600) and in the upper and lower extremities (b715).

Conclusions

Salat is associated with improvements in posture, muscle tone, strength, balance and flexibility. These neurophysiological benefits may be related to the extrapyramidal and pyramidal pathways in the brain and spinal cord.

Keywords

Salat, Muslim prayer, health benefits, musculoskeletal, ICF

EP319

PSYCHOLOGICAL BENEFITS OF SALAT BASED ON THE INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH (ICF)

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Background and aims

Spirituality is the dimension of human life that relates to the way people experience, express and seek meaning/purpose/transcendence, and the way they connect to the moment, to self/nature/the sacred. There is increased evidence to incorporate spirituality such as yoga, mindfulness or prayers to enhance psychological well-being and promote healing.

The aims of this study are to review the health benefits of Salat (Muslim prayer) and to classify them based on the International Classification of Functioning, Disability and Health (ICF) domains.

Method

A scoping review was conducted from February to April 2023 using PubMed, EBSCO, and the Scopus Library databases. Articles published between 2012 and 2023 were retrieved using the following keywords: “impact” OR “effect” OR “health benefit” OR “functional outcome” AND “shalat” OR “Muslim prayer” OR “Salat”. Inclusion criteria include full-text articles in English that explored the health effects of Salat. Exclusion criteria involved articles unrelated to the effect of Salat on health. Health benefits of Salat were subsequently categorised into five domains of the ICF.

Results

Thirty-one articles were included in the review. Salat is associated with positive coping mechanism (d2401), improved regulation of emotion and environmental mastery (b1521), reduced anxiety (b152) and depression (b126). The frequency and duration of Salat had positive associations with maintaining employment (d8451), increased life satisfaction (b1521), self-esteem (b1266) and optimism (b1265).

Conclusions

Salat is associated with positive effects on regulation of emotion and environment, maintaining employment and increased life satisfaction via the parasympathetic nervous system and anterior cingulate cortical pathways.

Keywords

Salat, Muslim prayer, health benefits, psychological, ICF

EP320

ETHICAL CONCERNS AMONG CLINICIANS ATTENDING NON-INVASIVE BRAIN STIMULATION COURSE

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Background and aims

This study aimed to explore ethical concerns among clinicians attending a non-invasive brain stimulation course and assess their interest in ethics education. Understanding these concerns is crucial for developing effective ethics training programs that address the diverse needs of clinicians in this field.

Methods

A self-constructed questionnaire, based on previous studies, was developed in English and Malay. The survey included one open-ended question and two closed-ended questions, distributed to clinicians attending a non-invasive brain stimulation course. Participants were invited to complete the questionnaires, which were collected at the end of the course in a designated drop-off box.

Results

Of 43 clinicians, 16 participated (response rate of 37%). The majority (70%) were female, with 50% having attended medical ethics courses previously. Treatment-related issues emerged as the primary ethical theme (63%), encompassing treatment dilemmas (34%), informed consent (18%), and standard operating procedures (11%). Professionalism issues were the second most common theme (37%). Participants showed a strong preference for educational topics like withholding and withdrawing treatment (93.8%), while research ethics was rated lowest at 56.3%. Respondents preferred educational formats such as series of lectures and workshops over self-learning modules.

Conclusion

This study highlights the prevalence of ethical concerns among clinicians involved in non-invasive brain stimulation, including treatment-related dilemmas and professionalism issues. The findings underscore the need for targeted ethics education that addresses these concerns and supports the development of effective ethics training modules. A larger-scale study could provide deeper insights into ethical challenges faced by clinicians across various specialties and aids in the creation of comprehensive ethics education programs.

EP321

EFFECT OF YOGA EXERCISES IN WORKING WOMEN WITH MECHANICAL LOW BACK PAIN

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Background and aims

Low back pain (LBP) is a prevalent condition affecting 70-80% of individuals at some point in their lives¹. Among working women, mechanical low back pain (MLBP) is common due to prolonged sitting, incorrect posture, and sedentary lifestyles³. Yoga, an ancient practice, is known to improve flexibility, muscular endurance, and posture⁹. However, limited research has explored its impact on working women with MLBP. This study aims to determine the effectiveness of yoga exercises in reducing pain, improving flexibility, and enhancing muscular endurance in women with MLBP.

Methods

A total of 31 working women with MLBP were selected using a convenient sampling method. The intervention included yoga exercises such as Surya Namaskar, Pashchimottanasana, Ushtrasana, Shalabhasana, Uttanapadasana, Bhujangasana, and Dhanurasana over two weeks (five sessions per week). Pain intensity (NPRS), lumbar flexion and extension (Modified Schober's Test), and muscular endurance (abdominal crunches and back extension tests) were assessed pre- and post-intervention. Data analysis was performed using a paired t-test.

Results

A significant reduction in NPRS scores was observed from 6.032 ± 0.9123 to 3.226 ± 0.845 ($p < 0.001$). Lumbar flexion improved from 4.113 ± 0.8086 to 5.206 ± 0.6608 ($p < 0.001$), while lumbar extension increased from 2.645 ± 0.4911 to 3.565 ± 0.5407 ($p < 0.001$). Abdominal crunches improved from 11.9 ± 2.007 to 17.26 ± 2.352 ($p < 0.001$), and back extension scores increased from 7 ± 1.897 to 12.03 ± 2.345 ($p < 0.001$).

Conclusion

The study shows that a two-week yoga program significantly reduces pain and enhances lumbar range of motion and muscular endurance in working women with MLBP. This suggests that yoga is an effective, affordable solution for managing MLBP in professionals.

EP322

THE SYNERGY OF UPPER-LIMB REHABILITATION ROBOTS AND AI FROM A SOCIAL MEDICINE PERSPECTIVE: PROMOTING HEALTH EQUITY OR WIDENING THE TECHNOLOGY GAP?

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Background and aims

Upper-limb dysfunction is a common disability, especially post-stroke, affecting millions globally. While robotic rehabilitation has shown promise in improving motor function, its integration with AI offers potential for personalized and adaptive therapy. However, the high cost and accessibility issues may exacerbate health inequities, particularly in low-resource settings.

To investigate the impact of integrating upper-limb rehabilitation robots with AI on patient outcomes and health equity, and to explore whether this technology widens the existing technology gap.

Methods

A mixed-methods study was conducted, combining quantitative assessments of functional recovery and qualitative interviews on accessibility. Patients undergoing upper-limb rehabilitation were divided into two groups: one using AI-driven robots and the other receiving conventional therapy. Functional outcomes were measured using standardized scales, while interviews focused on patient experiences and barriers to access.

Results

Quantitative data showed significant improvements in upper-limb function and muscle strength in the AI-robot group compared to conventional therapy. However, qualitative interviews revealed concerns about cost and accessibility, suggesting that the technology may be out of reach for many.

Conclusion

The synergy of upper-limb rehabilitation robots and AI can enhance functional recovery but may widen the technology gap due to cost and accessibility issues. Future efforts should focus on making these technologies more affordable and accessible to promote health equity.

EP323

ROADBLOCKS TO RECOVERY: CASE SERIES ON HOW UNCONTROLLED NON-COMMUNICABLE DISEASES HINDER INPATIENT REHABILITATION

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Background and aims

Stroke remains a predominant cause of disability globally, with prognosis contingent on multiple factors. Among these, poorly controlled non-communicable diseases (NCDs) may pose profound setbacks towards functional recovery and rehabilitation outcomes. These case reports delineate the impact of suboptimal NCD controls on stroke rehabilitation and underscores the necessity of comprehensive, multidisciplinary management strategies.

Methods

Two patients with complex medical histories experienced substantial rehabilitation setbacks due to poorly controlled NCDs. A 37-year-old man with diabetes mellitus, hypertension, chronic kidney disease, and ischemic heart disease sustained a left lacunar stroke. Despite good neurological recovery (MBI 100), multiple target organ damages mainly contributed by lack of insight and nonadherence to medical therapy hindered his progress; and thus, his ability to return to work.

A 55-year-old man with recurrent strokes, hypertension, diabetes mellitus with retinopathy and nephropathy, and chronic kidney disease required a second rehabilitation admission due to functional regression (MBI 51). Rehabilitation was impeded by persistent acute on chronic medical issues. Both the patient and his caregiver demonstrated inadequate disease comprehension, leading to dietary noncompliance, exacerbating metabolic instability, and ultimately preventing reintegration into employment.

Results

Despite initial functional gains, recurrent metabolic and cardiovascular complications necessitated acute medical management, diverting focus from rehabilitation. Prolonged hospitalization and stagnation in functional recovery underscored the significance of stringent medical control, structured patient education, and caregiver involvement. Multidisciplinary interventions integrating medical stabilization with rehabilitation strategies are imperative.

Conclusion

Uncontrolled NCDs impede stroke rehabilitation by exacerbating medical instability, delaying recovery, and prolonging hospital stays. A holistic approach encompassing stringent medical optimization, patient education, and proactive caregiver engagement is essential to enhance rehabilitation outcomes and facilitate community reintegration.

EP324

SHOULDER PAIN IN THE SETTING OF THALAMIC BLEED AND MULTIPLE MYELOMA: A MANAGEMENT CHALLENGE

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Background

Multiple myeloma, a hematologic malignancy, can lead to bone involvement, resulting in structural weakening, fractures, and nerve compression, all of which contribute to significant pain including shoulder pain. Post-stroke shoulder pain is multifactorial, encompassing neurological, mechanical, or combined aetiologies. Managing shoulder pain in patients with concurrent cerebrovascular and oncologic conditions presents unique challenges. This case report highlights a structured, multidisciplinary approach to pain management in a patient with a recent right thalamic haemorrhage and underlying multiple myeloma in remission.

Methods

A 56-year-old male with multiple myeloma in remission presented with persistent left shoulder pain one month following a right thalamic haemorrhage secondary to hypertensive emergency. The pain was rated 9 on the Numerical Rating Scale (NRS) and significantly restricted shoulder mobility, impeding rehabilitation progress. Clinical assessment suggested both musculoskeletal and neuropathic components. Radiographic imaging of the left shoulder revealed no lytic lesions. However, ultrasound findings demonstrated partial tears of the supraspinatus and infraspinatus tendons. Given the contraindication for regenerative interventions such as prolotherapy and platelet-rich plasma (PRP) injections in this patient, a comprehensive pharmacological and non-pharmacological management strategy was devised.

Result

Pharmacological agents were selected based on safety considerations in the context of multiple myeloma. A multimodal non-pharmacological approach was implemented, incorporating therapeutic ultrasound, interferential current therapy, transcutaneous electrical nerve stimulation (TENS), and heat therapy. This integrative strategy resulted in a reduction of pain intensity (NRS 5) and an improvement in shoulder mobility.

Conclusion

This case underscores the necessity of a multimodal, interdisciplinary approach in the management of post-stroke shoulder pain in patients with underlying multiple myeloma. Early collaboration with haematologists and pain specialists is essential for addressing both neurological and hematological complexities, optimizing functional recovery, and enhancing patient outcomes.

EP325

EARLY AMPUTATION REHABILITATION IN PREVENTION KNEE FLEXION DEFORMITY IN ACUTE TRANSTIBIAL AMPUTATION (TTA), HOSPITAL SULTAN HAJI AHMAD SHAH

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Background and aims

Transtibial amputation (TTA) is a profounding life-changing event that impacts mobility, daily activities, and quality of life. In Malaysia, around 160,000 people require prosthetic or orthotic devices. Prosthetic restoration plays a crucial role in promoting independence, but its success varies due to individualized factors. Knee flexion deformity, a common complication following TTA which can hinder successful prosthetic outcomes. This study aims to determine the prevalence of knee flexion deformity post-TTA and the factors contributing to it.

Methods

This study includes TTA patients referred to the rehabilitation department at Hospital Sultan Haji Ahmad Shah, Temerloh, Pahang, between January to December 2024. Patients were followed up 6-8 weeks post-amputation. Data were collected using the E-Fisicien electronic record system, with variables including demographics, knee flexion deformity, and functional improvements measured by the Modified Barthel Index (MBI). Knee flexion deformity was measured using a goniometer, with an imaginary line from the neutral position of full knee extension to the current range of motion (ROM) of the knee joint in its extended position.

Results

The cohort included 14 patients, 2 (14.28%) of whom underwent amputation due to trauma, and the rest due to diabetic complications. The mean referral duration from TTA diagnosis was 2.14 days, with an average hospital stay of 7.38 days. At the first rehabilitation review, 3 patients (21.43%) had knee flexion deformity, ranging from 10° to 45°. After 6 weeks, 50% of patients exhibited knee flexion deformity, ranging from 5° to 24°.

Conclusion

Early intervention, including stump care education, physiotherapy, and range-of-motion exercises, helps reduce knee flexion deformity and improves functional outcomes post-amputation.

EP326

CHALLENGES IN STROKE REHABILITATION FOR MORBIDLY OBESE PATIENTS: A CASE SERIES

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Background and aims

Stroke rehabilitation is crucial in helping individuals regain independence and mobility after a stroke and plays a significant role in the recovery process. Outcomes of stroke rehabilitation depend on several factors, which may include the severity of the stroke, premorbid status, medical complications and rehabilitation input. A systematic review of impact of obesity on stroke rehabilitation functional outcomes showed that outcomes were inconclusive. The case series aims to describe the challenges that are faced in rehabilitation for morbidly obese patients.

Methods

Three young patients between the ages of 27 and 44 with stroke and morbid obesity were admitted for a stroke rehabilitation program. Two patients had lacunar infarcts and one patient had a total anterior circulation infarct. All patients had BMI between 40 and 51 and encountered challenges to improve the mobility outcomes by the rehabilitation team mostly due to body habitus.

Results

All patients showed improvements in functional outcomes and mobility. Two patients required more than one admission for intensive rehabilitation to reach a small but meaningful outcome for their mobility and functional status. The third patient showed good recovery during his admission, however needed a longer rehabilitation stay compared to other patients in the same ward. On top of standard rehabilitation, all three patients were given dietician counselling and offered meal replacement options during their admission. Two of the three patients demonstrated weight loss during follow up (between 2-11% of baseline body weight).

Patient	Baseline Weight	Baseline BMI	Latest Weight	Latest BMI	% of weight loss	Baseline MBI	Latest MBI	No of Admissions
Mr H. R	130kg	40	119kg	36	8	43	85	3
Mr I. I	164kg	51	145kg	45	11.5	18	85	1
Mr M. A	153kg	51	148kg	50	2	37	58	2

Conclusion

All patients deserve the opportunity for access to rehabilitation, however the road to rehabilitation is fraught with challenges for those with morbid obesity. With the increase in global obesity, it is essential that rehabilitation programs take into consideration that these patients may require a longer admissions or multiple admissions for inpatient rehabilitation to achieve functional recovery.

EP327

A CASE OF SUCCESSFUL SOCIAL REINTEGRATION SUPPORT THROUGH HOME-VISIT REHABILITATION FOR A PATIENT WITH COGNITIVE IMPAIRMENT

Minako Fujita

Background

The patient was a 47-year-old man with bilateral frontal lobe infarcts, presenting with left mild paralysis and significant impairments in attention and executive function. Due to cognitive impairment, he required assistance in establishing a rhythm of life and using public transport, making outpatient rehabilitation at the hospital difficult.

Methods

Home visit rehabilitation was initiated, with step-by-step support planned based on the employment readiness pyramid. Occupational therapy and aerobic exercise aimed at improving cognitive functions were implemented to promote independence in all aspects of life. Following this, training in the use of public transport was provided to facilitate commuting to an employment transition support facility.

Results

As a result of the rehabilitation efforts, the patient gradually developed a rhythm of life and achieved independence in daily life management. He began commuting to the facility and currently attends the center three times a week. Through home-visit rehabilitation, the patient was able to recover his social functions and increase his motivation to work.

Conclusion

The patient improved his quality of life and took significant steps toward social reintegration. Home-visit rehabilitation was considered a meaningful therapeutic tool, demonstrating its effectiveness in supporting individuals with cognitive impairments in their journey toward independence and social participation.

EP328

CLEAN INTERMITTENT CATHETERIZATION TRAINING FOR PARENTS COMBINED TO REHABILITATION AS TREATMENT OF NEGLECTED NEUROGENIC BLADDER AND CATHETER-RELATED URINARY INFECTION OF A MYELOMENINGOCELE CHILD: A RURAL AREA SETTING

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Introduction

A child with myelomeningocele often use clean intermittent catheterization (CIC) for renal preservation. Starting CIC at early age is associated with good outcomes, in fact, especially in a rural area, for reason lack of knowledge and difficulties with multiple catheterization, neglected bladder management often occur. However, modified training education for caregiver is likely increase the successful of CIC.

Case Report

A 4-years-girl with neurogenic bladder due to myelomeningocele, she lived in a rural area of South Sumatra which CIC was not so familiar as bladder management. She also experienced urinary tract infection and renal deterioration function as shown by supportive finding results (urea: 69 mg/dl, creatinine 0.74 mg/dl and e GFR 20.98 ml/minute/1.73 m², hydronephrosis grade III). Then, treatment of cotrimoxazole and CIC were applied. Mother was trained how to perform CIC independently. She also got information about drinking time schedule include how to fill out bladder diary. Furthermore, transcutaneous electrical stimulation on 5 cm above malleolus medial and pelvic floor training were applied. Once mother could perform CIC properly and fill out bladder diary correctly, CIC program was started.

Discussion

CIC allows physiological process of urination in myelomeningocele. Although we can't deny that there is a time burden issue, CIC with modified structure instruction and training to caregiver is very likely to be implemented even in rural area. In this case, after 30 days, there was a positive outcome: no sign of urinary infection, urea 48 mg/dl, creatinine 0.46 mg/dl, e GFR 83 ml/minute/1.73 m². Patient was continued rehabilitation program to improve her functional ability due to motoric issues.

Conclusion

To perform CIC in child with myelomeningocele requires an extra effort, but since it gives good outcome, it is worth trying even in a situations that are far from ideal.

EP329

SPORTS AND ITS EFFECT ON WHEELCHAIR USERS

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Introduction

Aim of the study is to compare the Quality of Life of wheelchair users participating in regular recreational physical activity (wheelchair cricket) and those who did not participate in any sports, by using World Health Organization (WHO) Quality-of-Life(QoL) Scale.

Materials and methods

Study design: Cross sectional study

Study setting: Non-Government Organization (NGO) at Malappuram and Department of PMR, Composite Regional Centre, Kozhikode.

Study population: Contains 30 people, 15 are team members of wheelchair cricket at an NGO, Malappuram (Group 1) and 15 are wheelchair users attending Composite Regional Centre, Kozhikode, who did not participate in any sports (Group 2) whose age is between 20 – 45 years.

Study method: Quality of Life was assessed using WHO QoL scale by filling google form.

Results

Total 30 patients participated in the study, all were males. Overall QoL and general health, physical, psychological and social domain scores were higher in Group1 than Group 2 ($p < 0.05$), whereas environment domain scores were similar in both groups.

Conclusion

The QoL was significantly higher in wheelchair users participating in sports (wheelchair cricket) than those who did not participate in any sports.

Key words

World Health Organization (WHO) Quality-of-Life (QoL) Scale, Non-Government Organization (NGO).

EP330

IFULL 365: AN AI-DRIVEN MARKERLESS MOTION CAPTURE SYSTEM FOR PERSONALIZED STRENGTH TRAINING IN OLDER ADULTS

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Background

Taiwan is projected to become a super-aged society by 2025, with over 20% of its population aged 65 and above. Age-related sarcopenia and functional decline threaten older adults' independence and quality of life. Traditional fitness programs often lack data-driven personalization and objective monitoring. To address these challenges, we developed iFull 365, an AI-enabled digital health platform that supports automated functional screening and individualized physical training aligned with clinical standards.

Methods

The platform integrates markerless motion capture via Redpill's VideoPose AI, multimodal motion analysis, and intelligent coaching logic to deliver an end-to-end personalized training experience.

- **Functional Screening:** A digital, multimodal version of the Short Physical Performance Battery (SPPB) is implemented using standard RGB cameras. Key metrics—including sit-to-stand time, 4-meter gait speed, and postural stability—are analyzed to classify users into frailty, pre-frailty, or healthy categories. These risk levels inform subsequent training prescriptions.
- **AI-Powered Strength Training:** Six foundational exercises (squats, lunges, glute bridges, push-ups, rows, and overhead presses) are structured across five difficulty levels. Progression is dynamically adjusted based on user performance history and biomechanical tracking.
- **Motion Recognition & Feedback:** Real-time evaluation of range of motion, movement tempo, and symmetry supports immediate feedback. An AI scoring engine generates corrective cues and quantifies movement quality.
- **Gamified Interaction:** An AI-driven virtual coach delivers instructions and motivation through animated avatars, synthesized speech, and voice-guided dialogue.
- **Backend Management:** A cloud-based dashboard enables trainers and clinicians to monitor skeletal tracking data, adjust programs, and export performance reports.

Results

Pilot testing confirmed that the system accurately captured SPPB metrics and facilitated adaptive training progression. Older adults responded positively to the interactive interface and voice feedback. The platform demonstrated potential in improving user adherence, lower-limb strength, and overall exercise consistency through a recommended three-session-per-week routine.

Conclusion

iFull 365 offers a scalable, intelligent solution for promoting physical health in aging populations. Its integration of VideoPose AI, clinical screening tools, adaptive motion tracking, and gamified coaching supports deployment in both community and home environments. Future development will focus on longitudinal efficacy, clinical validation, and integration with rehabilitation and eldercare systems.

EP331

IMPACT OF AVATAR APPEARANCE ON THE PERSUASIVENESS OF A VIDEO TO ENCOURAGE PHYSICAL ACTIVITY

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Background and aims

Avatars have been used as tools for communication in various fields. However, the characteristics of avatars useful for health communication remain unclear. This study aimed to examine the impact of medical avatars on health communication.

Methods

An anonymous questionnaire survey was conducted among individuals aged 18–59 years. Participants were randomly assigned to view one of four avatar-based videos (medical male, nonmedical male, medical female, or nonmedical female avatar). Total scores for perceived persuasiveness of the video, avatar acceptability, and exercise self-efficacy were then compared between the medical and nonmedical avatar groups.

Results

Overall, 309 participants were included in the analysis; 160 were classified into the medical avatar group (51.8%) and 149 into the nonmedical avatar group (48.2%). The medical avatar group had higher scores for persuasiveness and acceptability than the nonmedical avatar group. In the subgroup analysis based on avatar experience among individuals with avatar experience, the medical avatar group had higher persuasiveness and acceptability scores than the nonmedical avatar group; however, no significant difference was observed among individuals without avatar experience.

Conclusion

In health communication, avatar appearance may impact the persuasiveness and acceptability of the videos. The results of this study demonstrated that avatars wearing white coats were more persuasive and acceptable to the participants.

EP332

HIGH-INTENSITY INTERVAL TRAINING VERSUS MODERATE-INTENSITY CONTINUOUS TRAINING ON POST-STROKE PATIENTS: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED TRIALS

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Background and aims

Moderate-intensity continuous training (MICT), which can effectively improve fitness, balance, and motor function, is commonly used as part of cardiorespiratory exercise training for post-stroke patients. On the other hand, high-intensity interval training (HIIT) has been used for the treatment of coronary artery disease and heart failure in recent years. However, the effects of HIIT on post-stroke patients remain unclear. This study is the first meta-analysis to compare the therapeutic effects of HIIT with those of MICT in post-stroke patients.

Methods

We performed the literature search in the PubMed, Embase, and Cochrane Library databases in January 2025. Randomized trials comparing the outcomes of HIIT with those of MICT in post-stroke patients were included. The mean difference (MD) and standardized mean difference (SMD) were determined as the effect size for continuous outcomes, with outcome accuracy determined using 95% confidence intervals (CIs).

Results

In total, 8 studies involving 371 patients were included in our meta-analysis. The meta-analysis revealed that HIIT significantly improved peak oxygen uptake (VO_2 peak, MD = 1.88 ml/kg/min, 95% CI: 1.25 to 2.51) and mean heart rate (SMD = 1.02, 95% CI: 0.48 to 1.56) relative to MICT. However, no significant differences were observed between HIIT and MICT in terms of peak heart rate (SMD = 0.23, 95% CI: -0.11 to 0.56), systolic blood pressure (MD = -1.10 mmHg, 95% CI: -5.55 to 3.36), diastolic blood pressure (MD = -0.68 mmHg, 95% CI: -3.56 to 2.19), 6-minute walk distance (MD = 19.39 m, 95% CI: -4.25 to 43.03) and 10-meter gait speed (MD = 0.07 m/s, 95% CI: -0.04 to 0.18). In addition, no serious adverse events were observed.

Conclusion

HIIT has favorable effects on cardiorespiratory fitness for post-stroke patients. Therefore, HIIT may serve as an effective and safe cardiopulmonary rehabilitation modality for post-stroke patients.

EP333

INFLAMMATION-TARGETED NANOMEDICINES ALLEVIATE OXIDATIVE STRESS AND REPROGRAM MACROPHAGES POLARIZATION FOR MYOCARDIAL INFARCTION TREATMENT

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Background and aims

Myocardial infarction (MI) is a significant global health issue, characterized by a complex microenvironment with excessive oxidative stress and intense inflammatory responses that exacerbate cardiac dysfunction and MI progression. Current treatments are limited by their inability to effectively target these issues. This study aims to develop a mannan-based nanomedicine, Que@MOF/Man, to target the inflammatory infarcted heart and deliver quercetin (Que), an antioxidant and anti-inflammatory agent, to create a favorable myocardial microenvironment for cardiac repair.

Methods

The Que@MOF/Man nanomedicine was designed with mannan on its surface to enable selective internalization by macrophages rather than cardiomyocytes. The nanoparticles were evaluated for their ability to neutralize reactive oxygen species (ROS) in macrophages, promote macrophage differentiation into a reparative phenotype, and enhance cardiomyocyte survival through intercellular communication. In vivo studies were conducted in MI rats to assess the distribution of Que@MOF/Man and its effects on inflammation resolution and cardiomyocyte protection.

Results

Que@MOF/Man effectively reduced oxidative stress in macrophages and promoted their differentiation into a reparative phenotype, thereby mitigating the inflammatory response and enhancing cardiomyocyte survival. In vivo, Que@MOF/Man specifically accumulated in the injured myocardium of MI rats compared to free Que. The treatment significantly resolved inflammation, protected cardiomyocytes, prevented further myocardial remodeling, and improved cardiac function in MI rats.

Conclusion

The findings validate the rational design of an inflammation-targeted delivery strategy using Que@MOF/Man to mitigate oxidative stress and modulate the inflammatory response in the injured heart. This approach presents a promising therapeutic avenue for MI treatment by improving the myocardial microenvironment and enhancing cardiac repair.

EP334

GAIT ANALYSIS OF FIRST STEP AFTER STANDING-UP OF PATIENTS WITH STROKE WEARING ANKLE-FOOT-ORTHOSIS

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Background and aims

Individuals at risk of falling are more likely to experience falls during the transition from sitting to standing and the initial step of walking. Ankle-foot orthoses (AFOs) can improve ankle stability and toe clearance, increasing gait speed. However, AFOs do not significantly enhance propulsive force. This study explores the effects of 3D-printed AFOs on the kinematic and kinetic parameters of the first step after standing up.

Methods

Participants were enrolled three months after stroke onset. A motion capture system (Qualisys Track Manager, QTM) and force plate system (Kistler Instruments) measured gait during the first step after standing. Participants underwent three conditions: wearing a 3D-printed AFO, a low-temperature thermoplastic AFO, and no AFO. Testing order was randomized. SPSS version 20 was used for statistical analysis, with the Friedman test applied due to the small sample size.

Results

The study enrolled 10 males and 2 females (58.3 ± 7.7 years). Wearing the 3D-printed AFO, the gait cycle and swing phase durations were significantly reduced compared to no AFO. The low-temperature thermoplastic AFO also reduced these durations, with significance in the swing phase. No significant differences were observed between the 3D-printed and low-temperature thermoplastic AFOs. The peak propulsion power was greater with the 3D-printed AFO, though not statistically significant. The center of pressure displacements were smaller with the 3D-printed AFO, but no significance was found.

Conclusion

Both AFOs increased gait speed, with the 3D-printed AFO showing potential to improve foot stability, warranting further investigation with larger sample sizes.

EP335

A CASE REPORT: SPECIALIZED SHOULDER-ELBOW ORTHOSIS (SEO) FOR FUNCTION AFTER HUMERAL OSTEOSARCOMA SURGERY

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Background and aims

Osteosarcoma, the most common malignant bone tumor, often necessitates limb salvage surgery (LSS). While LSS aims to improve quality of life (QoL), complications like infection and wound dehiscence can occur. This case addresses a complex situation following LSS for osteosarcoma of the humerus, where recurrent complications led to bone graft removal, resulting in a “boneless” humerus and functional limitations. The aim is to present the design and outcomes of a specialized shoulder-elbow orthosis (SEO) to manage this unique challenge.

Methods

A case of a 28-year-old woman with a “boneless” right humerus following complicated LSS for osteosarcoma. The patient reported weakness, tingling, and reduced hand function. In addition, the hanging position of her hand caused aching and fatigue. Muscle power of the wrist flexor and extensor was rated 4/5 on the right hand. Sensibility of the right brachial plexus decreased to 90%. Previously working as Human Resource staff, she now relies on her right hand for daily activities and parenting. She has difficulty performing daily activities such as cooking, writing, and activities that require right hand. A specialized SEO was designed to support her functional needs. Isometric strengthening exercises for wrist flexors and extensors were prescribed.

Results

An orthotic-prosthetic (OP) device was designed to create a SEO aimed at facilitating her activities and improving muscle power. The SEO provided support and stability, enabling improved function. Subjectively, improvements in QoL were noted, attributed to increased self-confidence and independence in daily tasks.

Conclusion

The implementation of a specialized SEO significantly improved functional abilities for a patient with a boneless humerus following complicated LSS for osteosarcoma. This case highlights the potential of orthotic intervention to address unique challenges and improve QoL in patients with significant bone defects after bone removal and complications.

EP336

ASSOCIATIONS BETWEEN MEASUREMENTS BY TRUNK MUSCLE TRAINING DEVICE AND TORQUE OF TRUNK FLEXION AND EXTENSION

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Background and aims

Trunk muscle training has received remarkable attention not only for rehabilitation, but also for young athletes, adult athletes, and preventing falls in older adults. Recently, an innovative trunk muscle training device was developed. This study aimed to examine the association between trunk muscle training device measurements and trunk flexion and extension torques.

Methods

This cross-sectional study included 25 young asymptomatic female adults. Trunk muscle strength was measured using a trunk muscle training device in the standing position, while maximum voluntary isometric trunk flexion and extension torque were measured using a dynamometer in a sitting position. Data were analyzed using correlation, partial correlation, and multiple regression analyses.

Results

Correlation analysis revealed significant relationships between trunk muscle strength and torque of trunk flexion ($r=0.661$, $p<0.001$) and extension ($r=0.406$, $p=0.044$). Partial correlation analysis showed a significant correlation between trunk muscle strength and trunk flexion torque, with trunk extension torque as a control variable ($r=0.575$, $p=0.003$); however, no significant correlation was observed between trunk muscle strength and trunk extension torque, with trunk flexion torque as a control variable ($r=0.085$, $p=0.692$). Multiple regression analysis revealed that trunk flexion torque ($\beta=0.621$, $p=0.003$) significantly influenced the trunk muscle strength (Adjusted $R^2=0.391$, $p=0.002$, $f^2=0.642$).

Conclusion

These findings suggest that trunk muscle strength, as measured using a trunk muscle training device, is primarily associated with trunk flexor muscle strength.

EP337

EVALUATING THE LONG-TERM EFFECT OF SHOCKWAVE THERAPY IN TREATING PLANTAR FASCIITIS

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Background and aims

Plantar fasciitis affects over 2 million people annually, with women nearly twice as susceptible. While conventional treatments offer temporary relief, ESWT has effectively reduced pain and improved function, making it a promising non-invasive option. To evaluate the effectiveness of shockwave therapy in reducing pain and improving functional outcomes in patients with plantar fasciitis.

Methods

This quasi-experimental study was conducted at the Department of Physical Medicine and Rehabilitation, Dhaka Medical College, from July 2019 to June 2020, following ethical approval. A total of 46 plantar fasciitis patients were enrolled through purposive sampling, with 39 completing the study. Participants received Extracorporeal Shock Wave Therapy (ESWT) alongside NSAIDs, exercises, massage, heel pads, and activity modifications. ESWT was administered three times per week for three weeks. Pain and functional outcomes were assessed at baseline and follow-ups at 1, 2, 4, 12, 24, and 48 weeks using the VAS and Foot Function Index (FFI). Data were analyzed using repeated measures ANOVA in SPSS version 25, with a 5% significance level and 95% confidence interval.

Results

The study included 39 participants with a mean age of 45.66 ± 7.39 years and a mean BMI of 24.29 ± 3.11 kg/m². Males comprised 53.8%, and left-sided plantar fasciitis was more common (59.0%). The mean symptom duration was 4.92 ± 2.56 months, with an average daily standing time of 6.74 ± 2.92 hours. The mean VAS pain score significantly decreased from 8.82 ± 0.88 at baseline to 1.66 ± 0.77 by the 48th week ($p < 0.001$).

Similarly, the mean Foot Function Index (FFI) score declined from 59.65 ± 5.43 to 10.10 ± 3.23 , indicating significant functional improvement ($p < 0.001$).

Conclusion

ESWT is a safe and effective long-term treatment for plantar fasciitis, offering significant pain relief and functional improvement. These findings support its use as a first-line option, especially for patients unresponsive to conventional therapies.

EP338

CLINICAL STUDY ON THE IMPROVEMENT OF COGNITIVE DYSFUNCTION BY MANUAL LYMPHATIC DRAINAGE OF THE HEAD AND NECK

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Objective

This study aims the potential of improving cognitive dysfunction through manual lymphatic drainage of the head and neck, and to provide a new treatment approach for patients with cognitive impairment.

Methods

A total of 80 patients with cognitive impairment who were undergoing rehabilitation at the First Affiliated Hospital of Xi'an Jiaotong University from August 2023 to December 2024 were selected. They were divided into an experimental group and a control group according to the random number table method, with 40 patients in each group. The control group ($n = 40$) received conventional cognitive training, while the experimental group ($n = 40$) received a comprehensive treatment of conventional cognitive training and manual lymphatic drainage of the head and neck. The intervention lasted for 12 weeks. The cognitive function of the patients was evaluated using the Montreal Cognitive Assessment scale (MoCA) and the Mini - mental State Examination (MMSE) before the intervention, at 4 weeks, 8 weeks, and 12 weeks of the intervention, and 1 month after follow - up.

Results

There was no significant difference in the baseline levels of each group before the intervention ($P > 0.05$). The intervention effect of the experimental group was significantly higher than that of the control group at all evaluation time points ($P < 0.05$).

Conclusion

The comprehensive treatment of conventional cognitive training and manual lymphatic drainage of the head and neck (HNMLD) has a definite curative effect on the improvement of cognitive dysfunction. Moreover, manual lymphatic drainage of the head and neck (HNMLD) provides a new method for improving cognitive dysfunction.

EP339

APPLICATION EFFECT OF A NEW INTEGRATED TRADITIONAL CHINESE AND WESTERN MEDICINE REHABILITATION TREATMENT MODEL IN THE PERI-OPERATIVE PERIOD OF LYMPHATICOVENOUS ANASTOMOSIS (LVA)

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Objective

This study aims to explore the application effect of a new integrated traditional Chinese and Western medicine rehabilitation treatment model in the peri - operative period of lymphaticovenous anastomosis (LVA), analyze its impact on patients' postoperative recovery and treatment efficacy, and provide new ideas and methods for the rehabilitation treatment of diseases such as lymphedema.

Methods

A total of 60 patients who underwent LVA were selected in this study and randomly divided into two groups: the control group (30 cases) and the experimental group (30 cases). The control group received routine peri - operative nursing and rehabilitation treatment (CDT). The experimental group introduced a new integrated traditional Chinese and Western medicine rehabilitation treatment model. This model included traditional Chinese medicine treatments such as acupuncture and herbal medicine penetration, as well as Western medicine rehabilitation training, physical therapy, and CDT. The degree of lymphedema, limb function, quality of life and other indicators of the patients were evaluated before surgery, 1 week after surgery, and 1 month after surgery, and the relevant data were recorded.

Results

After receiving the new integrated traditional Chinese and Western medicine rehabilitation treatment model, the experimental group had a significantly reduced degree of lymphedema compared with the control group, faster recovery of limb function, and a significantly improved quality of life. Specifically, the experimental group had a greater reduction in lymphedema volume, stronger limb mobility, and obvious relief of discomfort such as pain and swelling.

Conclusion

The new integrated traditional Chinese and Western medicine rehabilitation treatment model has a significant application effect in the peri -operative period of lymphaticovenous anastomosis (LVA). It can effectively reduce the degree of lymphedema, promote the recovery of limb function, and improve the quality of life of patients. Therefore, this rehabilitation treatment model is worthy of further promotion and application in clinical practice.

EP340

ACUPUNCTURE COMBINED WITH MOTOR IMAGERY IMPROVES UPPER LIMB FUNCTION OF POST-STROKE PATIENTS: NEURAL MECHANISMS REVEALED BY fNIRS-EEG MULTIMODAL IMAGING

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Background and aims

Upper limb dysfunction impacts about 75% of stroke survivors, severely affecting their quality of life. Although acupuncture and motor imagery (MI) individually aid stroke rehabilitation, their combined effects and neural mechanisms are unclear. This study explored the synergistic impact of acupuncture and MI on upper limb function in stroke patients and examined the underlying neural mechanisms using functional near-infrared spectroscopy (fNIRS) and electroencephalography (EEG) simultaneously.

Methods

This randomized controlled trial involved 112 stroke patients, divided into an acupuncture group (n=54) and an acupuncture combined with MI group (n=58). Both groups received interventions five days a week for two weeks. Upper limb function was evaluated using FMA-UE, WMFT, and MBI before and after treatment. Resting-state fNIRS and EEG data were collected simultaneously and analyzed using graph theory, Granger causality for effective connectivity (EC), and the CSTDN algorithm for global efficiency (GE), local efficiency, and average in-degree.

Results

Both groups exhibited improved upper limb function following the two-week intervention. However, the combined group showed significantly greater improvements in FMA-UE, WMFT, and MBI scores compared to acupuncture alone. Notably, participants with greater FMA-UE improvement also demonstrated increased EC in both fNIRS and EEG. A statistically significant correlation was observed between FMA-UE scores and EC in the sixth frequency band of fNIRS in both groups. Furthermore, improvements in FMA-UE scores were positively correlated with increased GE in the theta frequency band of both fNIRS and EEG.

Conclusion

This study confirms the efficacy of combining acupuncture with MI in enhancing upper limb function in stroke patients. The findings suggest that the observed improvements are associated with enhanced EC and GE in specific brain networks, as evidenced by fNIRS and EEG data, which provide valuable insights into the neural plasticity and network remodeling mechanisms underlying the therapeutic effects of this combined intervention.

EP341

ADMINISTERING A MALAY RECEPTIVE LANGUAGE ASSESSMENT FOR CHILDREN WITH CEREBRAL PALSY USING EYE-TRACKING

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Background and aims

The language comprehension of children with disabilities is often assessed by speech-language therapists by using standardized receptive language assessments. These assessments often require the child to point at a picture that corresponds with the referent after it is named by the SLT (e.g., point to the ball). Children with cerebral palsy (CP) are often unable to participate in traditional language assessments because of their limited mobility. The purpose of this study was to evaluate the performance of children with CP on a receptive language assessment conducted via eye-tracking and comparing it to their performance on a traditional receptive language assessment.

Methods

Fifteen children with CP aged 6 to 14 were administered the Malay Preschool Language Assessment Test (MPLAT) via the traditional method and eye-tracking. The children attended two assessment sessions. In the first session, the receptive vocabulary assessment was administered via the traditional method and in the second session, the assessment was administered via eye-tracking. Children also had the opportunity to practice eye-tracking via online games before the assessment was conducted via eye-tracking.

Results

Eight children with CP performed better on the assessment conducted via eye-tracking, two obtained the same scores across both assessment methods whereas the other five scored lower on the assessment via eye-tracking. Most children had poor consistency of scores across the two assessment methods.

Conclusion

Findings from this study suggest that although some children with CP can benefit from receptive vocabulary assessments conducted via eye-tracking, no one assessment method is best suited for all children with CP.

EP342

FIBROMYALGIA AND HYPERBARIC THERAPY: A GAME-CHANGER? META-ANALYSES, META REGRESSION AND SYSTEMATIC REVIEW

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Background and aims

Hyperbaric oxygen therapy (HBOT) has emerged as a promising treatment modality for fibromyalgia syndrome (FMS) patients, a chronic condition characterized by widespread musculoskeletal pain, fatigue, and cognitive disturbances. This therapeutic approach has been shown to reduce inflammation, alleviate pain, and enhance overall quality of life in fibromyalgia patients. This systematic review aimed to present HBOT itself as both an effective and a standalone solution for managing fibromyalgia symptoms effectively.

Methods

We conducted a systematic review following the PRISMA guidelines and included studies obtained from databases such as PubMed, Scopus, ProQuest, Cochrane, SagePub, and Epistemonikos. Our focus was on randomized controlled trials (RCTs) published between 2015 and 2025. In total, six studies fulfilled the criteria for inclusion in this review. Studies included HBOT compared to control (medication, physical exercise, and psychotherapy). We conducted meta-regression analysis in Jamovi 2.4.14 to determine the independent effect of age, sample size and duration of follow on the overall effect. The quality of each study was evaluated using the Cochrane Risk of Bias tool 2.0.

Results

A total of 372 initial studies, 6 RCTs met the inclusion criteria for analysis. HBOT showed significant outcomes in fibromyalgia: VAS ($P < 0.02$), SSS ($P < 0.00001$), WPI ($P = 0.0003$), BDI ($P < 0.00001$), SF-36 general health ($P = 0.0002$), SF-36 physical limitation ($P < 0.0001$), SF-36 social functioning ($P < 0.00001$), SF-36 pain domain ($P < 0.00001$), SF-36 energy ($P < 0.0001$). The co-founding factors related to the outcome were found in age with VAS score ($p = 0.030$), BSI total with sample size ($p = 0.028$), SF-36 emotional with sample size ($p = 0.007$). One study also showed the importance of HBOT-preconditioning compared to ambience conditions (AC)-preconditioning for long-lasting neuroplasticity effect.

Conclusion

HBOT showed significant improvement in VAS, SSS, WPI, BDI, SF-36 in five aspects. Future studies should consider larger sample sizes and a more gender-diverse analysis to further validate these findings.

EP343

FUNCTIONAL AND MOTOR RECOVERY IN INCOMPLETE TRAUMATIC SPINAL CORD INJURY: A CASE REPORT ON THE SYNERGISTIC EFFECTS OF TRANSCRANIAL AND TRANS-SPINAL MAGNETIC STIMULATION WITH CONVENTIONAL THERAPY

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Background and aims

The application of non-invasive magnetic stimulation has been extensively explored in various contexts; however, its efficacy in individuals with spinal cord injury (SCI) remains unclear. Existing studies indicate that both transcranial magnetic stimulation (TMS) and trans-spinal magnetic stimulation (TsMS) can promote spinal cord neuroplasticity and mitigate spasticity in patients with non-traumatic SCI. Herein, we present a case involving a patient with traumatic SCI who underwent an intensive conventional rehabilitation program augmented with TMS and TsMS, yielding promising outcomes.

Methods

A 17-year-old male was involved in a motor vehicle accident in September 2023, resulting in an L1 Chance fracture and a T8-T9 fracture dislocation. He underwent T12-L2 decompression and T7-L3 posterior instrumentation, laminectomy, and dura repair on the third day post-trauma. Concurrently, he sustained a closed comminuted midshaft fracture of the right femur, which was surgically addressed in the same setting. Initially classified as ASIA A with a neurological level of injury (NLI) at T10, he experienced spontaneous neurological recovery after six months, with reassessment revealing ASIA D NLI T11. An intensive rehabilitation program commenced at seven months post-injury, once he was permitted full weight-bearing on the fractured limb. He received daily intensive conventional rehabilitation for six weeks aiming to enhance sensorimotor function and balance. TMS and TsMS were introduced in the seventh week, and administered daily before physiotherapy sessions for a total of 14 sessions.

Results

Outcome measures were assessed at baseline (T0), before TMS (T1), and after TMS (T2). The patient demonstrated improvements in walking independence, balance, and functional mobility.

Conclusion

TMS and TsMS combined with conventional rehabilitation programs may safely and effectively enhance the recovery of sensorimotor, balance, walking independence, and functional mobility of patients with incomplete traumatic SCI.

EP344

EFFECTIVENESS OF HIGH-INTENSITY LASER THERAPY IN IMPROVING NECK MOBILITY AFTER RADIOTHERAPY IN A BREAST CANCER PATIENT WITH LYMPH NODE METASTASIS, A CASE REPORT

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Background and aims

Radiotherapy is nowadays a common treatment for breast cancer with metastasis, while it may result in musculoskeletal complications such as restricted range of motion (ROM) in adjacent structures. High-intensity laser therapy (HILT), a new treatment modality in recent years, has shown favorable outcome in patients with different disorders. This study reports a case of breast cancer with neck lymph node metastasis who received HILT for post-radiotherapy sequelae affecting her neck mobility.

Methods

This case was a 53-year-old female with a history of right breast cancer with right neck lymph node metastasis. Following radiotherapy, the patient experienced tightness in her neck and a significant reduction in its ROM. To address these problems, she underwent HILT once per week for four weeks. Neck ROM was measured before and after the intervention to assess changes in mobility.

Results

After completing the four sessions of HILT, the patient demonstrated an improvement in neck mobility. Specifically, neck flexion increased by 20 degrees, extension by 10 degrees, side bending to the left side by 20 degrees, and rotation to the left side by 25 degrees. Additionally, the patient reported decreased sensation of tightness in her neck following the treatment.

Conclusion

HILT appears to be an effective intervention for improving neck mobility in breast cancer patients who experience reduced ROM due to post-radiotherapy sequelae. In this case, HILT enhanced neck flexibility and reducing discomfort in such patients. Further studies with larger sample sizes and longer follow-up periods are recommended to confirm the effectiveness of HILT in managing musculoskeletal side effects of radiotherapy in breast cancer patients with neck lymph node metastasis.

EP345

ENHANCING CONVENTIONAL THERAPY: INTEGRATING ROBOTIC REHABILITATION, TRANSCRANIAL MAGNETIC STIMULATION, AND TRANS-SPINAL MAGNETIC STIMULATION FOR IMPROVED FUNCTIONAL RECOVERY IN A PATIENT WITH NEUROMYELITIS OPTICA SPECTRUM DISORDER: A CASE REPORT

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Background and aims

Sensory and functional recovery following neurological impairments involving central nervous system such as stroke, spinal cord injury, inflammatory spinal diseases and other motor disorders presents significant challenges in clinical practice. Transcranial magnetic stimulation (TMS) and trans-spinal magnetic stimulation (TsMS) have emerged as promising non-invasive techniques aimed at facilitating sensory, motor and functional recovery by modulating neural activity and enhancing neuroplasticity. We report a case of an inflammatory spinal disease patient undergoing a combination of TMS, TsMS, Robotic, and conventional rehabilitation, yielding promising outcome.

Methods

The patient, a 38-year-old woman, presented with progressive bilateral lower limb weakness and numbness. She was diagnosed with transverse myelitis secondary to Neuromyelitis Optica Spectrum Disorder (NMOSD) three years ago. She experienced recurrent episodes of blurred vision and was treated with intravenous immunoglobulin (IVIG) and oral corticosteroids. One week post-treatment, she commenced an intensive conventional and robotic rehabilitation program aimed at enhancing sensorimotor and mobility functions. By the sixth week of rehabilitation, we incorporated daily sessions of TMS, followed by TsMS, in addition to her conventional and robotic therapies, for one hour each, totaling ten sessions.

Results

The outcome measures were assessed at baseline, prior to TMS and post-combined TMS and TsMS therapies. The patient showed improvement in sensory, balance and functional mobility. However, motor recovery was minimal.

Conclusion

This case report highlights the potential efficacy and safety of combined transcranial and trans-spinal magnetic stimulation in promoting sensorimotor and functional recovery in a case of non-traumatic spinal cord injury. The synergistic application of these modalities, together with intensive conventional and robotic therapies, can enhance sensorimotor function and recovery.

EP346

STOCHASTIC RESONANCE THERAPY AS INTERVENTION THERAPY FOR SENSORY APHASIA AND HEMIPARESIS IN SEQUELAE OF EPILEPSY: A CASE STUDY

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Background and aims

Hemiparesis and sensory aphasia in epilepsy patient is a rare cases. The treatment for this case can be done within rehabilitation program and pharmacological. In this case report we use Stochastic Resonance Therapy (SRT) to treat the hemiparesis and sensory aphasia in subject after several seizure attack due to epilepsy.

Methods

This study is a case report of a 22-year-old woman that have right hemiparesis and sensory aphasia after several events of seizure due to first diagnosed epilepsy. After intervention 14 sessions of SRT in addition to conventional rehabilitation, using program "Reflex Stimulation" and "Cognitive Deficit". Assigned twice a week, every session consists 60 second SRT program for 6 times and 30 seconds break between every set in standing position.

Results

After the intervention of 14 Sessions SRT in addition to conventional rehabilitation, the patient had improvement recovery in Fugl-Meyer Assessment Upper extremity, from the total score 23 become 66, Wolf Motor Function Test, from the total score 46 become 75, MS aphasia screening test, from the total score in receptive subscale 18 become 34 and Mini-Mental Stage Exam from the total score 19 become 29.

Conclusion

Result of SRT session has a clinically meaningful effect of the hemiparesis and aphasia sensory symptom in sequelae epilepsy patient.

EP347

RESHAPING THE REHABILITATION TEAM IN 2035 THROUGH SOCIAL MEDICINE AND HEALTH SERVICE MANAGEMENT

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Background and aims

By 2035, integrating social medicine and health service management is set to revolutionize the rehabilitation team. The goal is to build a multidisciplinary team, transition from hospital-centric rehabilitation to a community-based health ecosystem, and leverage ethical technology. This approach aims to tackle societal and economic challenges while improving rehabilitation outcomes.

Methods

The new team will incorporate health policy analysts, community health coordinators, and data-driven managers. Artificial intelligence will be utilized for early detection and intervention in lifestyle-related diseases. Human-machine collaboration will be emphasized to minimize algorithm bias. Cost-effective rehabilitation pathways will be crafted in line with value-based payment models, and personalized social rehabilitation plans will be developed for the elderly and chronic disease patients.

Results

This comprehensive approach is anticipated to boost the efficiency and availability of rehabilitation services. Through the integration of community health systems and ethical technology, fairer and more effective care can be provided. Policy-driven decision-making will help align services with healthcare economics, easing the financial strain on patients.

Conclusion

The integration of social medicine and health service management will reshape the rehabilitation team by 2035. It will enhance patient outcomes, encourage community participation, and ensure sustainable healthcare practices.

EP348

EFFECTS OF INTERMITTENT THETA BURST STIMULATION ON MOTOR FUNCTION, GAIT, AND PAIN IN PATIENTS WITH INCOMPLETE SPINAL CORD INJURY: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and aims

Recent trials indicated that intermittent theta burst stimulation (iTBS) improves motor function, gait, and spasticity in patients with incomplete spinal cord injury (iSCI). This study aims to evaluate the effects of iTBS on functional outcomes in individuals with iSCI compared to sham iTBS.

Methods

A systematic search was conducted across PubMed, EMBASE, Cochrane Library, Web of Science, and ClinicalTrials.gov databases up to February 2025. The primary outcome was the Extremity Motor Score (EMS), including the Lower Extremity Motor Score (LEMS) and Upper Extremity Motor Score (UEMS). All outcomes were reported as continuous variables.

Results

Six randomized control trials (RCTs) involving 116 patients with iSCI were identified. iTBS showed significant improvements compared to sham iTBS in LEMS (mean difference [MD]: 7.13, 95% confidence interval [CI]: 0.71 to 13.56, $p = 0.03$), step length (MD: 7.81, 95% CI: 5.35 to 10.26, $p < 0.001$), motor evoked potential (MEP) amplitude (MD: 24.47, 95% CI: 17.17 to 31.77, $p < 0.001$), the Spinal Cord Independence Measure (SCIM) (MD: 15.42, 95% CI: 6.72 to 24.13, $p < 0.001$), pain level (standardized MD [SMD]: 2.77, 95% CI: 0.05 to 5.5, $p = 0.05$), and the Modified Ashworth Score (MAS) (MD: -2.89, 95% CI: -5.76 to -0.02, $p = 0.05$). However, no significant differences were observed in EMS (MD: 3.96, 95% CI: -4.2 to 12.12, $p = 0.34$), walking speed (MD: 0.03, 95% CI: -0.0 to 0.07, $p = 0.08$), MEP latency (MD: -2.39, 95% CI: -5.27 to 0.49, $p = 0.1$), and the Extremity Sensory Score (ESS) (SMD: 0.13, 95% CI: -0.43 to 0.7, $p = 0.64$).

Conclusion

iTBS significantly improves lower limb motor function, step length, pain, independence, and spasticity compared to sham iTBS, with minimal adverse events and non-invasiveness. However, further RCTs with larger cohorts are needed.

EP349

RESTORING FUNCTION AFTER BRACHIAL PLEXUS INJURY IN THE ELDERLY: A 3-MONTH REHABILITATION APPROACH

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Background and aims

BPI rehabilitation for the elderly has its own challenges. Aging reduces the regenerative capacity of peripheral nerves, leading to delayed axonal regrowth. The purpose of this case report is to describe the impact of a comprehensive rehabilitation of an elderly with a brachial plexus injury.

Methods

A 73-year-old female experienced right upper extremity weakness, pain, and numbness following a fall resulting in right shoulder dislocation and proximal humerus fracture. Patient underwent close reduction for the shoulder dislocation. Physical examination revealed weakness at the muscles innervated by C5-T1 from the root level, along with sensory deficits, leading to wrist drop and limitations in daily activities. Electrodiagnostic study indicated mild brachial plexus palsy at the superior trunk. The initial treatment included cryotherapy for pain and swelling, followed by neuromuscular electrical stimulation (NMES) for the wrist extensors. After evaluated the patient's progress, the patient received ultrasound diathermy (USD), low level laser therapy (LLLT), and gradual exercises including range of motion (ROM) exercise, muscle strengthening, sensory re-education, and activities of daily living (ADL) training. Prolotherapy injections were also administered to address shoulder pain and ROM limitation.

Results

After 3 months of rehabilitation, the patient not only regained normal function, including full range of ROM, muscle strength, and hand function, but also demonstrated improvement in iADL and quickDASH score. These enhancements were crucial, as they enabled the patient to resume her role as a market vendor, that holds significant personal and economic value for the patient.

Conclusion

This case demonstrates that comprehensive, structured rehabilitation can significantly improve motor function, ROM, pain, and ADL in elderly patient with brachial plexus injury. Despite the challenges of aging-related nerve regeneration in the elderly, a structured rehabilitation program coupled with consistent home exercises and the patient's commitment led to remarkable recovery.

EP350

BREAKING THE NERVE PAIN CYCLE: A CASE REPORT ON PERINEURAL INJECTION THERAPY IN TRIGEMINAL NEURALGIA

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Introduction

Trigeminal neuralgia is a chronic neuropathic condition characterized by excruciating facial pain. Perineural injection therapy (PIT) with 5% dextrose in water (D5W) has shown potential in reducing pain and improving quality of life for affected patients.

Case presentation

A 28-year-old male patient presented with left-sided facial pain that had persisted for four years. The pain progressively worsened, with a Visual Analog Scale (VAS) score of 7. It lasted 2 minutes and occurred 5 to 10 times per hour, predominantly localized to the cheek area and aggravated by light touch. The patient had a history of traumatic injury in 2011, leading to fractures of the upper jaw, nose, and chin. A metal plate was implanted at that time and removed in 2020 following multiple surgeries. Motor and sensory examination revealed reduced sensation, with no abnormalities observed in mastication. A nerve block procedure was provided.

Discussion

Perineural injection therapy with D5W was performed three times at two-week intervals, targeting the supraorbital, infraorbital, mental, and auriculotemporal nerves. Evaluation showed a reduction in the VAS score from 7 to 4 and a decrease in pain frequency from 5-10 times per hour to 2-3 times per hour, with no side effects observed. D5W has an osmolarity comparable to normal saline. It is hypothesized that glucose may reduce neurogenic inflammation by inhibiting the transient receptor potential vanilloid 1 (TRPV1). Perineural injection therapy with D5W is believed to alleviate pain in trigeminal neuralgia by nourishing and hydrating the injured nerve while reducing inflammation around the nerve.

Conclusion

Perineural injection therapy with D5W provided immediate pain relief for this patient with trigeminal neuralgia. Due to its cost-effectiveness and low incidence of side effects, it offers a promising treatment option for this condition.

EP351

PLATELET-RICH PLASMA THERAPY: A PROMISING APPROACH FOR ISCHIOCRURAL TENDINOPATHY

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Case diagnosis

Chronic bilateral ischiocrural tendinopathy

Clinical case

A 24-year-old man presented with 6 months of persistent bilateral deep gluteal pain, with Visual Analog Scale (VAS) score 7. Complaints aggravated with prolonged sitting especially on hard surfaces. The pain radiated to the posterior thigh without numbness. Patient has habitude of slouching sitting. He had no history of systemic illness or trauma. On physical examination found tenderness at bilateral ischial tuberosity. Pain was exacerbated during hamstring stretch and neurological examination finding was normal. Musculoskeletal ultrasound of bilateral ischial tuberosity region reveal appearance of tendinopathy by showing calcification at tendon insertion, thickening of tendon, and reduced echogenicity tendon edema, reduce echogenicity and fibrillar pattern.

Discussion

Platelet-Rich Plasma (PRP) injection has been performed to treat chronic pain and tendinopathy. PRP was given three times at one-month intervals. PRP was advanced to the region of tendinopathy with ultrasound (US) guidance. Firstly, percutaneous needle penetration was performed then followed by intratendinous injection to the tendon insertion and infiltrated with a total of 7 ml of PRP. Evaluation after three injections showed reduction in VAS score from 7 to 2. Progress for VAS Score change for pain at the 6-, 12-, 24-, and 52-week follow-ups.

Platelet-Rich Plasma (PRP) is an autologous blood product that contains a concentrated mixture of platelets, growth factors, cytokines, and chemokines. The released growth factors including platelet-derived growth factor (PDGF), transforming growth factor-beta (TGF- β), and vascular endothelial growth factor (VEGF) promote cell proliferation, angiogenesis, and synthesis of extracellular matrix components, all of which are play pivotal roles in regulating the inflammatory process and the subsequent of tendon healing and regeneration.

Conclusion

Platelet-Rich Plasma therapy has promising results to reduce pain and improves function in patients with chronic ischiocrural tendinopathy.

EP352

PROLOTHERAPY ON THE INFRAPATELLAR BRANCH OF THE SAPHENOUS NERVE: A CASE REPORT

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Background

Injury to the infrapatellar branch of the saphenous nerve (IPBSN) can occur following trauma or knee surgery. It interferes with patient physical and functional activity due to the pain. If not addressed early, it can lead to chronic pain. The purpose of this report is to share the effectiveness of prolotherapy as one of the treatments.

Method

Mr. WM is a 32-year-old male with a complaint of right knee pain after playing futsal. His MRI showed a partial tear of the anterior cruciate ligament (ACL). He underwent arthroscopic debridement and partial lateral meniscectomy and received post-op rehabilitation such as hydrotherapy and physical modalities. 5 months post-op, he complained of pain over the anterior part of the right knee with a pain score of 7/10 NPRS and difficulty in managing stairs. On examination, there was tenderness over the anterior-medial part of the right knee. Ultrasound diagnostics showed osteophyte and right infrapatellar branch of saphenous nerve (IPBSN) appeared enlarged. The patient was offered prolotherapy treatment over IPBSN. He received 3 sessions of prolotherapy with 5 cc of 10% dextrose injected each session. His pain score improved from 7/10 to 1/10 NPRS, and during the follow-up ultrasound scan, IPBSN appeared smaller.

Result

Prolotherapy involves the injection of dextrose into injured tissues, which causes inflammation that triggers the release of multiple growth factors and leads to healing. In Malaysia, dextrose solutions are easily available, cheap, and hence can be more accessible to the general population.

Conclusion

Prolotherapy is effective in relieving pain and improving the quality of life of patients. Since it is easily available in Malaysia, the general population can benefit from it for pain management.

EP353

TARGETED PAIN RELIEF IN LIMB-GIRDLE MUSCULAR DYSTROPHY: GENICULAR NERVE BLOCK AND PROLOTHERAPY FOR KNEE OSTEOARTHRITIS AND LIGAMENT INJURY

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Background and aims

Limb-Girdle Muscular Dystrophy (LGMD) is a progressive neuromuscular disorder leading to muscle weakness, joint instability, and musculoskeletal complications. Chronic knee pain is common in LGMD due to biomechanical alterations, osteoarthritis, and ligamentous injuries, significantly impacting daily activities. Conventional pain management may be inadequate due to underlying muscle weakness. This case report explores the effectiveness of a genicular nerve block and prolotherapy in managing knee pain in an LGMD patient.

Methods

A 49-year-old Malay female with LGMD, diagnosed in 2015, was functionally wheelchair-dependent but retained certain limited standing activities. She presented with nine months of bilateral knee pain (NRS 5-6/10) more severe on the right side, impairing her ability to stand for essential tasks such as bathing, assisted sit-to-stand transitions, and cooking. Clinical assessment revealed bilateral medial and lateral collateral ligament injuries and osteoarthritis. Despite analgesics and knee braces, pain persisted, and brace use was limited due to muscle weakness. Examination findings included bilateral genu recurvatum, genu varus deformity, and positive valgus and varus stress tests. Imaging studies showed reduced joint space with mild osteophyte formation on X-ray and partial MCL and LCL tears with patellar tendinopathy on ultrasound. The patient underwent a genicular nerve block followed by six cycles of prolotherapy at 4-5 week intervals for the right knee.

Results

The patient reported significant pain relief (NRS 0/10) and functional improvements, including improved sit-to-stand transitions with moderate assist, and the ability to cook for short durations. No adverse effects were observed.

Conclusion

This case highlights the potential of genicular nerve block and prolotherapy as effective treatment modalities for chronic knee pain in LGMD patients with osteoarthritis and ligament injuries. This multimodal approach may be a valuable alternative to conventional management. Further research is needed to establish standardized treatment protocols in neuromuscular disorders with musculoskeletal complications.

EP354

SWALLOWING THERAPY AND NEUROMUSCULAR ELECTRICAL STIMULATION FOR POST-STROKE DYSPHAGIA: A CASE REPORT

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Background and aims

Patients with neurological diseases like stroke, dementia, and Parkinson's have a high risk of dysphagia. Swallowing problems occur in 55% of the patients with stroke. Dysphagia is a disorder that includes any dysfunction from chewing in the mouth to the passage of the bolus into the esophagus. It increases the risk of aspiration pneumonia by up to sevenfold, with mortality rates reaching 40%. The most common treatment for dysphagia patients is the use of feeding tubes to prevent aspiration pneumonia. This study aims to evaluate the effectiveness of swallowing exercises and neuromuscular electrical stimulation (NMES) in improving post-stroke dysphagia.

Methods

We report a case of a 66-year-old male with dysphagia, left-sided limb weakness, dysarthria, and difficulty swallowing after an ischemic stroke, who presented to the rehabilitation medicine polyclinic. The patient experienced left-sided limb weakness, dysarthria, and difficulty swallowing. At the initial assessment, the Functional Oral Intake Scale (FOIS) score was 3, indicating a dependence on nasogastric tube feeding. A rehabilitation program was implemented, including effortful swallow, shaker exercise, chin tuck against resistance, expiratory muscle strengthening, and NMES therapy twice weekly for four weeks. FOIS was used to assess swallowing function improvement.

Results

After four weeks of therapy, the patient's FOIS score improved from 3 to 4, allowing him to discontinue nasogastric tube feeding. The therapy was continued for another four weeks, leading to further improvement in swallowing function and oral intake, with fewer choking episodes. By the end of the rehabilitation program, the FOIS score reached 5, indicating a significant reduction in dysphagia severity. No complications were reported.

Conclusion

A structured swallowing rehabilitation program combining swallowing exercises and NMES effectively improved post-stroke dysphagia, reducing severity by 50%. Further studies are needed to establish definitive long-term outcomes.

EP355

DRY CUPPING IMPROVES AUTONOMIC ACTIVITY AND TRAPEZIUS COMPLIANCE IN SMARTPHONE ADDICTS IN A DOSE-DEPENDENT MANNER

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Background and aims

Prolonged smartphone use can lead to forward head posture and stiffness in the neck and shoulders, potentially affecting autonomic nervous system (ANS) function. While cupping therapy is recognized for its ability to alleviate myofascial stiffness, there is a lack of comprehensive dosing guidelines. This study aimed to investigate the effects of cupping pressure and duration on soft tissue compliance and ANS activity.

Methods

Thirty-two university students with habitual smartphone use were recruited. Participants completed the Smartphone Addiction Inventory (SPAI), Neck Disability Index (NDI), and Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire. Participants were classified into two groups: smartphone addiction and control. Each participant received four cupping treatments: 1) -300 mmHg for 5 minutes; 2) -450 mmHg for 5 minutes; 3) -300 mmHg for 15 minutes; 4) -450 mmHg for 15 minutes. Six cupping cups were applied to the trapezius, and soft tissue compliance and ANS activity were measured before and after cupping. Oxidative stress was assessed via blood tests at the upper trapezius.

Results

Cupping significantly decreased sympathetic activity, as indicated by the low-frequency/high-frequency (LF/HF) ratio and LF% ($p < 0.05$), with a trend toward increased parasympathetic activity (HF, $p = 0.062$). The 15-minute cupping treatment showed a more substantial effect on overall (total power & LF, $p < 0.05$) and parasympathetic activity (HF, $p = 0.028$) compared to the 5-minute treatment. Cupping also significantly improved soft tissue compliance ($p < 0.001$), with the -300 mmHg for 15 minutes showing the greatest improvement (time $\times$ trial, $p < 0.001$). However, no significant differences were observed in oxidative stress or NDI/DASH scores.

Conclusion

The duration of cupping therapy, rather than the pressure, had a more significant impact on ANS activity. Appropriate cupping doses are essential for optimizing therapeutic effects.

EP356

THE EFFICACY OF VIBRATION THERAPY FOR KNEE OSTEOARTHRITIS: AN UMBRELLA REVIEW OF THE EVIDENCE

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Background and aims

Knee osteoarthritis (KOA) is a common musculoskeletal disorder that leads to chronic pain, reduced mobility, and disability, primarily affecting older adults. This review aims to provide a comprehensive summary of the evidence from published systematic reviews regarding the effectiveness of vibration therapy for knee osteoarthritis.

Methods

This study conducted an overall review of systematic reviews with and without meta-analyses, searching the PubMed, PEDro, Web of Science, and Embase databases. The search was completed by December 2024. Two reviewers independently screened articles, extracted data, and assessed the quality of the included studies. Our focus was on systematic reviews and meta-analyses comparing the effectiveness of vibration therapy with other interventions for knee osteoarthritis (KOA). The methodological quality was assessed using the AMSTAR 2 tool (A Measurement Tool to Assess Systematic Reviews 2), and the results were reported qualitatively.

Results

Among the initially identified 86 articles, six systematic reviews (SRs) published between 2015 and 2022 were included. Of these, five were meta-analyses, and one was a systematic review. All reviews were scored using the Assessment of Multiple Systematic Reviews 2 (AMSTAR 2) tool, with scores ranging from 9 to 13, indicating moderate to high quality. The most frequently reported outcomes were the Visual Analogue Scale (VAS), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) (pain, stiffness, function), Berg Balance Scale (BBS), 6-Minute Walk Test (6MWT), Timed Up and Go (TUG), and muscle strength.

Conclusion

Vibration therapy is an effective option for improving pain intensity and physical function in KOA and may be an effective way to improve KOA. Due to the small number of original studies, we were unable to draw reliable quality of life results. More research in this area could help us draw more reliable conclusions, and further studies, especially mechanistic studies, are needed to determine the actual efficacy of vibration training in the treatment of KOA.

EP357

REVIVING SENSORY FUNCTION IN NERVE INJURY WITH LOW-LEVEL LASER THERAPY: A CASE REPORT

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Background and aims

The role of photobiomodulation (PBM) in regeneration enhancement of injured peripheral nerve is not well documented. This case illustrates the benefit of PBM using Low-level laser therapy (LLLT) in a 30-year-old man with severe traumatic brain injury and left common peroneal nerve palsy who has foot drop and complete sensory loss over the affected area. A trial of LLLT was prescribed at 8 weeks post injury to target the motor and sensory aspect of the injured common peroneal nerve.

Methods

The left common peroneal nerve was first identified via ultrasound imaging, after which 10 points were marked on the skin along the peroneal nerve from proximal to distal. The markings were 2 to 3 cm apart. LLLT was then applied over the 10 points with the following setting: Red light with wavelength of 660nm and near-infrared wavelength of 905nm, power output of 50mW and at a frequency of 10kHz pulse light. This was followed by continuous light of 808nm with power output of 400mW. Each point was received two minutes of light intermittently, with a total therapy time of 20 minutes per cycle. The patient underwent 10 cycles over the course of 2 weeks (5 days/week).

Results

At the 4th session, patient reported sensory improvement by 40% to light touch and pin prick assessment. By the completion of therapy, he reported a 60% improvement. However, no motor recovery was observed.

Conclusion

LLLT shows potential in enhancing sensory recovery after common peroneal nerve injury, supporting nerve regeneration. This finding suggests LLLT as a promising adjunctive treatment for nerve injury rehabilitation. However, further studies are needed to optimize treatment protocols and confirm its long-term efficacy.

EP358

INNOVATIVE LOW-COST DIY PROSTHESIS FOR LOWER LIMB AMPUTEES: A COMMUNITY-DRIVEN SOLUTION

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Background and aims

Lower limb amputation significantly impacts physical function, social participation, and overall quality of life, often leading to anxiety and depression. Limited mobility poses a barrier to social reintegration, emphasizing the need for prosthetic solutions. This case report presents an innovative, low-cost, do-it-yourself (DIY) lower limb (LL) prosthesis made from polyvinyl chloride (PVC) plastic and wood.

A 66-year-old gentleman with longstanding Type II Diabetes Mellitus underwent a right transtibial amputation secondary to infected Charcot osteoarthropathy. Two months post-amputation, he collaborated with a carpenter friend to design a temporary LL prosthesis using locally available, cost-effective materials.

Methods

The prosthesis was fabricated using a 16-inch PVC pipe as the socket, a PVC fitting reducing socket as the connector, a 6-inch PVC pipe as the pylon, and a wooden foot component from a soursop tree. A rubber shoe sole and a non-detachable sock were attached to the wooden foot. A custom knee cuff was created using sewn shoe straps and an extender for a thigh corset, secured with a buckle. The patient used a crepe bandage and layered stockings for stump protection. The total cost was MYR 16 (equivalent to USD 3.55), and fabrication took two hours.

Results

The patient successfully used the DIY prosthesis indoors and for short outdoor ambulation with a walking frame. For longer distances, he relied on a motorized wheelchair. He reported reduced energy consumption, easier transfers, and improved mobility, including travel to Thailand. No pressure injuries were observed. However, the shorter length of the DIY LL prosthesis resulted in genu valgus (10°) and a knee flexion contracture (10°), leading to compensatory gait patterns.

Conclusion

This case highlights the potential of low-cost prosthetic solutions for LL amputees. Encouraging community-driven innovations can improve accessibility, mobility, and dignity for individuals facing financial constraints. Developing affordable prosthetic options should be a priority in rehabilitation medicine.

EP359

A RIGID REMOVABLE CAST AS A TRANSITIONAL AID IN PEDIATRIC SYME'S AMPUTATION: A CASE REPORT

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Background

Syme's amputation involves the removal of the distal lower limb, including both malleoli, while preserving the heel pad, which is repositioned to serve as a weight-bearing surface. Heel pad migration is a common postoperative challenge, particularly during early stages of stump maturation. A rigid removable cast is often applied in the initial weeks to support healing and stump stabilization, followed by prosthetic fitting.

Case report

LWJ, a 9-year-8-month-old boy, developed meningococcal septicemia at 9 months old, leading to extensive cutaneous necrosis of all four limbs. Septic emboli caused distal gangrene, resulting in autoamputation of both forefeet. At 9 years 4 months, he underwent Syme's amputation of the left foot due to a calcaneal deformity following a prior forefoot autoamputation. Eight weeks post-amputation, he demonstrated a fear of weight-bearing on the stump. A rigid removable cast was applied to facilitate gradual weight-bearing. Although the critical stump maturation period (first four to six weeks) had passed, the cast was maintained to address psychological barriers to ambulation.

Result

After two weeks of physiotherapy and gait training, he regained confidence and was able to walk and run while using the cast. One month after the cast was prescribed, no heel pad migration was observed, and he was deemed ready for prosthetic fitting to further improve gait function.

Conclusion

While a rigid removable cast is primarily used post-Syme's amputation to prevent heel pad migration, it can also serve as an effective transitional tool for gait training and confidence-building before prosthetic prescription.

EP360

AEROBIC EXERCISE AND RTMS INTERVENTION ON COLLEGE STUDENTS WITH SUICIDE RISK

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Background and aims

This study aims to investigate the combined effects of aerobic exercise and repetitive transcranial magnetic stimulation (rTMS) on improving mental health and reducing suicide risk among college students. The focus is on assessing changes in functional connectivity and psychological assessments to determine the efficacy of these interventions. This study has been reviewed and approved by the Ethical Review Committee of Yancheng First People's Hospital (Ethical Approval No.: 2023-K-230), the Ethics Committee of INTI International University (ethical committee approval No.: INTI-IU/FHLS-RC/BTCMI/AUGUST2022/003), and registered and approved by the Chinese Clinical Trial Registration Center (Registration No.: ChiCTR2400079723).

Methods

A total of 215 students, aged between 18 and 21 years, from Jiangsu Vocational College of Medicine, participated in the study. These students, enrolled in either 2022 or 2023, were screened using the Xinhai University Crisis Intervention System, which identified 48 students as having a potential risk of suicide. Participants were divided into four groups: Group A: Aerobic exercise combined with rTMS; Group B: Aerobic exercise with pseudo rTMS; Group C: Control group with no intervention; Group D: Healthy control group. Interventions included supervised aerobic exercise sessions thrice a week and high-frequency rTMS applied to the dorsolateral prefrontal cortex (DLPFC). Functional connectivity was assessed using functional Near-Infrared Spectroscopy (fNIRS), and psychological assessments included the Self-rating Depression Scale (SDS) and Self-rating Idea of Suicide Scale (SIOSS).

Results

Group A : Functional Connectivity: Significant improvements in both 2D and 3D functional connectivity tests ($p < 0.01$). SDS Scores: Reduced from 58.4 (SD=10.3) to 40.2 (SD=8.5), indicating a significant decrease in depressive symptoms ($p < 0.01$). SIOSS Scores: Reduced from 22.7 (SD=6.1) to 11.3 (SD=4.5), indicating a significant reduction in suicidal ideation ($p < 0.01$).

Group B : Functional Connectivity: Improvements observed, though less pronounced than in Group A ($p < 0.05$). SDS Scores: Reduced from 56.9 (SD=9.8) to 45.5 (SD=9.2), indicating a significant reduction in depressive symptoms ($p < 0.05$). SIOSS Scores: Reduced from 21.9 (SD=5.8) to 15.8 (SD=5.1), indicating a significant reduction in suicidal ideation ($p < 0.05$).

Group C : Functional Connectivity: No significant changes observed. SDS Scores: Remained stable at 54.2 (SD=8.9). SIOSS Scores: Remained stable at 20.1 (SD=5.3).

Group D : Functional Connectivity: Stable functional connectivity observed. SDS Scores: Remained low and stable at 25.3 (SD=5.1). SIOSS Scores: Remained low and stable at 5.2 (SD=2.4).

Conclusion

The study demonstrates that the combination of aerobic exercise and rTMS significantly improves functional connectivity and reduces depressive symptoms and suicidal ideation among college students at risk of suicide. Group A, receiving both interventions, showed the most pronounced improvements, suggesting a synergistic effect. These findings highlight the potential of non-pharmacological interventions in enhancing mental health and mitigating suicide risk in college students. Further research is recommended to explore the long-term effects and underlying neurophysiological mechanisms of these interventions, as well as their generalizability across different populations. This research highlights the promising role of integrated aerobic exercise and rTMS interventions in enhancing psychological well-being and brain function, offering a viable approach to mitigating suicide risk among college students.

EP361

DYSPHAGIA: A WARNING OF LONG-TERM MISDIAGNOSIS OF PHARYNGITIS

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Background and aims

Congenital epiglottic aplasia is an extremely rare anomaly, typically presenting with severe respiratory and feeding complications in infancy. Adult cases are seldom reported, often leading to misdiagnosis as chronic pharyngitis or bronchitis. This study reports a unique case of epiglottic aplasia in a 64-year-old male with progressive dysphagia and chronic pharyngitis, aiming to highlight the importance of considering congenital laryngeal anomalies in adults and evaluate the efficacy of electroacupuncture (EA) in symptom management.

Methods

A 64-year-old male with a decade-long history of chronic pharyngitis presented worsening dysphagia, aspiration, and hoarseness. Diagnosis was confirmed via electronic laryngoscopy and gastrointestinal contrast imaging, revealing epiglottic aplasia, glottic stenosis, and laryngeal mass proliferation. The patient underwent 15 EA sessions administered by an experienced acupuncturist. Key acupoints included Fengchi (GB20), Gongxue, Juanshe, Tiyan, MS6 (middle and lower 2/5), Zhiqiang, Tunyan, and Lianquan (CV23). Needles were inserted at depths of 8–50 mm, with electrical stimulation (30 minutes/session) and manual manipulation techniques.

Results

Post-treatment, the patient exhibited significant improvement in swallowing function and reduced pharyngeal discomfort, though hoarseness persisted. Aspiration episodes decreased markedly, and no adverse effects were reported. Imaging and clinical assessments confirmed the absence of epiglottic structure and associated compensatory mechanisms.

Conclusion

This case underscores the necessity of considering congenital laryngeal anomalies in adults with refractory chronic pharyngitis and dysphagia. Early diagnosis is critical to mitigate complications like chronic aspiration. EA demonstrated potential as a therapeutic intervention for symptom alleviation, warranting further investigation into its role in managing congenital upper airway anomalies. Clinicians should maintain heightened awareness of rare congenital conditions to prevent diagnostic delays.

EP362

MODIFIED TOTAL CONTACT CAST ALLOWING TOE ACCESS IN TREATING ACTIVE CHARCOT: A CASE REPORT

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Background

Charcot neuroarthropathy is a highly destructive joint disease characterized by progressive multiple bone fractures, dislocations and severe deformity of the foot and ankle. Charcot neuroarthropathy most commonly occurs in people with diabetes mellitus, although it can also affect those with peripheral neuropathy. An irremovable total contact cast (TCC) is the gold standard treatment for active Charcot neuroarthropathy. It is used to offload and immobilize the affected foot and ankle to prevent trauma, further fractures and destruction, while preserving foot structure during the inflammatory phase. However, conventional total contact casts are tightly fitted and prevent access to the foot. This case report aims to discuss a modified total contact cast extending up to metatarsal heads, allowing access to the toes in patients with active Charcot neuroarthropathy.

Case report

This is a case report of 53-year-old lady with long-standing diabetes mellitus who presented with left foot swelling for two weeks without prior trauma. Her left foot was erythematous, warm and oedematous. However, she had no fever and was systemically well. An X ray was performed, leading to the diagnosis of acute Charcot neuroarthropathy (Eichenholtz stage 0) in the left foot. She was managed with a modified total contact cast extending up to metatarsal heads for management.

Results

Her left foot temperature decreased, and the oedema and erythema began to subside after one week of using a modified total contact cast extending up to metatarsal heads.

Conclusion

The use of a modified total contact cast extending up to metatarsal heads is as effective as the conventional total contact cast for treatment of active Charcot neuroarthropathy.

EP363

EFFICACY OF REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION FOR MULTIPLE SYSTEM ATROPHY: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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Background and aims

Recent studies suggest that repetitive transcranial magnetic stimulation (rTMS) may provide therapeutic benefits for individuals with multiple system atrophy (MSA), particularly by improving motor function and psychological symptoms. However, the efficacy remains inconclusive. This study aims to evaluate the impact of rTMS on motor and psychological outcomes in patients with MSA.

Methods

A comprehensive literature search was independently performed by two investigators in PubMed, EMBASE, Cochrane Library, Web of Science, and ClinicalTrials.gov from inception to February 2025. Eligible studies were identified through a two-step process, including an initial title and abstract screening, followed by a full-text assessment. The primary outcome measure was the Scale for the Assessment and Rating of Ataxia (SARA), which quantifies ataxia severity. Secondary outcomes included the Unified Multiple System Atrophy Rating Scale Part II (UMSARS-II), Hamilton Anxiety Scale (HAMA), Hamilton Depression Rating Scale (HAMD), and Fatigue Severity Scale-9 (FSS-9). All outcomes were analyzed as continuous variables using Review Manager (RevMan, version 5.4.1).

Results

A total of six randomized control trials (RCTs) with 140 patients with MSA were included. Compared to the sham device, rTMS led to significant improvements across multiple outcome measures, including SARA (mean difference [MD]: -6.26, 95% confidence interval [CI]: -8.52 to -4, $p < 0.001$), UMSARS-II (MD: -1.95, 95% CI: -3.91 to 0, $p = 0.05$), HAMA (MD: -6.43, 95% CI: -10.08 to -2.77, $p < 0.001$), HAMD (standardized MD [SMD]: -0.99, 95% CI: -1.6 to -0.38, $p = 0.001$), and FSS-9 (MD: -13.03, 95% CI: -19.18 to -6.87, $p < 0.001$).

Conclusion

These findings suggest that rTMS may be an effective intervention for alleviating motor impairment, anxiety, depression, and fatigue in individuals with MSA. Given the limited treatment options for MSA, rTMS may serve as a non-invasive adjunct therapy to improve symptom relief and quality of life.

EP364

MACHINE-BASED TRUNK MUSCLE STRENGTHENING IN THE PREVENTION OF LOW BACK PAIN IN ACTIVE NURSES AGED 45+: RESULTS OF A FEASIBILITY RANDOMIZED CONTROLLED STUDY

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Background and aims

Active nurses aged 45+ are at very high risk for low back pain (LBP). As evidence-based recommendations of regular trunk muscle training to prevent LBP in nurses remains unclear, this pilot study sought 1) to ascertain the feasibility of machine-based trunk muscle strengthening at the workplace to prevent LBP and disability and 2) to identify suitable and sensitive health and functional measures to be included in a confirmatory RCT.

Methods

Thirty-three active nurses older than 45yrs who reported LBP on at least six of 30 monitored days (intensity ≥ 3 on 11pts RSA) participated in this randomized, controlled cross-over trial. The intervention engaged participants to train back extensor and trunk flexor muscles for five months (2x/week) using machines. Controls remained without intervention. After six months, groups were switched. Evaluations were performed at baseline, five, and 11 months later. The primary outcome measures included daily pain and disability ratings, the Roland Morris Disability Questionnaire (RMDQ), the Multidimensional Pain Inventory (WHYMPI), and the Work Productivity and Ability Index (WPAI). Secondary outcomes were trunk strength, endurance and activity measures, and satisfaction with the intervention.

Results

82% of the participants completed the training sessions, 81% of whom expressed satisfaction with the intervention and indicated a willingness to repeat it. No significant changes were observed for the RMDQ or the WPAI at the conclusion of the intervention. The MPID exhibited a clinically relevant improvement among participants when allocated to the intervention. No correlation was found between secondary outcome and primary outcome measures.

Conclusion

A confirmatory study with active 45+ nurses who experience LBP that does not require medical attention would likely demonstrate that regular trunk muscle training would positively effect on psychosocial life aspects as measured with the WHYMPI. However, the efficacy of this intervention in enhancing back-related health (RMDI), or workability (WPAI), in these individuals appears improbable.

ClinicalTrials.gov ID NCT03393429

EP365

EFFECTS OF ROBOT-ASSISTED BIMANUAL TRAINING ON BRAIN FUNCTIONAL REORGANIZATION IN SUBACUTE STROKE: A MECHANISTIC INVESTIGATION

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Background and aims

Robot-assisted bimanual training (RBMT) has been preliminarily demonstrated to provide safe and effective treatment in stroke patients. However, the mechanisms of RBMT remain unclear. Therefore, the aim of this study is to investigate the impact of RBMT training on brain functional reorganization in patients with subacute stroke, and the correlation between brain function and motor function.

Methods

In total 17 stroke patients were recruited in this clinical experiment and allocated to RBMT and conventional therapy (CT) groups. Motor function was assessed clinically using the grasp strength, Modified ashworth scale (MAS), Fugl-Meyer assessment score (FMA-UE), the modified Barthel index (MBI) and SF-36 before and after the intervention. Electroencephalograms (EEG) were recorded also before and after 20 sessions training. Event-related desynchronization (ERD) was used to indicate the activation of the lesioned area, while Brain symmetry index (BSI) was used to assess the interhemispheric asymmetry of brain activation.

Results

Both groups demonstrated significant improvements in upper extremity motor function after treatment, as measured by the Fugl-Meyer Assessment for Upper Extremity (FMA-UE). Patients receiving RBMT demonstrated significant enhanced neural activation in the lesioned hemisphere and a reduction in BSI, whereas no such changes were observed in the control group. Notably, a statistically significant correlation was found between the magnitude of change in relative low-alpha power and the improvement in FMA-UE scores ($p = 0.024$). Furthermore, the reduction in BSI was significantly associated with improvements in quality of life, as assessed by the SF-36 ($p = 0.012$).

Conclusion

RBMT may promote *upper extremity motor* functional recovery in subacute stroke patients through neural reorganization and improved interhemispheric balance.

EP366

PROTOCOL OF A MULTICENTER PROSPECTIVE SEQUENTIAL INTERVENTION COHORT STUDY: ASSESSING THE IMPACT OF THE GUSU CONSTRAINT STANDING TRAINING ON HEMIPARETIC GAIT IN STROKE-INDUCED HEMIPARETIC PATIENTS

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Background and aims

Stroke is a leading global health challenge, frequently resulting in hemiparetic gait as a sequela. The Gusu Constraint Standing Training (GCST) is an innovative muscle-oriented postural relearning therapy that promotes active muscle activation of the pelvis and lower extremities in stroke-induced hemiparetic patients by applying controlled external perturbations to the bilaterally innervated pelvic muscle groups during standing. Preliminary studies have suggested that the GCST benefits gait in children with cerebral palsy and hemiparetic patients; however, its efficacy and mechanisms require further investigation. This study aims to assess the effect of the GCST on multi-muscle coordinated activation and gait performance in stroke-induced hemiparetic patients and explore its clinical applicability.

Methods

This multicenter, prospective, sequential intervention cohort study will recruit 60 stroke-induced hemiparetic patients and 30 healthy adult controls at each center. The study involves five intervention steps of the GCST, progressing from single-muscle activation to multi-muscle synergy and segmental separation movements. Primary outcome measures include muscle architecture, surface electromyography indicators, postural and gait parameters, lower extremity motor function, and quality of life. Statistical analysis will utilize repeated measures ANOVA.

Results

The project is currently in the implementation phase, with evaluation results expected in August 2025. Trial registration number: ChiCTR2400094903.

Conclusion

The GCST shows potential to enhance multi-muscle activation and gait performance by leveraging controlled external perturbations to promote active muscle engagement. The comprehensive assessment will provide insights into its efficacy and mechanisms. Results are expected to support evidence-based rehabilitation protocols for stroke-induced hemiparesis, potentially offering a novel therapeutic approach for improving post-stroke rehabilitation outcomes.

EP367

TREATMENT OF TRIGGER DIGITS: A SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS

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Background and aims

Various treatments are available for trigger digits. Open surgery is the last option for managing trigger digits. We aim to investigate different treatment options for trigger digits compared to open surgery through a systematic review and network meta-analysis.

Methods

We searched the PubMed, EMBASE, and Cochrane Library electronic databases from their inception to February 20, 2025. We included trials that (1) involved participants with trigger digits, (2) adopted different management strategies as the intervention, (3) compared them to other types of interventions, and (4) reported disease severity as an outcome. The network meta-analysis was conducted using the online tool ShinyNMA (version 1.01).

Results

Our analyses revealed that corticosteroid injection, hyaluronic acid injection, percutaneous release, and percutaneous release with splinting after the procedure are more effective in reducing disease severity in the short term compared to open surgery. In the long term, corticosteroid injection, corticosteroid injection with a hand therapy program, hyaluronic acid injection, open surgery with a hand therapy program, and percutaneous release with splinting after the procedure are more effective than open surgery.

Conclusion

Our results suggest that corticosteroid injection, hyaluronic acid injection, and percutaneous release with splinting after the procedure could be viable management options for trigger digits in both the short-term and long-term follow-up compared to open surgery.

EP368

THERAPEUTIC EFFECT OF REPETITIVE MAGNETIC STIMULATION ON HEMIPLEGIC SHOULDER PAIN

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Background and aims

Hemiplegic shoulder pain (HSP) is a debilitating and ubiquitous condition among stroke patients. Current treatments emphasize pain relief while aiming to restore muscle strength and correct biomechanical deficits, while severe neurological deficits pose significant challenges. This study aims to explore the therapeutic effect of high intensity peripheral magnetic stimulation (PMS) in treating HSP and its associated symptoms.

Methods

We enrolled 24 patients with HSP. All participants received conventional rehabilitation. Among which, 14 subjects were assigned to the superinductive system (SIS) treatment group, and received additional PMS targeting the posterior deltoid muscle. The remaining 10 subjects were allocated to the control group, receiving additional transcutaneous electrical nerve stimulation (TENS) instead. Our primary outcome was shoulder pain. Secondary outcomes included shoulder subluxation (evaluated through palpation, X-ray and ultrasound), strength, spasticity, and range of motion.

Results

All participants completed the additional treatment (either SIS or TENS) without complications. Subjects in the SIS group experienced substantial and sustained pain reduction from day 14 to day 28 (day 14, $p=0.006^*$; day 26, $p=0.001^*$), maintaining over 40% reduction two weeks after completing treatment. In contrast, TENS therapy did not result in significant pain alleviation at any time point. Furthermore, when comparing pain reduction between the two groups, the SIS group demonstrated significantly lower pain levels from day 7 onward, persisting through day 28 ($p<0.001^*$). However, regarding secondary outcomes, including shoulder subluxation, muscle strength, spasticity and ROM, SIS was neither superior to TENS, nor provided additional benefits beyond conventional rehabilitation.

Conclusion

Peripheral magnetic stimulation shows promising potential for alleviating hemiplegic shoulder pain and may enhance multidisciplinary treatment approaches. However, further research, including randomized controlled trials with larger sample sizes, as well as studies exploring its mechanism and optimal parameters, is needed to confirm its efficacy and optimize its clinical application.

EP369

THE IMMEDIATE EFFECT OF ABDOMINAL DRAWING IN MANEUVER WITH PLANK ON PAIN AND DISABILITY AMONG UNIKL RCMP STUDENTS

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Background and aims

Low back pain (LBP) is a prevalent musculoskeletal disorder across all age groups, with a particularly high occurrence among Malaysian university students. The consequences of LBP can affect students' academic performance, mental health and community involvement. It may also lead to poor sleep quality, resulting in decreased concentration and limited physical activity. Plank exercise is a well-established method for enhancing core stability; however, the immediate effects of combining the Abdominal Drawing In Maneuver (ADIM) with plank exercises remain unclear. The purpose of the study was to determine whether the ADIM technique with plank could immediately improve pain and disability.

Methods

Twenty participants with nonspecific back pain were recruited for the study and randomly assigned to either the traditional plank exercise group or the group performing a combination of ADIM with plank exercises. Pain was assessed using the Visual Analog Scale (VAS), while low back disability was evaluated using the Oswestry Disability Index (ODI). These measurements were recorded before and immediately after the exercise intervention. Data were analyzed using paired t-tests to compare pre- and post-intervention values within groups and independent t-tests to assess differences between groups.

Results

Both exercises resulted in pain reduction; however, the decrease was significantly greater in the group that performed the combination of ADIM and plank exercises ($p < 0.05$). Additionally, the reduction in the ODI score was not statistically significant in the traditional plank exercise group, whereas the ADIM and plank combination group showed a significantly greater reduction ($p < 0.05$).

Conclusion

This study indicates that while both traditional planks and ADIM-enhanced planks provide immediate pain relief and improve low back function, the combination of ADIM with planks is more effective, making it a promising approach for managing nonspecific low back pain.

EP370

PHOTOBIMODULATION IN TRAUMATIC BRACHIAL PLEXUS INJURY: ENHANCING AXILLARY NERVE RECOVERY WITH LOW-LEVEL LASER THERAPY - A CASE REPORT

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Background

Traumatic brachial plexus injury (TBPI) is a debilitating condition that affects upper limb function, often classified as preganglionic or postganglionic and involving upper or lower trunk. This case highlights the potential role of low-level laser therapy (LLLT) in facilitating axillary nerve recovery.

Case presentation

A 30-year-old right-hand-dominant lady sustained a left upper trunk (C5-C6) brachial plexus injury following a motor vehicle accident in August 2024. She presented with left shoulder pain, numbness and weakness, with neurological examination revealing hyporeflexia, reduced shoulder abduction (MRC 2/5), impaired C5-C6 sensation, and no Horner's syndrome or scapular winging. Imaging showed a lateral clavicle fracture and an undisplaced greater tubercle of humerus fracture. She opted for conservative management with an arm sling and referred to rehabilitation team. She underwent neuromuscular electrical stimulation (NMES) and 10 cycles of LLLT targeting the brachial plexus and axillary nerve. She was subjected to C5/C6 neurolysis in view of persistent limited shoulder abduction and tenderness at deltoid region. After neurolysis in November 2024 that showed presence of shoulder abduction and supraspinatus contraction upon stimulation of suprascapular nerve and C5, C6 nerve roots, she underwent another cycle of LLLT focusing on axillary nerve in view of her range of motion remains the same. Her active shoulder abduction range of motion improved from 30° to 80° with MRC strength 3/5 after five LLLT sessions.

Discussion

This case highlights the potential role of low-level laser therapy (LLLT) in facilitating nerve recovery, particularly in axillary nerve involvement following an upper trunk brachial plexus injury (C5-C6).

Conclusion

The patient demonstrated notable improvements in shoulder abduction range of motion and muscle strength following LLLT sessions, supporting that photobiomodulation may enhance nerve regeneration and functional recovery. While the clinical benefit observed in this case is promising, further studies are needed to establish standardized protocols and determine long-term efficacy in brachial plexus injuries.

EP371

SPECIAL CHAIR FOR SPECIAL CHILD: ACHIEVING THE MOST FROM THE LEAST

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Background and aims

Wheelchairs are important facilities to support and accommodate the activities of CP patients, along with their secondary condition such as scoliosis. Rehabilitation Centre Harapan Jaya in Pematangsiantar, North Sumatra, believe that wheelchairs can be made from the simplest and locally available materials. Here we present the process of a customized wheelchair for a 11-year-old quadriplegic CP patient with equinovarus feet and scoliosis.

Methods

The modification process for a wheelchair involves several key steps to ensure optimal comfort, stability, and aesthetics for the user. The old frame is used as the foundation for the modification. The first step is to create vacuum print of the client's seat using styrofoam, to achieve the individual shape and maximum stabilization. Seat is made of layered cardboard, which was shaped using a positive plaster from the vacuum print and wetted. Once formed, the seat is left to dry naturally until it hardens. Foam padding is then used to create comfortable cover and to adjust backrest for optimal comfort. Finally, the seats and backrest are covered with fabric. This modification results in a wheelchair seat that is not only comfortable and ergonomic but also aesthetically pleasing and easy to maintain.

Results

The tailor-made wheelchair supports and improves his posture well. The patient is alleviated from pain, and the family express satisfaction with the quality of the wheelchair.

Conclusion

Limited material does not mean limited function. A tailor-made wheelchair can still be made effectively from available materials, to achieve maximum support for the needs of patients with cerebral palsy.

EP372

EFFECTIVENESS OF STRETCHING EXERCISES IN PATIENTS WITH FIBROMYALGIA: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background and aims

Fibromyalgia (FM) is a chronic rheumatic condition characterized by widespread musculoskeletal pain, activity limitations, and cognitive and psychiatric disturbances. Stretching exercises are effective nonpharmacological therapies for patients with musculoskeletal diseases. However, the effects of stretching exercises on FM remain unclear. This meta-analysis compared the effects of stretching exercises and other types of physical exercise on patients with FM and evaluated each exercise's outcomes.

Methods

A systematic review and meta-analysis were conducted. PubMed, Embase, and Cochrane Library were searched for studies published up to July 2023 that compared stretching exercises with other physical exercise modalities.

Results

Nine studies involving 462 patients were included. Stretching exercises exhibited a favorable trend in terms of pain, Fibromyalgia Impact Questionnaire (FIQ) scores, and depression and did not exhibit a lower efficacy than resistance exercises. However, a comparison of stretching and aerobic exercises revealed that aerobic exercises consistently yielded more favorable outcomes in terms of FIQ and depression scores.

Conclusion

Stretching exercises may be a feasible alternative to other exercise modalities for managing pain, FIQ scores, and depression levels in patients with FM.

EP373

EFFICACY OF INTRA-ARTICULAR INJECTION OF AUTOLOGOUS PLATELET RICH PLASMA IN PATIENTS WITH GRADE 2 OSTEOARTHRITIS KNEE: A CROSS-SECTIONAL STUDY FROM A TERTIARY HOSPITAL OF CENTRAL INDIA

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Background and objectives

Osteoarthritis of knee is the most common progressive and degenerative condition affecting mainly the elderly population causing restriction in their Activities of Daily Living and resulting in decreased Quality of Life. Platelet Rich Plasma injections attributing to their regenerative properties are now being used in most of the degenerative conditions and in osteoarthritis of knee, the outcomes vary and so this study was proposed to measure both subjective and objective parameters.

Methods

The study assessed the clinical and radiological efficacy of intra-articular injections of Platelet Rich Plasma in Kellgren Lawrence grade 2 osteoarthritis knee in terms of pain relief, functional outcome and cartilage Thickness. Three doses of freshly prepared autologous Platelet rich plasma injection were given intra-articularly in the knee weekly once for three weeks.

Results

Thirty participants were enrolled in this study. On comparison between baseline and follow up period at the end of six months, there was a significant reduction in pain in Visual Analogue Scale ($p < 0.01$), improvement in ultrasonographic evaluation of cartilage thickness ($p < 0.01$) and functional improvement in Knee Osteoarthritis Outcome Score ($p < 0.01$).

Interpretation and conclusions

Three doses of intra-articular injections of Platelet Rich Plasma in grade 2 osteoarthritis knee produces improvement in Quality of life and Activities of Daily living and helps in cartilage repair and regeneration and is found to efficacious in this study.

EP374

PRELIMINARY EFFECTS OF LOW-INTENSITY FOCUSED ULTRASOUND THERAPY FOR CHEMOTHERAPY INDUCED PERIPHERAL NEUROPATHY

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Background and aims

Chemotherapy-induced peripheral neuropathy (CIPN) is a common dose-limiting side effect experienced by patients receiving treatment for cancer. Approximately 30–40% of patients treated with neurotoxic chemotherapy will develop CIPN and there is considerable variability in its severity between patients. It is often sensory-predominant with pain and can lead to long-term morbidity in survivors. The prevalence and burden of CIPN will likely increase as cancer survival rates continue to improve in the coming decades. Our objective is to evaluate the effectiveness of low-intensity focused ultrasound (LIFU) therapy in the management of chemotherapy induced peripheral neuropathy.

Methods

A single center retrospective study.

Results

A total of 16 patients with CIPN were treated with LIFU. The mean age of patients was 66.91 years (SD 10.28) and included 9 males and 7 females. The most common oncological diagnosis was lymphoma followed by breast cancer, colorectal cancer, ovarian cancer and Ca stomach. The most common drug involved was oxaliplatin and paclitaxel followed by vincristine and bortezomib. The most common area involved was feet, followed by finger tips. Out of 16 patients 3 patients were lost for follow up after 1st session. 13 patients underwent on an average 8.38 sessions. Mean pre-treatment NRS was 7.24, which was reduced to 3.88 (46.4% reduction, $p < 0.001$). None of the patients who underwent any number of LIFU therapy had any adverse effects.

Conclusion

LIFU therapy may be a viable treatment modality in the management of CIPN, with a minimal side effect profile.

EP375

A CASE REPORT ON ADAPTIVE COMPLETE DECONGESTIVE THERAPY FOR UPPER LIMB LYMPHEDEMA DUE TO METASTATIC BREAST CANCER

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Background and aims

Improving the Quality of Life (QoL) of life of cancer survivors is the role of physiatrist. Lymphedema is the most common long-term sequelae of breast cancer treatment. Cosmetic issue is not the only problem with lymphedema, it can cause shoulder dysfunction, balance issues fall risk and can itself be the cause of mortality.

A case report on the effect of adaptive Complete Decongestive Therapy(CDT) for the management of upper limb lymphedema due to metastatic breast cancer.

Methods

Complete Decongestive Therapy has been done with short stretch bandage and patients QoL assessed by EQ-5D questionnaire, pain assessed by Visual Analogue Scale, Volume of limb assessed by water displacement method and mental status assessed by Hospital Anxiety Depression scale done weekly.

Results

Manual Lymphatic Drainage done as a part of CDT provided pain relief, smoothening effect and reduced anxiety, prevent further accumulation of fluid and relaxes tense skin which further reduced the pain and improved overall QoL. But, the limb volume cannot be reduced due to obstructive cancer environment.

Conclusion

Adaptive CDT helps to improve the QoL, reduce pain and anxiety even in metastatic breast cancer.

EP376

NEUROMUSCULAR TAPING HELPS TO IMPROVE LOWER LIMB EDEMA IN A GIRL WITH SYSTEMIC LUPUS ERYTHEMATOSUS

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Background and aims

Systemic lupus erythematosus (SLE) may present with lymphatic dysfunction, which leads to swelling and decreased quality of life. We report a case of a 14-year-old girl with SLE suffering from painful lower limb edema with no evidence of vein or artery occlusion.

Methods

The patient received neuromuscular taping (NMT) application for posterior lower limbs and anterior feet drainage, while continuing pharmacotherapy and physiotherapy.

Results

We registered an immediate effect of a decrease in swelling and pain two days after NMT application. One month follow-up revealed no recurrence of swelling and continual pain reduction. There was no adverse event reported.

Conclusion

Our report suggests a potential utility of NMT as a safe, effective, and feasible method for lower limb edema management in SLE.

EP377

MODULATORY EFFECTS OF HIGH-FREQUENCY PERIPHERAL MAGNETIC STIMULATION OF THE RADIAL NERVE ON FUNCTIONAL CONNECTIVITY OF THE MOTOR CORTEX AND NEUROMUSCULAR ACTIVITY: A MULTIMODAL STUDY BASED ON FNIRS AND SURFACE ELECTROMYOGRAPHY

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Background and aims

This study investigated the effects of high-frequency repetitive transcranial magnetic stimulation (rTMS) on cortical activation and functional connectivity in healthy adults.

Methods

Thirty participants were randomly assigned to an intervention group (20 Hz, 1.2×rMT, 600 pulses) or sham group, targeting the non-dominant radial nerve. Functional near-infrared spectroscopy (fNIRS) measured resting-state (bilateral primary motor cortex [M1], supplementary motor area) and task-state (wrist extension, index finger extension, button pressing task) cerebral oxygenation changes. Surface electromyography (sEMG) and motor evoked potentials (MEPs) were simultaneously recorded to assess neuromuscular outcomes.

Results

Statistical analyses revealed significant enhancements in interhemispheric and intracortical functional connectivity within motor-related networks in the intervention group compared to sham ($p < 0.05$). Notably, bilateral M1 connectivity showed the most prominent increase, accompanied by strengthened connections in left somatosensory-motor areas and left supplementary motor area. sEMG metrics demonstrated elevated root mean square (RMS) and integrated electromyogram (iEMG) values in resting-state radial wrist extensors and brachioradialis during index finger extension ($p < 0.01$). MEP measurements exhibited shortened latency and increased amplitude ($p < 0.05$) in the intervention group, with significant intergroup differences.

Conclusion

These findings suggest that peripheral rTMS modulates functional connectivity in motor cortical networks while enhancing neuromuscular efficiency. The observed improvements in cortical-cortical communication and peripheral motor output provide novel insights into the mechanisms of neuroplasticity induction through non-invasive brain stimulation. This research has clinical implications for developing rTMS-based therapies for motor dysfunction recovery by elucidating the relationship between cortical reorganization and functional rehabilitation outcomes.

EP378

BILATERAL ARM REHABILITATION DEVICE (BARD) AND PAIN MANAGEMENT IN PAEDIATRICS: A CASE REPORT

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Background and aims

Individual with limb pain tends to avoid movements and always anticipate pain with movements, thus resulting in restricted limb movements, fear to move and limited participation in activities of daily livings (ADLs). We would like to report the expanded usage of BARD (Synslai system) in the management of upper limbs pain in paediatric population. BARD is a bilateral upper limb training platform that has been adapted for clinical use in Taiwan to support upper limb rehabilitation in adult stroke patients. BARD enables targeted training of the shoulder and elbow joints, helping users regain mobility and strength in the affected limb.

Methods

QQ, 10 years old girl with underlying T-cell acute lymphoblastic leukaemia, complicated by intrathecal methotrexate-induced polyradiculopathy. She presented with tetraplegia and generalised upper limbs pain 6 months post-event. She was fully dependent in mobility and all ADLs. Due to the generalised upper limbs pain despite optimal analgesics usage, she refused physical touch and handling thus hindered the conduction of rehabilitation assessment and interventions. QQ was given a trial of BARD, in which she was able to perform the facilitative passive upper limbs movement without complaining of pain. In view of this, BARD was added to her conventional occupational therapy (OT) sessions.

Results

After 3-week of structured usage of BARD, QQ was able to participant in conventional OT sessions with huge improvement noted. Upon discharged, she was able to use toothbrush and perform self-feeding with palmar pocket, and able to maneuver electric wheelchair independently.

Conclusion

As illustrated in this case report, creativity and diversion is essential in rehabilitation management, especially for paediatric population, to enable provision of early and timely interventions. Hence, BARD, an upper limb training tool for adult stroke patients, may act as an adjunct to conventional rehabilitation interventions for upper limbs pain management in paediatric population.

EP379

ANTEROPOSTERIOR FORCE FEEDBACK WITH END-EFFECTOR TYPED GAIT REHABILITATION ROBOT FOR STROKE PATIENTS

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Background and aims

Morning Walk[®], the end-effector typed gait rehabilitation robot has independently controllable robotic footplates for gait generation and an active saddle for body weight support. It provides various real-time biofeedback that includes ground reaction force, amount of body weight support, foot pressure distribution and kinematic data. An anteroposterior force (APF) feedback system was newly developed to improve the asymmetric walking pattern of stroke survivors.

Methods

Based on 7 degrees of freedom, Morning Walk[®] enables personalized settings including step length, height and foot angles according to the patient's symptoms. During gait training on Morning Walk[®], the measured electric current of the motor driver associated with the horizontal movement changes according to the patient's gait pattern. Using the difference between the no-load current and the current measured during the patient's training, it is possible to estimate the magnitude of the anteroposterior force generated by patient.

Results

The real-time APF feedback system was successfully developed. It displays patient's bilateral anteroposterior forces which can train patients to generate symmetrical propulsive forces on unaffected and affected sides. The results showed that the patient's propulsive force increased depending on whether the APF feedback system is applied or not during patient's gait training.

Conclusion

The APF feedback system of Morning Walk[®] may helpful to train gait symmetry and have the potential to improve the walking pattern in stroke patients.

EP380

INTELLIGENT PULSED ELECTROMAGNETIC FIELD PHYSIOTHERAPY PLATFORM PRECISELY MODULATES MESENCHYMAL STEM CELLS FOR TENDON INJURIES

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Background and aims

Tendon repair remains a clinical challenge due to the lack of self-regenerative capacity. Human bone marrow mesenchymal stem cells (hBMSCs) have been used in tendon tissue engineering for their excellent self-renewal ability and paracrine function. However, how to precisely regulate the fate of hBMSCs remains a difficult issue at present. Pulsed electromagnetic field (PEMF) is considered an effective treatment for musculoskeletal tissue repair due to its non-invasive and cellular modulation potential. The purpose of this study was to investigate the role of PEMF in repairing tendon injuries by modulating the fate of h-BMSCs and to design an intelligent magnetic physiotherapy platform for multi-joint.

Methods

The optimal PEMF intensity and frequency were selected by cell proliferation, qPCR, and immunofluorescence. RNA-seq was performed to determine the biological processes and potential mechanisms by which different PEMFs act on hBMSCs. Finally, a SD rat Achilles tendon injury model was constructed and a multi-degree-of-freedom magnetic physiotherapy device was fabricated. After 7 days and 1 month of magnetophysical therapy, the efficacy of PEMF combined with h-BMSCs was determined by ultrasound, tissue staining, and gait experiments.

Results

1mT intensity of PEMF significantly up-regulated tendonogenic genes and proteins in BMSCs. RNA-seq revealed that PEMF enhanced oxidative phosphorylation, mild upregulation of ROS, increased ATP synthesis, and enhanced mitochondrial activity in BMSCs, which provided the energy metabolic basis for cell differentiation and proliferation. Animal experiments revealed that tendon adhesion, motor function, tissue structure, inflammation and survival of MSCs were significantly improved in the PEMF+MSCs group. To advance the clinical translation, we designed and fabricated an intelligent automated magnetic physiotherapy platform for whole-body multi-joints based on virtual reality and automated algorithms.

Conclusion

PEMF regulates the metabolism and proliferation of BMSCs and promotes their regeneration to repair tendon tissues. The intelligent magnetic physiotherapy platform is a precise strategy for tendon injuries in the future.

EP381

VITAMIN D-3 LEVEL OF ADULT PATIENTS AND TREATMENT OUTCOMES: A CROSS-SECTIONAL STUDY IN A TERTIARY CARE HOSPITAL

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Introduction

Vitamin D-3 is essential for bone health, regulating osteoblast activity, and facilitating calcium and phosphorus absorption. Deficiency in adults can lead to osteomalacia and is associated with cardiovascular diseases, diabetes, cancers, and autoimmune conditions.

Objective

This study aimed to assess vitamin D-3 levels and treatment outcomes among adult orthopedic patients at a tertiary care hospital.

Methods

This descriptive type of cross-sectional study was conducted from January 2023 to December 2024 at the Orthopedic Department of Central Police Hospital (CPH), Dhaka. A total of 200 adult patients aged 18 and above with various orthopedic conditions were enrolled. Serum 25(OH)D levels were measured using the radioimmunoassay technique, categorizing deficiency (<20 ng/mL), insufficiency (20-30 ng/mL), sufficiency (30-100 ng/mL), and toxicity (>100 ng/mL). Patients with deficiency or insufficiency received vitamin D-3 supplementation for 2-3 months, with follow-up at 3 months.

Results

The mean patient age was 46.47 ± 6.67 years, with 58% being female. Most participants (97.5%) were urban residents, and low back pain (42.5%) was the most common clinical presentation. Vitamin D-3 deficiency was found in 80% of patients, with 14.5% insufficient and 5.5% sufficient. Deficiency was most prevalent in the 29–39 age group, with females (70%) being more affected than males (30%). After supplementation, 96.87% of deficient and 96.55% of insufficient cases achieved sufficient vitamin D-3 levels.

Conclusion

The findings highlight the high prevalence of vitamin D-3 deficiency among orthopedic patients, particularly women, emphasizing the urgent need for supplementation to improve health outcomes and support recovery.

EP382

REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION (RTMS) IN STROKE AND EPILEPSY PATIENTS: CLINICAL INSIGHTS AND OUTCOMES

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Background and aims

Repetitive Transcranial Magnetic Stimulation (rTMS) is an advanced neuromodulatory therapy that has shown positive outcomes in neurology and rehabilitation. While its mechanisms are not fully understood, rTMS is believed to modulate neurotransmitter activity, immune responses, and neuroplasticity, potentially improving motor, cognitive and language functions. This case-series describe the clinical and functional effects of rTMS in post-stroke rehabilitation and drug-resistant focal motor epilepsy.

Methods

Three post-stroke patients with ischemic stroke underwent 10 rTMS sessions with adjunct physical and occupational therapies. Functional status was evaluated before and after treatment. One patient, treated at three months post-stroke, demonstrated increased muscle strength, particularly in elbow extension (mMRC 1/5 to 3/5) and ankle plantarflexion (mMRC1/5 to 4/5) within three weeks. Another patient with a lacunar infarct regained full motor strength following rTMS. A third patient with expressive dysphasia secondary to a left parietal infarct showed verbal improvements after an aphasia-targeted rTMS protocol. One patient with drug-resistant focal motor epilepsy underwent 10 rTMS sessions and reported a reduction in seizure frequency and duration without medication changes.

Results

Observations suggest that rTMS intervention enhances motor recovery, speech function and seizure control. Improvements were noted in muscle strength, verbal expression and seizure patterns.

Conclusion

rTMS shows potential as a primary intervention of choice in post-stroke rehabilitation and epilepsy management. However, limited availability of rTMS and lack of awareness of clinical indications among healthcare professionals restrict its broader application. Further studies with larger sample sizes and objective evaluations are needed to validate its efficacy and optimize treatment protocols.

EP383

TAI CHI CHUAN IMPROVES MEMORY FUNCTION IN TYPE 2 DIABETES COMBINED WITH MCI VIA DKK3-MEDIATED ANTI-INFLAMMATORY EFFECTS

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Background and aims

Tai Chi Chuan (TTC) has shown therapeutic potential in enhancing memory consolidation and cognitive performance in older adults with type 2 diabetes mellitus (T2DM) and comorbid mild cognitive impairment (MCI). However, the neurophysiological mechanisms underlying these effects remain unclear. This study aims to investigate the mechanisms by which TTC improves memory in older adults with T2DM and MCI.

Methods

A total of 162 older adults with T2D and MCI were randomly assigned to one of three groups: TCC, fitness walking (FWG), or a control group (CG). Participants underwent a 24-week intervention, followed by a 36-week period. Memory function was assessed, and proteomic analysis revealed a significant increase in the expression of DKK3 following TCC. Serum levels of DKK3, IL-6, TNF- α , and CRP were measured using ELISA. To further investigate the role of DKK3 in modulating inflammation, HT22 hippocampal neuronal cells were employed to assess the inflammatory response following DKK3 knockdown.

Results

At 24 weeks, the TCC group showed significantly better memory performance compared to the control group (CG). In addition, the TCC group exhibited markedly elevated serum DKK3 levels and reduced IL-6 levels relative to the CG. Knockdown of DKK3 in HT22 cells led to increased mRNA and protein expression of TNF- α , along with decreased mRNA and protein levels of IL-10. Although no significant changes were observed in IL-6 and IL-1 β mRNA levels, their protein expressions were significantly elevated, accompanied by an upregulation of phosphorylated JNK protein expression.

Conclusion

Our findings suggest that TCC ameliorates cognitive impairment in T2D patients with comorbid MCI through DKK3-mediated immunomodulation, which subsequently downregulates pro-inflammatory cytokine cascades.

EP384

UNVEILING PUSHER SYNDROME: A COLLECTION OF CASE STUDIES

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Background and aims

Pusher syndrome is a phenomenon commonly seen in patients' post-stroke or brain injury, whereby individuals actively push or lean to one side, leading to significant challenges in balance and mobility. It is reported in 10-16% of stroke patients. This collection of case studies aims to shed light on the varied presentations of pusher syndrome, focusing on diagnostic challenges and treatment approaches. The aim is to emphasize the importance of early detection and tailored rehabilitation strategies to manage this condition.

Methods

A retrospective review of case studies at Hospital Sultanah Bahiyah, Kedah, Malaysia, combined with a literature review, was conducted to emphasize the range of clinical manifestations and therapeutic approaches for Pusher Syndrome.

Results

2 male patients aged 63 and 52 years old, developed stroke caused by right basal ganglia bleed due to hypertensive emergency and right anterior cerebral artery infarct due to acute thrombosis respectively, displayed characteristic signs of Pusher Syndrome, including marked inclination towards one side, accompanied by resistance to correction. They presented with varying degrees of post-stroke hemiparesis and cognitive impairments, posing challenges for rehabilitation. Rehabilitation interventions included postural retraining, sensory stimulation, and progressive functional exercises aimed at increasing patient awareness of body orientation. Additionally, cognitive behavioral strategies were employed to address spatial neglect and promote adaptive behaviors. Patients exhibited significant improvements in balance and mobility for most patients, with gradual reduction in the inclination toward the affected side over a 3–6 month period.

Conclusion

Early diagnosis and tailored rehabilitation, including physical therapy and cognitive interventions, are crucial for functional recovery. This case series highlights the importance of comprehensive assessment and a multidisciplinary approach to optimizing outcomes.

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