

OSA · Sleep Apnea

OSA means your airway squashes shut when you sleep; CPAP is the fix that keeps it propped open.

THE ONE-LINE TRUTH

Your throat collapses over and over while you sleep, choking off air until your brain wakes you up gasping — CPAP holds it open so you can breathe all night.

The chain — how it unfolds

1. Airway is too narrow to stay open during sleep — why: Excess fat around the neck and tongue, large tonsils, a small jaw, weak pharyngeal muscles, or aging tissue laxity make the pharynx (throat tube) so narrow that when the muscles relax during sleep, the walls collapse inward and block airflow completely.
2. Apneas (breathing stops) and hypopneas (shallow breathing) occur repeatedly — why: Each collapse shuts off air for 10 seconds or longer (apnea) or partially blocks the airway so oxygen drops (hypopnea). The pauses in breathing (apnea)-hypopnea index (AHI) — the number of events per hour — defines severity: 5-15 is mild, 15-30 moderate, >30 severe.
3. Oxygen desaturations and CO₂ retention stress the body — why: With no airflow, oxygen saturation (SpO₂) falls — sometimes into the 70s or 60s — and carbon dioxide builds up. These chemical changes trigger the brainstem's respiratory centers (the medulla) to force an arousal.
4. The brain wakes you up briefly; you gasp and the airway opens — why: The reticular activating system jolts you awake just enough to stiffen the pharyngeal muscles. The airway pops open, you gasp or snort loudly, air rushes in, and oxygen climbs back up. You fall asleep again within seconds, usually without remembering.
5. Sleep is fragmented; you never get deep, restorative sleep — why: Arousals happen dozens to hundreds of times per night, yanking you out of deep (stage 3) and REM sleep before your brain can rest and repair. Result: crushing daytime sleepiness, brain fog, mood swings, and falling asleep at the wheel or at work.

6. Chronic sympathetic activation drives up blood pressure and damages the heart — why: Every arousal floods your body with adrenaline, norepinephrine, and cortisol (stress hormones). Night after night, this keeps your sympathetic nervous system (fight-or-flight) locked on high, causing sustained high blood pressure (hypertension) (often resistant to medication), left ventricular hypertrophy (thickened heart muscle), atrial fibrillation (an irregular, quivering heartbeat) (chaotic heart rhythm), and heart failure.
7. Inflammation, oxidative stress, and metabolic dysfunction accumulate — why: Repeated oxygen dips (intermittent low oxygen (hypoxia)) generate reactive oxygen species (harmful molecules) and trigger systemic inflammation (elevated C-reactive protein, cytokines). This damages blood vessel linings (endothelial dysfunction), promotes atherosclerosis (plaque buildup), worsens insulin resistance and type 2 diabetes, and raises stroke risk.
8. Without treatment, serious complications follow — why: Untreated OSA significantly raises the risk of stroke, heart attack, sudden cardiac death, car crashes from falling asleep at the wheel, and perioperative complications (airway obstruction during anesthesia). CPAP therapy — wearing a mask that delivers continuous positive airway pressure to hold the airway open all night — reverses these risks, restores sleep, and saves lives.

Spot it — what you see, and why

- Loud snoring that stops and starts: The soft tissue at the back of the throat collapses and blocks the airway during sleep, then vibrates loudly when air squeezes through or stops completely until the brain wakes you just enough to open it again.
- Gasping or choking during sleep: When the airway closes completely (an pauses in breathing (apnea), meaning no breathing), oxygen in the blood drops. The brain detects the danger and jolts you awake just enough to gasp and reopen the airway so you can breathe again.
- Daytime sleepiness that interferes with work or driving: Repeated wake-ups (often dozens or hundreds per night, though you may not remember them) chop up deep, restorative sleep. Without that deep sleep, the brain never gets the rest it needs, so you feel exhausted all day.
- Morning headache: During apneas, carbon dioxide (the waste gas from breathing) builds up in the blood because you are not exhaling. High carbon dioxide widens blood vessels in the brain, which causes a dull, throbbing headache when you wake up.
- Dry mouth or sore throat on waking: When the upper airway is partly blocked, you breathe through your mouth instead of your nose. Mouth breathing all night dries out the saliva and can irritate the throat.

- Trouble concentrating or memory problems: The hippocampus (the brain's memory filing center) and the prefrontal cortex (the front part that handles focus and decisions) both need deep sleep to work well. Fragmented sleep starves them of that rest, so attention and memory suffer.

Red flags — act now

- Falling asleep while driving or during conversations
- New or worsening high blood pressure that does not respond to medicine
- Witnessed breathing pauses longer than ten seconds, especially with turning blue or gray
- Chest pain, irregular heartbeat, or waking up gasping for air with a racing heart
- Severe daytime sleepiness in someone who operates heavy machinery or cares for children

Treat it — in this order

1. Continuous positive airway pressure (CPAP) — a bedside machine that blows steady air through a mask into your nose or mouth while you sleep → The steady air pressure acts like a splint that holds your airway open so it cannot collapse and block. Your body stops waking up gasping, gets oxygen all night, and your brain and heart stop being stressed. Blood pressure drops, heart rhythm steadies, and daytime sleepiness goes away.
2. Weight loss through calorie reduction and regular physical activity if body mass index (BMI) is ≥ 25 → Losing 10% of your body weight reduces fat around your neck and chest, which makes the airway passage bigger and reduces the number of times it collapses during sleep. AHI often drops by half.
3. Oral appliance (custom-fitted mouthpiece worn at night that moves your lower jaw and tongue forward) → Pushing your jaw forward stretches the soft tissue at the back of your throat and pulls your tongue away from the airway, which opens the passage so air flows through without blocking.
4. Positional therapy — wearing a device that keeps you sleeping on your side instead of your back → Sleeping on your back lets gravity pull your tongue and soft palate backward into the airway. Sleeping on your side keeps the airway open. This works if your pauses in breathing (apnea) happens mostly when you are on your back.
5. Uvulopalatopharyngoplasty (UPPP) — surgery that removes extra tissue from the soft palate, uvula, and throat to widen the airway → Removing loose, floppy tissue makes the airway passage bigger so it does not collapse as easily during sleep. This surgery works best if the blockage is in the throat rather than the nose or base of the tongue.

Your top priorities at the bedside

1. Check oxygen saturation with pulse oximetry every 4 hours and during sleep if the patient is admitted to the hospital. — why: Repeated apneas drop oxygen saturation below 90 percent and cause low oxygen in the blood (hypoxemia) (low blood oxygen) that damages the heart and brain; monitoring catches dangerous drops needing immediate intervention.
2. Keep the head of the bed elevated at least 30 degrees at all times. — why: Gravity pulls the tongue and soft palate (roof of mouth tissue) forward when the head is up, which keeps the airway more open and reduces the number of pauses in breathing (apnea) episodes.
3. Make sure the CPAP machine is set up correctly with a mask that seals without gaps and tubing that is not kinked. — why: Air leaks or blocked tubing drop the pressure inside the airway so it cannot splint (hold open) the floppy throat tissues, making CPAP useless and allowing apneas to continue.