An 85-year-old male with loud snoring noted during recent hospital admission for altered mental status was referred for a polysomnogram. Past medical history included suspected Alzheimer dementia, headaches, depression, and gastroesophageal reflux disease. Physical examination was notable for a Mallampati class II oral airway with erythematous soft palate and uvula.

His baseline polysomnogram showed obstructive sleep apnea (OSA) with an apnea-hypopnea index (AHI) of 37 events/h and minimum oxygen saturation of 78%. He was initially tried on an oronasal mask per patient preference. During continuous positive airway pressure (CPAP) titration, obstructive apneas persisted with a CPAP setting of 18 cmH2O. The patient was switched to a nasal mask and bilevel positive airway pressure (BPAP) for comfort. Obstructive apneas were controlled at BPAP 13/7 cmH2O (Figure 1). Supine position and total leak at 38–58 L/min were maintained with CPAP and BPAP settings. CPAP was not retested with the nasal mask. Although there was the concomitant change to BPAP, the nasal mask required significantly lower pressures (expiratory pressure of 7 cmH2O) compared with the oronasal mask (CPAP of 18 cmH2O) for control of obstructive apneas and hypopneas.

**QUESTION:** Why did the oronasal mask have a higher pressure requirement than the nasal mask for effective OSA treatment?

![Figure 1](https://dx.doi.org/10.5664/jcsm.7742)

**Figure 1—Epochs from the patient’s study.**

1-minute epochs from the patient’s titration study with continuous positive airway pressure of 14 cmH2O on oronasal mask (left), 18 cmH2O on oronasal mask (middle), and bilevel positive airway pressure of 13/7 cmH2O on nasal mask (right).
 versus oronasal mask.1–4 Most patients breathe through the nose while sleeping,5,6 with oronasal masks affecting obstruction.11 Studies have demonstrated an average of 1–2 cmH2O decrease in pressure requirements or lower residual AHI with a nasal versus oronasal mask.7–10 Most patients require higher pressures than nasal masks during a PAP titration study. Cheng H, Shelgikar AV. Oronasal masks result in increased inspiratory flow rate and jaw positioning with oronasal masks affecting obstruction.11

**DISCUSSION**

Studies have demonstrated an average of 1–2 cmH2O decrease in pressure requirements or lower residual AHI with a nasal versus oronasal mask.1–4 Most patients breathe through the nose while sleeping,5,6 consistent with findings showing oral airway resistance was more than double the nasal airway resistance during sleep despite oral airway resistance being lower during wakefulness.7 One hypothesis suggests that nasal masks increase the pressure gradient from the nasopharynx to the oral cavity, pushing the soft palate anteriorly. A study in 10 patients with OSA, done during wakefulness, found the amount of retropalatal airway opening was significantly less with oronasal compared to nasal mask; mask type did not affect the size of the retroglossal airway.8 Another hypothesis proposes the lower lip of the oronasal mask pushes the lower jaw and tongue posteriorly, increasing the propensity for obstruction. A study of 11 patients with OSA tested a nasal mask against an oronasal mask with and without a mandibular advancement device; oronasal masks required higher pressures than nasal masks but showed partial improvement with addition of an oral appliance.9 Other hypotheses include nasal airflow reflex resulting in increased inspiratory flow rate and jaw positioning with oronasal masks affecting obstruction.10

**SLEEP MEDICINE PEARLS**

1. Start initial titration studies with a nasal mask.
2. For patients requiring high pressures with an oronasal mask, consider trying a nasal mask in order to reduce the therapeutic pressure requirement.
3. Oronasal masks are advised for patients with significant nasal airway resistance, mouth venting despite chinstrap, and patients unable to tolerate nasal masks (especially at higher pressures).

**REFERENCES**


**DISCLOSURE STATEMENT**

The authors report no conflicts of interest.