OBSTRUCTIVE SLEEP APNEA

Management Guidelines

Audience: APRN | **Contact hrs:** 1.5 | **Pharmacology hrs:** 0.0

Expected revision: October 4, 2028

Pharmacology hours are included in the total contact hours.

Treat the patient, not only the index

A patient who wears a mask for four hours but sleeps for seven may still spend much of the night without treatment. Another may stop snoring after losing weight yet have persistent obstructive events. A third may feel more alert after a wake-promoting medicine while the airway remains untreated. Effective obstructive sleep apnea care connects objective control of breathing with symptoms, safety, tolerability, and a treatment the patient can actually use (Patil et al., 2019a; Caples et al., 2021).

Purpose, audience, and scope

This activity prepares advanced practice registered nurses to individualize management of adult obstructive sleep apnea (OSA), recognize inadequate treatment, and coordinate safer follow-up. It addresses outpatient care and selected inpatient transitions, not pediatric OSA or a complete protocol for acute respiratory failure. Diagnostic and prescribing decisions require appropriate preparation, authorization, and local privileges. Registered nurses contribute assessment, education, treatment support, monitoring, and escalation within their scope. U.S. product labeling is identified explicitly; availability and authorizations differ internationally. The four clinical cases are fictional teaching examples.

Learning outcomes

After completing this activity, learners should be able to: select an appropriate diagnostic pathway; compare PAP modes and resolve common barriers to use; individualize weight, positional, and oral-appliance treatment; distinguish disease-directed medication from treatment of residual sleepiness and apply key safety checks; evaluate referral for surgery or hypoglossal nerve stimulation; and construct an objective reassessment and continuity-of-care plan.

Confirm what needs treatment

OSA reflects recurrent upper-airway narrowing or closure during sleep despite respiratory effort. The consequences include interrupted sleep and variable hypoxemia. Airway anatomy, surrounding tissue, muscle responsiveness, sleep stage, and body position influence the pattern. Figure 1 contrasts collapse with the pneumatic splint produced by positive airway pressure (PAP). A low daytime symptom score does not establish normal breathing during sleep. Conversely, fatigue alone does not establish OSA (Kapur et al., 2017; Patil et al., 2019b).

Read the sleep study in context

The apnea–hypopnea index (AHI) describes scored apneas and hypopneas per hour of sleep on polysomnography (PSG). Conventional adult severity bands are mild, 5 to less than 15; moderate, 15 to less than 30; and severe, 30 or more events/hour. OSA can be diagnosed with at least five predominantly obstructive events/hour plus relevant symptoms or associated conditions, or at least 15 without those accompanying features. The event index is important, but it is not the entire treatment decision. Review oxygenation, central versus obstructive events, positional and rapid-eye-movement patterns when available, symptoms, and comorbid disease (VA/DoD, 2025; Kapur et al., 2017).

Many home sleep apnea tests (HSATs) use monitoring time rather than electroencephalographically measured sleep time. Their respiratory event index may therefore underestimate disease when the patient lies awake. The scoring rule for hypopneas also matters when comparing reports. A device-derived residual AHI during PAP is a treatment-monitoring estimate, not automatically equivalent to a diagnostic laboratory AHI. Obtain the actual report rather than relying on “mild sleep apnea” in a problem list (Kapur et al., 2017; Caples et al., 2021).

Choose PSG or HSAT deliberately

A technically adequate HSAT is an option for an uncomplicated adult with a clinical picture suggesting moderate-to-severe OSA. The American Academy of Sleep Medicine (AASM) recommends PSG after a

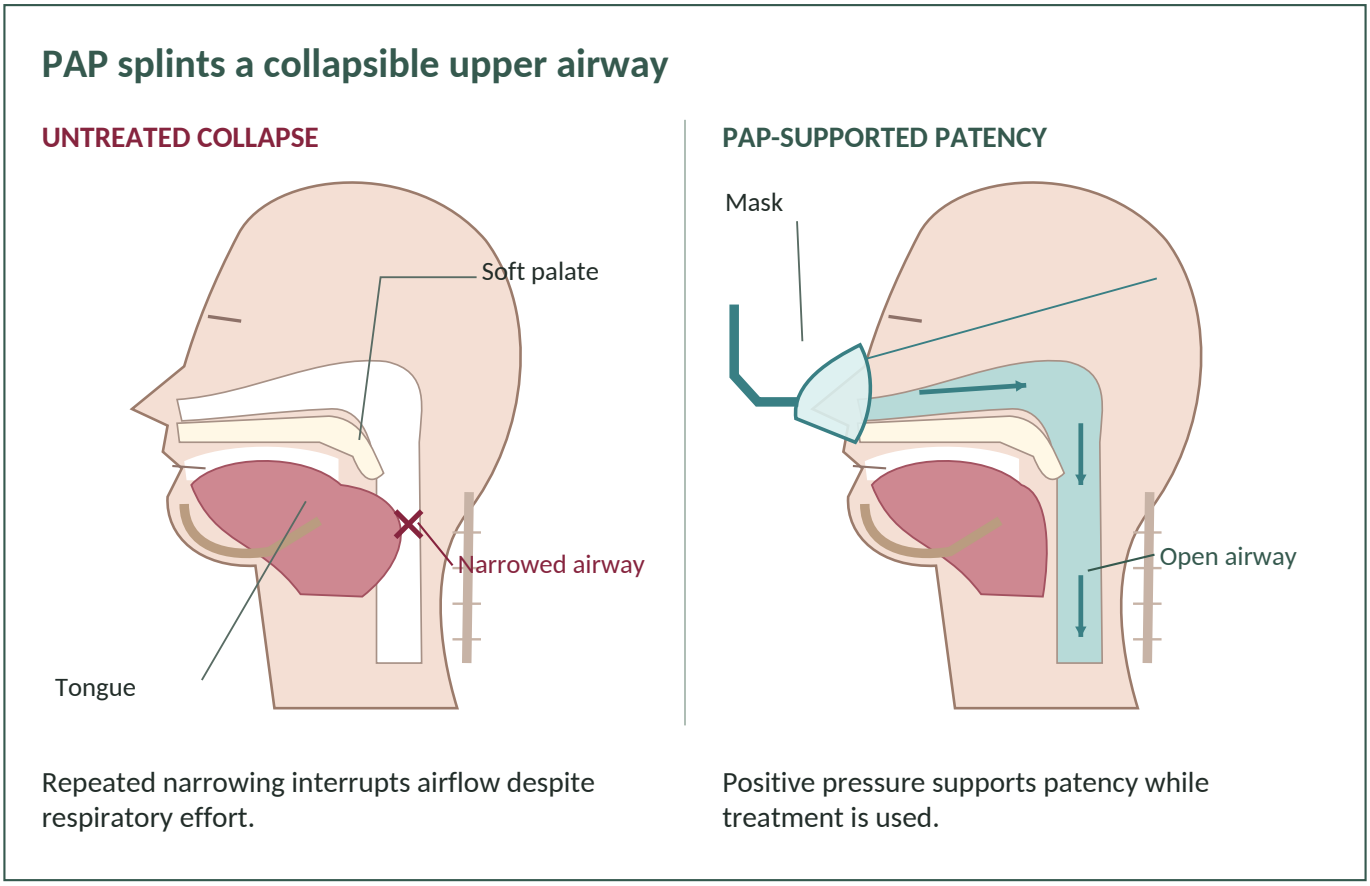

Figure 1. Simplified sagittal schematics contrast a narrowed pharyngeal airway with PAP-supported patency. Pressurized air acts as a pneumatic splint; it is not supplemental oxygen. Anatomy is schematic and is not a patient image. Sources: Patil et al. (2019a, 2019b).

single negative, inconclusive, or technically inadequate HSAT when evaluating suspected OSA. PSG is preferred when there is significant cardiorespiratory disease, possible hypoventilation, neuromuscular respiratory weakness, chronic opioid use, a history of stroke, or severe insomnia. These situations may require information that a limited home recording cannot provide (Kapur et al., 2017).

Guidelines are not identical: the 2025 U.S. Departments of Veterans Affairs and Defense (VA/DoD) pathway permits repeat HSAT or PSG after a nondiagnostic HSAT in selected circumstances. The safer choice depends on clinical complexity and the reason the first study failed. Repeating the same limited study should not become a way to avoid investigating hypoventilation or central apnea. Neither a questionnaire nor normal overnight oximetry alone rules OSA in or out (VA/DoD, 2025; Kapur et al., 2017).

Assess the person behind the report

Ask about witnessed pauses, choking, nocturia, morning headaches, unrefreshing sleep, unintended dozing, work schedules, and driving near misses. Distinguish sleepiness—the tendency to fall asleep—from low energy without sleep propensity. Review alcohol, opioids, sedating medicines, nasal obstruction, dentition, weight trajectory, blood pressure, and cardiopulmonary or neurologic disease. Investigate conditions such as hypothyroidism when the history or examination suggests them; broad endocrine testing is not a substitute for a focused sleep assessment (VA/DoD, 2025).

STOP-Bang estimates OSA risk; the Epworth Sleepiness Scale (ESS) quantifies self-reported dozing propensity. They answer different questions. An ESS above 10 commonly signals excessive sleepiness, but a lower score does not exclude OSA or establish fitness to drive. Ask directly about falling asleep at the wheel, not only whether the patient feels tired. Advise a patient with unsafe sleepiness not to drive or perform hazardous work until evaluated and adequately managed; use applicable occupational pathways for formal clearance (VA/DoD, 2025; Aurobindo Pharma, 2021).

> **CASE 1 · A reassuring home result that does not fit**
>
> Maria, 58, reports witnessed breathing pauses and recurrent morning headaches. She takes a prescribed opioid for chronic pain. An HSAT

reports a respiratory event index of 3/hour, but she recalls sleeping very little. She asks whether the negative result means that treatment is unnecessary.

The combination of persistent suspicion, substantial wake time, and opioid exposure makes that conclusion unsafe. The APRN arranges PSG rather than accepting the home result as exclusionary, reviews sedation and driving risk, and communicates concern for obstructive and nonobstructive breathing disorders. The next test must resolve the clinical question, not simply repeat a convenient measurement (Kapur et al., 2017).

Make PAP effective and usable

PAP is highly effective at preventing obstructive events while it is being used. AASM strongly recommends PAP for OSA with excessive sleepiness and conditionally recommends it for impaired sleep-related quality of life or comorbid hypertension. Moderate-to-severe OSA commonly warrants PAP, while treatment of mild OSA is individualized around symptoms, risk, preferences, and alternatives. Discuss realistic goals: better daytime function, fewer breathing disturbances, safer sleep, and a sustainable nightly routine (Patil et al., 2019a).

Match the mode to the physiology

Continuous PAP (CPAP) supplies a fixed pressure. Auto-adjusting PAP (APAP) varies pressure within a prescribed range in response to detected breathing patterns. Bilevel PAP (BPAP) provides a higher inspiratory pressure and a lower expiratory pressure; their difference provides pressure support. Figure 2 illustrates these concepts without implying a specific prescription. Severe OSA alone is not an indication to bypass CPAP or APAP and prescribe bilevel therapy (Patil et al., 2019a; Patil et al., 2019b).

For adults without significant comorbidity, treatment can begin with home APAP or laboratory titration. AASM supports CPAP or APAP for ongoing routine OSA management and generally favors either over BPAP. The VA/DoD guideline weakly favors APAP over fixed CPAP to facilitate use; this does not mean every stable CPAP user should be switched. Pressure intolerance despite practical adjustments, unusually high pressure requirements, hypoventilation, or another ventilatory disorder warrants individualized assessment rather than an automatic device upgrade (Patil et al., 2019a; VA/DoD, 2025).

A home APAP pathway is not a substitute for evaluating suspected hypoventilation, significant central apnea, or complex cardiopulmonary disease. Likewise, a rising machine “central apnea” index should prompt review of leak, event data, symptoms, medications, and the need for specialist testing. Do not assume that simply increasing pressure or switching to spontaneous bilevel will correct central events. Central sleep apnea requires a separate treatment assessment (Kapur et al., 2017; Caples et al., 2021).

Start with an actionable support plan

At setup, demonstrate mask assembly, fitting in the usual sleep position, humidifier use, and removal. Ask the patient to demonstrate the same steps. Explain how the prescribed ramp or expiratory pressure-relief setting works and who can change therapeutic settings. Agree on a contact pathway for problems during the first nights, rather than waiting for the next routine visit. Education at initiation and early troubleshooting, behavioral support, or telemonitoring can improve treatment use (Patil et al., 2019a; Patil et al., 2019b).

Review use over the entire sleep period, including naps. Administrative thresholds used by insurers or device eligibility rules are not physiologic treatment goals. Four hours of treatment can leave several hours of sleep unprotected, including later-night rapid-eye-movement sleep. Ask when and why the mask comes off. A report of “compliant” does not replace assessment of nightly duration, residual events, leak, symptoms, and the patient’s actual sleep opportunity (Patil et al., 2019b; Caples et al., 2021).

Troubleshoot before declaring failure

For leak, inspect cushion size, position, wear, mouth leak, and tubing connections; excessive strap tension can worsen fit and injure skin. Nasal dryness or congestion may improve with appropriately adjusted humidification and treatment of the underlying nasal problem. Interface choice should fit the patient’s anatomy and breathing pattern. Nasal or intranasal interfaces often have practical advantages, but persistent mouth leak or other limitations may require another interface (Patil et al., 2019b).

For pressure discomfort, separate difficulty falling asleep with pressure from recurrent awakening at high pressures or persistent respiratory events. Review the download before changing the range. Aerophagia, claustrophobia, insomnia, facial pain, or skin injury needs a specific response. A short period of daytime

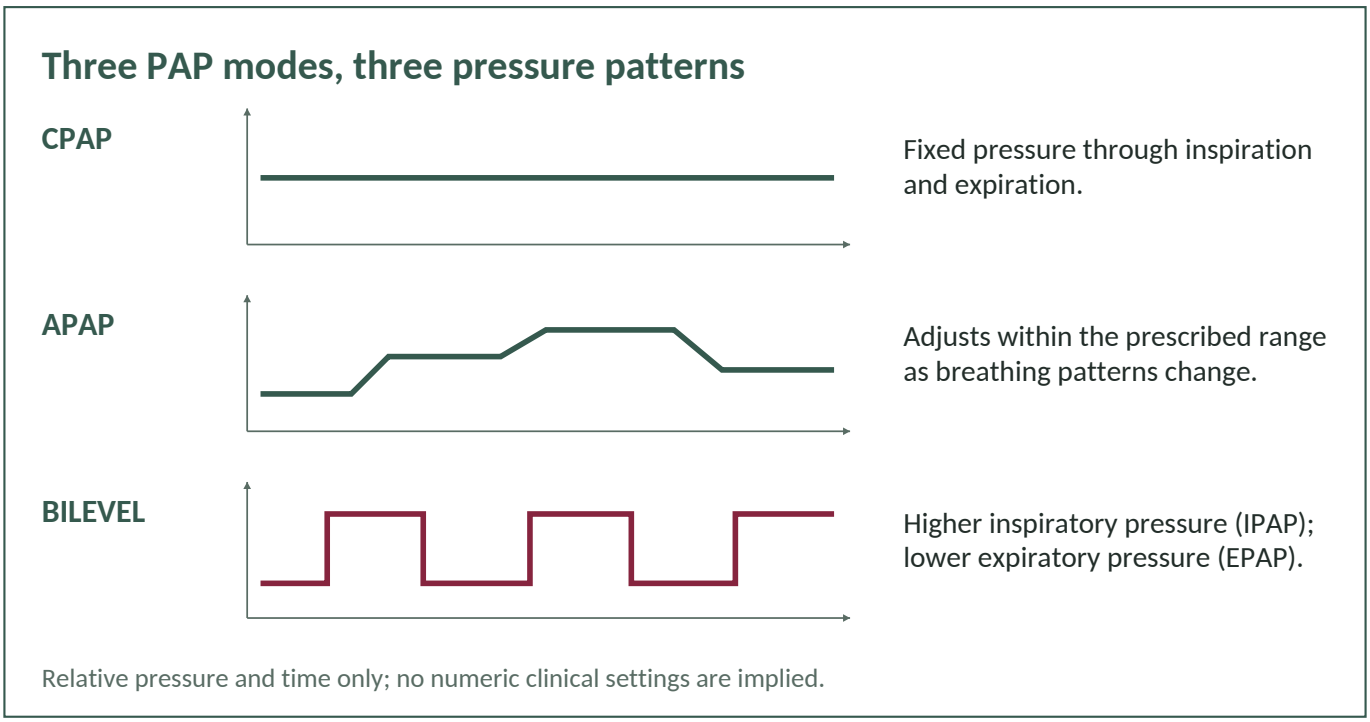

Figure 2. Conceptual pressure profiles, not measured waveforms or prescribed settings. CPAP stays fixed; APAP responds within a prescribed range; bilevel separates inspiratory and expiratory pressure. Routine severe OSA does not automatically require bilevel. Sources: Patil et al. (2019a, 2019b).

mask acclimatization can help a fearful patient practice without the pressure of immediately falling asleep. Persistent anatomic nasal obstruction may justify an otolaryngology evaluation to improve PAP tolerability (VA/DoD, 2025; Patil et al., 2019b).

Comorbid insomnia deserves treatment rather than repeated reminders to "try harder" with the mask. Cognitive behavioral therapy for insomnia is a first-line intervention. The VA/DoD guideline also describes a short, selected course of eszopiclone to facilitate PAP use; that is a conditional, individualized option, not routine sedative prescribing. Assess medication risks, other central nervous system depressants, and functional safety, and follow current prescribing information (VA/DoD, 2025).

Teach equipment care using the device manufacturer's instructions. Add-on cleaning claims do not remove the need for the recommended washing and maintenance process. The U.S. Food and Drug Administration (FDA) warns about risks from unauthorized ozone or ultraviolet cleaning products; even an authorized add-on bacterial-reduction device has a specific accessory indication and does not replace ordinary cleaning. Verify the actual product and its instructions rather than treating all cleaners as equivalent (FDA, n.d.).

CASE 2 · The download is not the whole night

James, 64, has baseline AHI 38/hour. His APAP report shows low residual events while used, but average use is four hours. He sleeps approximately seven hours, removes the mask because of dry mouth, and still dozes during afternoon conversations. He requests a medicine to stay awake.

His airway treatment is incomplete despite a favorable on-treatment index. The APRN checks for mouth leak and interface problems, reviews humidification and nasal symptoms, and creates an early follow-up plan to extend use across sleep. Residual-sleepiness medication should not be the first response to untreated hours. James also needs direct advice about avoiding driving while sleepy (Patil et al., 2019a; VA/DoD, 2025).

Combine therapies around patient priorities

Table 1 compares the treatment target and verification needs of the major options. More than one strategy may be appropriate, but every component should have a defined purpose (VA/DoD, 2025).

Weight, activity, and sleep position

Offer structured weight management to patients with overweight or obesity as part of OSA care, without postponing an effective airway treatment while waiting

Strategy	Primary treatment target	Verification / practical priority
CPAP or APAP	Pneumatic support of the upper airway during use.	All-sleep use, symptoms, leak, and residual-event data; troubleshoot barriers.
Oral appliance	Mandibular advancement or selected tongue retention.	Professional fitting and titration, dental surveillance, and follow-up sleep testing.
Weight management	Obesity-related contribution to OSA; includes medication or surgery when appropriate.	Track response and adverse effects. Reassess OSA before stopping airway therapy.
Positional therapy	Position-dependent obstruction in a suitable phenotype.	Confirm the pattern, sustained use, and effectiveness rather than relying on snoring alone.
Airway surgery or HNS	Selected anatomical contributors or dynamic muscle-related collapse.	Individual eligibility, procedural risks, activation/programming when relevant, and sleep reassessment.
Wake-promoting medicine	Persistent excessive sleepiness despite effective management of obstruction.	Verify adequate airway treatment and other causes; monitor drug-specific risks.

Table 1. Match the treatment to its target and verify the result. Sources: Patil et al. (2019a), Ramar et al. (2015), VA/DoD (2025), Eli Lilly and Company (2026), and Caples et al. (2021).

for weight change. Nutrition, physical activity, behavioral support, medication when appropriate, and metabolic or bariatric referral are different tools within that plan. Use respectful language and measurable goals. A patient should not be told that OSA is a personal failure or that PAP is unnecessary because weight loss has been recommended (VA/DoD, 2025; Kent et al., 2021).

A documented positional pattern can support an individualized trial of positional treatment, especially when nonsupine sleep substantially reduces events. It may be used alone in selected patients or alongside another therapy. “Sleep on your side” is not enough unless the patient can sustain the position and efficacy is assessed. Avoid assuming that the absence of loud snoring proves adequate oxygenation or control of all respiratory events (VA/DoD, 2025; Caples et al., 2021).

Discuss alcohol near bedtime, sedating medicines, adequate sleep opportunity, and shift-work pressures. Medication review should be collaborative: do not instruct patients to abruptly stop a chronic prescribed opioid or sedative without a safe plan. Smoking cessation and management of nasal symptoms support broader respiratory health, but neither replaces effective OSA treatment. A combined plan can reduce the burden of any one intervention while addressing the patient’s most important barriers (VA/DoD, 2025).

Oral appliances: choose, titrate, verify

A custom, titratable mandibular advancement device moves the lower jaw forward to help maintain upper-airway patency. Sleep clinicians and a qualified dentist should coordinate selection, fitting, titration, and follow-up. Assess dentition, periodontal health, jaw function, patient preference, and ability to use the appliance. An over-the-counter mouthguard is not equivalent to a professionally managed OSA device (Ramar et al., 2015).

Oral-appliance therapy is reasonable when a patient cannot tolerate PAP or prefers an alternative. The VA/DoD guideline supports PAP or a mandibular advancement device as first-line options for mild-to-moderate OSA. Severe OSA is not an absolute prohibition against an appliance, but PAP generally produces more complete respiratory-event and oxygenation control, making objective confirmation particularly important when an alternative is used (Ramar et al., 2015; VA/DoD, 2025).

Tongue-retaining devices stabilize the tongue rather than advance the mandible. They may be considered when dental circumstances limit mandibular

advancement, but the supporting evidence and tolerability are less established. Monitor appliance-related tooth or jaw discomfort, bite changes, salivation, and dryness. Arrange follow-up sleep testing after therapeutic adjustment; improvement reported by the patient or partner is useful but cannot establish the residual AHI (Ramar et al., 2015; Caples et al., 2021).

Nasal expiratory-resistance devices, myofunctional approaches, intraoral negative-pressure devices, and daytime neuromuscular stimulation should not be represented as interchangeable replacements for established care. The 2025 VA/DoD guideline found insufficient evidence for several of these approaches. Any selected use needs an explicit rationale, awareness of device-specific authorization, and objective assessment rather than reliance on promotional claims (VA/DoD, 2025).

Use medication for the right treatment target

Medication now has two distinct roles: treating obesity-related OSA in an eligible patient and improving persistent excessive daytime sleepiness after effective management of airway obstruction. These goals are not interchangeable. Document which problem the medicine is intended to address, what treatment continues alongside it, what outcome will be measured, and what finding should trigger reassessment rather than dose escalation (Eli Lilly and Company, 2026; Axsome Therapeutics, 2026).

Tirzepatide: disease-directed treatment in obesity

In the United States, tirzepatide, marketed as Zepbound, is approved for moderate-to-severe OSA in adults with obesity, alongside a reduced-calorie diet and increased physical activity. It is a dual glucose-dependent insulinotropic polypeptide and glucagon-like peptide-1 receptor agonist. Reduced caloric intake and weight loss contribute to improvement in OSA. This indication does not apply to every patient with OSA, and it does not create an OSA indication for every medicine in a related drug class (Eli Lilly and Company, 2026).

The labeled OSA studies enrolled adults with obesity and moderate-to-severe OSA, with and without existing PAP treatment. Figure 3 shows the 52-week changes in AHI. In the PAP cohort, PAP was temporarily suspended before the endpoint assessment, allowing assessment of underlying disease rather than the immediate splinting effect of PAP. The trials did not establish when PAP can safely be discontinued. Continue prescribed airway treatment while response is evaluated; reassessment, not reduced snoring alone, should guide a change (Eli Lilly and Company, 2026; Caples et al., 2021).

Begin at 2.5 mg subcutaneously once weekly for four weeks, then increase to 5 mg weekly. Further increases are in 2.5-mg steps after at least four weeks at the current dose, based on response and tolerability. The recommended OSA maintenance doses are 10 or 15 mg weekly; the maximum is 15 mg weekly. The 2.5-mg dose is initiation, and 5 mg is not the labeled OSA maintenance dose. Verify the supplied presentation and instructions rather than assuming all devices have the same injection volume (Eli Lilly and Company, 2026).

A personal or family history of medullary thyroid carcinoma, multiple endocrine neoplasia syndrome type 2, or serious hypersensitivity is a contraindication. Do not combine Zepbound with another tirzepatide product or another GLP-1 receptor agonist. Severe gastrointestinal reactions can cause dehydration and kidney injury; severe gastroparesis is a setting in which use is not recommended. Persistent severe abdominal pain requires prompt assessment for pancreatitis, and suspected pancreatitis requires discontinuation (Eli Lilly and Company, 2026).

Review insulin or sulfonylurea therapy because hypoglycemia risk may require dose adjustment and closer monitoring. Discuss gallbladder symptoms, hydration, and relevant diabetic retinopathy follow-up. Delayed gastric emptying can affect oral medication absorption and matters before anesthesia or deep sedation; the procedural team needs to know about treatment. Do not invent a universal perioperative withholding interval. Discontinue when pregnancy is recognized. Patients using oral hormonal contraception should use a nonoral method or add barrier protection for four weeks after initiation and four weeks after each dose increase (Eli Lilly and Company, 2026).

CASE 3 · Improvement does not mean stop the mask

Leah, 39, has BMI 36 kg/m² and AHI 32/hour and is using PAP. She begins tirzepatide and uses an oral contraceptive. At a dose-escalation visit she reports weight loss and quieter sleep and asks to stop PAP.

The APRN reviews tolerability, reinforces the four-week additional contraceptive precaution after this dose increase, and explains why weight response does not prove OSA resolution. PAP

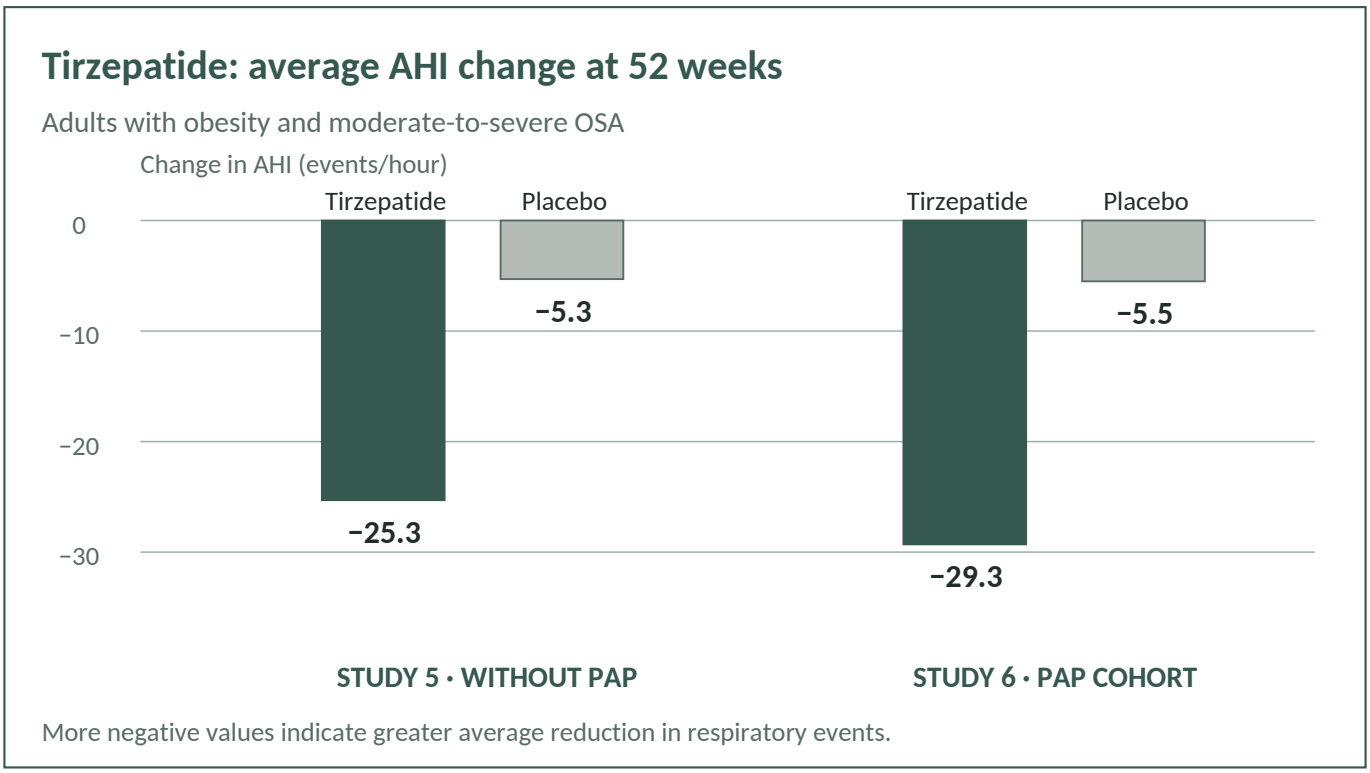

Figure 3. Adjusted mean AHI changes in the labeled OSA studies: Study 5, without PAP, and Study 6, in patients using PAP at enrollment. PAP was suspended before endpoint assessment in Study 6. Results do not define when PAP can be stopped. Source: Eli Lilly and Company (2026), section 14.2.

> continues while a reassessment plan is established. Persistent severe abdominal pain would require urgent evaluation rather than being dismissed as an expected adjustment symptom. These are three different decisions: drug safety, reproductive counseling, and verification of airway control (Eli Lilly and Company, 2026; Caples et al., 2021).

Residual sleepiness: reassess before prescribing

Before calling sleepiness residual, verify sufficient sleep opportunity, effective treatment during the whole sleep period, acceptable leak, and control of respiratory events. Consider circadian misalignment, insomnia, depression, sedating medicines, other sleep disorders, and medical contributors. Repeat objective testing when symptoms or unexplained device data warrant it. A medicine that improves alertness does not repair an untreated airway or prove that driving is safe (VA/DoD, 2025; Caples et al., 2021).

Solriamfetol improves wakefulness and is not a treatment for obstruction. Its U.S. label requires treatment of the underlying obstruction for at least one month before initiation, with that treatment continued. For OSA, begin at 37.5 mg orally on awakening; the maximum usual dose is 150 mg daily. Avoid dosing within nine hours of planned bedtime. Control blood pressure before treatment and monitor blood pressure, heart rate, sleep, and psychiatric symptoms. Monoamine oxidase inhibitors are contraindicated concurrently and within the preceding 14 days (Axsome Therapeutics, 2026).

Renal function materially changes solriamfetol dosing. With estimated glomerular filtration rate (eGFR) 30–59 mL/min/1.73 m², begin at 37.5 mg and do not exceed 75 mg daily; wait at least seven days before increasing. With eGFR 15–29, 37.5 mg is both the initial and maximum dose. It is not recommended below 15. Do not apply the usual dose-escalation schedule to renal impairment. Review cardiovascular stability and interacting medicines before adding a wake-promoting drug (Axsome Therapeutics, 2026).

Modafinil and armodafinil are additional U.S. options for excessive sleepiness associated with OSA after a maximal effort to treat the obstruction. The usual labeled adult morning dose is modafinil 200 mg, or armodafinil 150–250 mg. Higher doses are not automatically more beneficial. Consider reduced dosing or closer monitoring in older adults and dose reduction in severe hepatic impairment. Assess cardiovascular and psychiatric history and the possibility of persistent sleepiness despite treatment (Aurobindo Pharma, 2021; Aurobindo Pharma, 2023).

Serious rash, including Stevens–Johnson syndrome and systemic hypersensitivity, is a high-consequence

counseling point for both medicines. Discontinue at the first rash unless clearly unrelated to the drug; systemic symptoms need urgent assessment. These agents can reduce the effectiveness of steroidal contraceptives and alter exposure to other drugs through enzyme effects. Use alternative or additional contraception during treatment and for one month after discontinuation under the U.S. labeling. Reconcile the full medication list, not only other sleep medicines (Aurobindo Pharma, 2021; Aurobindo Pharma, 2023).

Upper-airway pharmacotherapy remains an active research area. AD109, an investigational combination of aroxybutynin and atomoxetine, should not be presented as an approved routine OSA treatment. Nor should an older recommendation against routine atomoxetine-based treatment be silently equated with results for every newer formulation. Separate investigational evidence, regulatory authorization, and a treatment recommendation; they answer different questions (Apnimed, n.d.; VA/DoD, 2025).

Refer for surgery without abandoning follow-up

An unsuccessful PAP experience should open a structured discussion, not end treatment. AASM strongly recommends discussing sleep-surgeon referral for adults with OSA and BMI below 40 kg/m² who are intolerant of or unwilling to use PAP. Bariatric-surgeon referral should also be discussed in PAP-intolerant or unaccepting patients with obesity and BMI at least 35. These are referral recommendations, not automatic instructions for a particular operation; other patients may still merit evaluation (Kent et al., 2021).

Anatomy, goals, and procedural trade-offs

Airway procedures aim to change the site or pattern of obstruction. Nasal surgery may improve breathing through an interface but should not be assumed to cure moderate-to-severe OSA. Palatal or pharyngeal procedures, tonsillar surgery, tongue-base approaches, and maxillomandibular advancement address different anatomical contributors. Advancing the upper and lower jaws enlarges the skeletal framework supporting the airway. The appropriate procedure depends on anatomy, anticipated benefit, morbidity, preferences, and the experience of the treating team (Kent et al., 2021; VA/DoD, 2025).

Awake examination does not reproduce all sleep-related collapse. Drug-induced sleep endoscopy (DISE) can characterize the location and direction of obstruction when it will change procedural selection. Its role is particularly important for devices whose labeling excludes specific collapse patterns. AASM generally suggests PAP as initial therapy even when a major upper-airway abnormality is present, while recognizing that other indications or individual circumstances can change the sequence (Kent et al., 2021; FDA, 2023).

Counsel about bleeding, pain, swallowing or voice effects, infection, anesthetic risk, and persistent or recurrent OSA according to the actual procedure. A lower AHI or less snoring does not guarantee elimination of disease. Arrange postoperative sleep reassessment and define who will continue longitudinal care. A referral letter should carry the original study, documented treatment trials, relevant anatomy and comorbidities, weight trajectory, and the patient's priorities (Kent et al., 2021; Caples et al., 2021).

Hypoglossal nerve stimulation: a treatment program

Hypoglossal nerve stimulation (HNS) recruits tongue-related musculature to stabilize the upper airway during sleep. Its purpose is to reduce dynamic collapse, not to deliver ventilatory pressure. Device designs differ: stimulation may be distal and selective, bilateral, or proximal with different patterns of muscle recruitment. Some systems coordinate stimulation with respiration; others do not require the same sensing arrangement. Figure 4 illustrates the mechanism and why eligibility must be product-specific (FDA, 2023; Nyxoah, 2025; LivaNova USA, 2026).

The Inspire indication includes adults aged 22 years or older with AHI 15–100 who fail or cannot tolerate PAP and do not have complete concentric collapse at the soft palate. FDA expanded its recommended upper BMI limit to 40. These boundaries are not a guarantee of clinical response or insurance coverage. A patient should not be rejected solely because an old study used BMI 32 or an upper AHI of 50; the current device criteria and individualized assessment matter (FDA, 2023).

Newer approvals broaden the technological choices but do not create a single shared eligibility rule. The Genio System 2.1 is labeled for adults at least 22 years old with AHI 15–65 who fail, cannot tolerate, or are ineligible for specified standard treatments. Its implant is MR Conditional under defined conditions. The aura6000 system is labeled for adults with AHI 15–65 after failure, intolerance, or ineligibility for standard care, but its original approved implanted system is MR Unsafe. Confirm the exact model and current labeling;

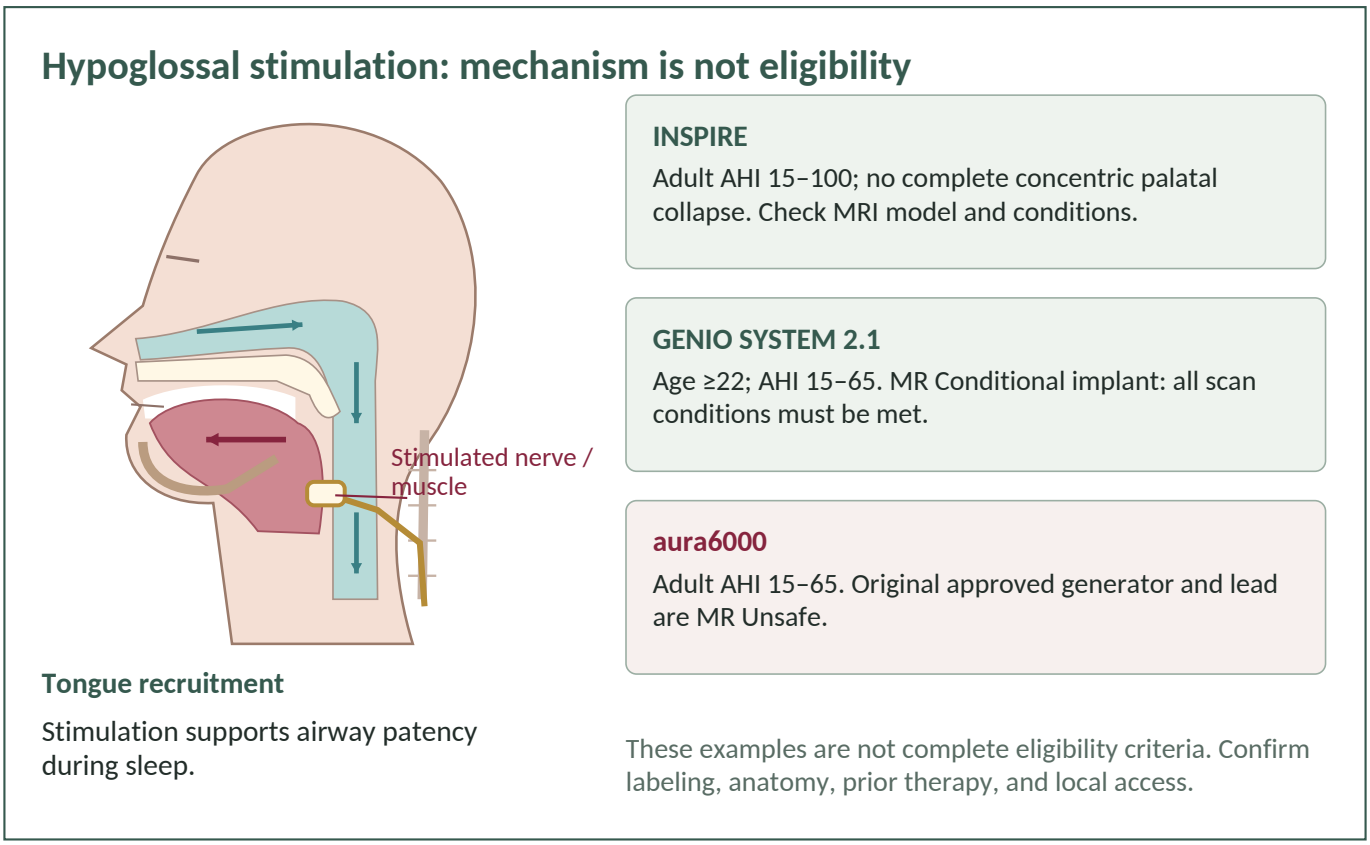

Figure 4. Original functional schematic of tongue-muscle recruitment, not a surgical implantation map. Systems differ in stimulation strategy, selection rules, components, and MRI conditions. Read exact current device labeling. Sources: FDA (2023), Nyxoah (2025), and LivaNova USA (2026).

approval does not establish local availability (Nyxoah, 2025; LivaNova USA, 2026).

Do not transfer DISE restrictions, MRI permissions, central-apnea thresholds, or component assumptions from one system to another. Inspire excludes complete concentric palatal collapse. The aura6000 labeling does not require DISE, but this is not proof that every anatomical phenotype responds equally. Central and mixed events at or above 25% of total AHI are contraindications for Genio and aura6000; Inspire labeling specifies more than 25%. Review the actual study composition and the exact device instructions rather than relying on the broad diagnosis "sleep apnea." (FDA, 2023; Nyxoah, 2025; LivaNova USA, 2026).

Selection also includes neurologic control of the airway, ability to operate the system or obtain reliable assistance, potential interactions with other implants, pregnancy-related restrictions, and the burden of surgery and maintenance. For MRI, obtain the implant identification card and verify every condition for all implanted components with the radiology safety team. "The patient has an Inspire-type implant" is not adequate documentation. MR Conditional is not unrestricted permission, and an MR Unsafe system cannot be treated as conditional because another brand permits scanning (FDA, 2023; Nyxoah, 2025; LivaNova USA, 2026).

After implantation, care includes wound assessment, scheduled activation after healing, patient training, gradual parameter optimization, and objective evaluation of efficacy. Activation is not equivalent to a completed titration. Address tongue discomfort, abrasion, swallowing difficulty, unwanted movement, infection, or suspected device malfunction through the implant team. New weakness, progressive swelling, or respiratory difficulty requires prompt assessment rather than unsupervised changes in stimulation (LivaNova USA, 2026; FDA, 2023).

The patient still needs to use the therapy during sleep. Review recorded use when available, symptom response, weight change, and any recurrence of respiratory symptoms. Reprogramming may improve comfort or efficacy, but numerical settings are device-specific and should not be copied from animal experiments or an early feasibility study. Continuing sleep-medicine follow-up is as important as the operation itself. Combination treatment may be appropriate when one intervention does not sufficiently

control disease (LivaNova USA, 2026; Caples et al., 2021).

CASE 4 · An old cutoff and a new safety question

Omar, 57, has BMI 33 kg/m², AHI 70/hour, predominantly obstructive events, and persistent PAP intolerance despite interface and pressure troubleshooting. He was told years ago that an implanted treatment was impossible because his BMI exceeded 32. He also expects to need serial MRI examinations for another condition.

A sleep-surgery consultation is reasonable; the historic BMI cutoff alone should not close the discussion. Device-specific evaluation must address his AHI, collapse pattern, prior treatment experience, and future imaging needs. An MRI-compatible pathway cannot be inferred from the general term HNS. The implant team and radiology service must verify the exact proposed system before a procedural decision (Kent et al., 2021; FDA, 2023; LivaNova USA, 2026).

Recognize complex physiology and care transitions

Hypoventilation is not simply severe OSA

Obesity hypoventilation syndrome (OHS) includes obesity, sleep-disordered breathing, and awake hypercapnia with $PaCO_2$ at least 45 mmHg after excluding other causes. In low-to-moderate clinical suspicion, serum bicarbonate below 27 mmol/L can help exclude OHS; a value at least 27 should prompt assessment of $PaCO_2$. High suspicion warrants arterial blood gas evaluation directly. A normal daytime pulse oximeter reading does not measure ventilation (Mokhlesi et al., 2019).

For stable ambulatory OHS with coexisting severe OSA, the American Thoracic Society conditionally recommends CPAP as initial therapy rather than automatically selecting noninvasive ventilation (NIV). Inadequate clinical or gas-exchange response requires reassessment and may require NIV. Patients hospitalized with respiratory failure and suspected OHS need a specific discharge ventilatory plan and timely diagnostic testing; this situation is not an uncomplicated home-APAP start (Mokhlesi et al., 2019).

Supplemental oxygen alone is not an OSA treatment. Persistent hypoxemia despite apparently adequate PAP should trigger evaluation for leak, undertreated events, hypoventilation, or coexisting pulmonary and cardiac disease. Oxygen, when indicated, requires a separate prescription and monitoring plan, including attention to carbon dioxide retention in susceptible patients. Do not convert a laboratory titration threshold into a universal home oxygen-adjustment instruction (VA/DoD, 2025; Mokhlesi et al., 2019).

Hospitalization, aging, and neurologic disease

The 2025 AASM hospital guideline supports continuing established sleep-disordered breathing treatment unless contraindicated. On admission, reconcile the home mode, pressure settings, interface, oxygen prescription, and actual use. Assess whether the patient can safely tolerate PAP; inability to protect the airway or relevant facial injury changes the plan. For newly suspected OSA, risk-based screening is most useful when linked to diagnostic evaluation, treatment, and follow-up rather than an isolated checklist (Mehra et al., 2025).

Use sedating medicines and opioids judiciously, communicate respiratory risk during handoff, and apply monitoring according to the patient's condition and institutional pathway. A normal saturation while receiving oxygen does not establish adequate ventilation. Escalate new somnolence, respiratory compromise, or suspected hypercapnia promptly. The hospital OSA guideline is not a replacement for acute respiratory-failure or perioperative protocols (Mehra et al., 2025; Mokhlesi et al., 2019).

Older adults and people with stroke, impaired dexterity, cognitive limitations, or sensory impairment may need adapted equipment teaching and caregiver support. Demonstrate the remote or mask operation, then observe actual performance. Do not equate advanced age with lack of potential symptomatic benefit, or promise that treating OSA will reverse established cognitive disease. Arrange a realistic support plan and choose testing appropriate to neurologic and respiratory complexity (Kapur et al., 2017; VA/DoD, 2025).

Verify benefit and maintain continuity

Follow-up should ask whether breathing is controlled, sleepiness and function are improving, treatment is being used, and adverse effects are acceptable. Figure 5 links these questions to the next action. Review treatment data in context: a technically favorable download with persistent sleepiness raises different questions from high leak and repeated mask removal. An unfilled prescription, unaffordable supplies, or absent dental follow-up is a treatment gap even when

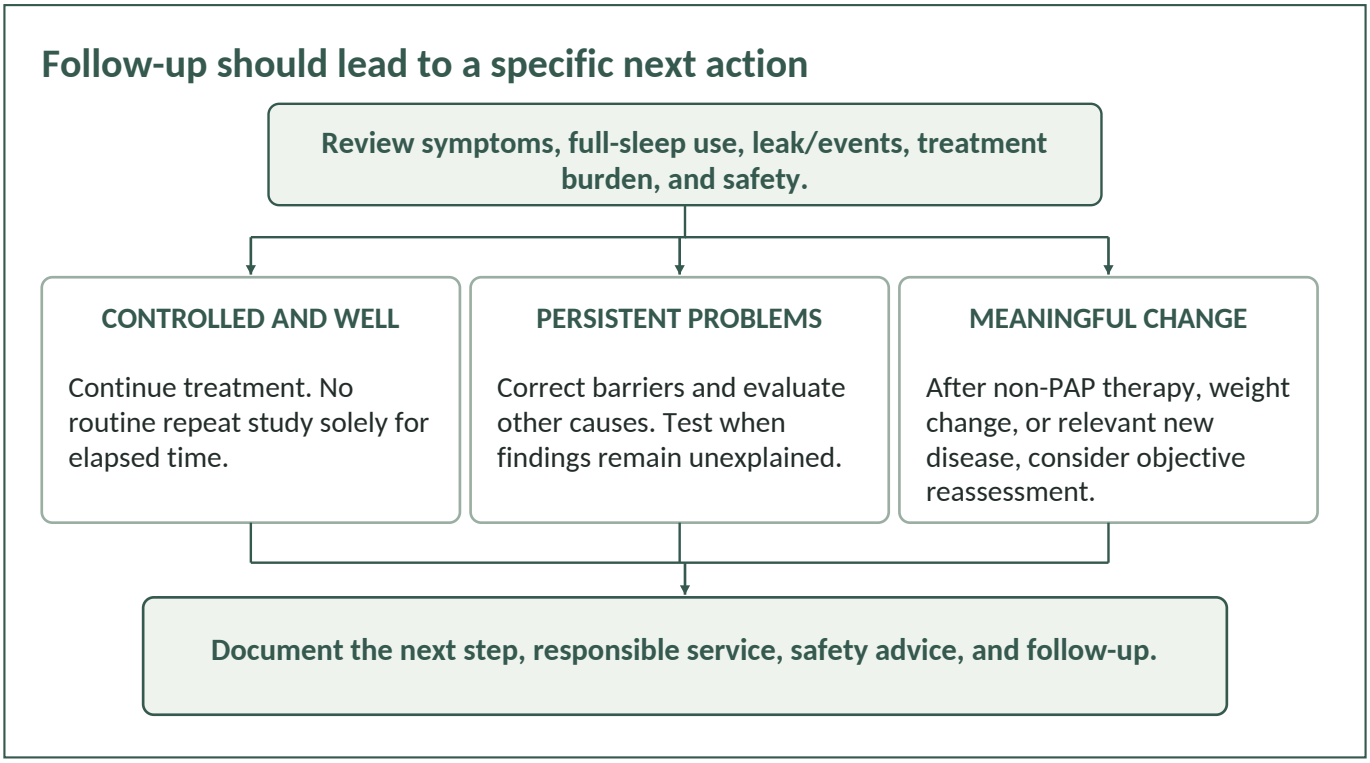

Figure 5. A practical reassessment framework. Review symptoms and objective treatment data together; use testing to answer a clinical question rather than as an automatic annual ritual. Sources: Caples et al. (2021), Patil et al. (2019a), and Mehra et al. (2025).

the chart lists an active therapy (Patil et al., 2019a; Caples et al., 2021).

Routine repeat PSG or HSAT is not recommended solely because a year has passed in an asymptomatic patient doing well on PAP. Testing is appropriate when symptoms recur despite adequate use, after non-PAP treatment, with clinically important weight change, or when unexplained device data or a change in cardiovascular disease would affect management. PSG may be needed to reassess hypoxemia or hypoventilation. Specify what clinical decision the test is intended to support (Caples et al., 2021).

Explain benefits without overstating prevention

PAP can improve respiratory events, sleepiness, quality of life, and blood pressure, but reductions in myocardial infarction, stroke, or mortality should not be promised to every patient. In the SAVE trial, CPAP added to usual care did not prevent cardiovascular events in participants with established cardiovascular disease and moderate-to-severe OSA; average use was approximately 3.3 hours/night. This finding does not erase symptomatic benefit or settle the effects of sustained all-night treatment in every population (McEvoy et al., 2016; Patil et al., 2019b).

Continue established cardiovascular prevention, blood-pressure treatment, diabetes care, and weight management. Observational associations and improvements in intermediate markers are not the same as proof that a specific OSA treatment prevents a clinical event. Shared decisions are stronger when the anticipated benefits, uncertainty, burden, and alternatives are stated plainly (McEvoy et al., 2016; VA/DoD, 2025).

Make the next step executable

At the end of a visit or hospital stay, ask the patient to explain what will be used during sleep, how to handle a common problem, what symptoms require help, and when follow-up will occur. Provide a named service or contact route for equipment, medication, dental, or implant issues. The handoff should state treatment modality, settings or dose, outstanding safety concerns, planned testing, and who owns the next decision (Mehra et al., 2025; Patil et al., 2019a).

The central management principle is sustained, verified treatment rather than allegiance to one device. Confirm the diagnosis, select therapy around physiology and preferences, solve barriers early, and reassess before interpreting symptom improvement as resolution. New medication and stimulation options expand individualized care, but they do not remove the need for airway assessment, safety counseling, and long-term follow-up (VA/DoD, 2025; Caples et al., 2021).

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