FULL-FACE MASKS: A FULL CAN OF WORMS

By Thom Russell, RRT(Adv); PSGT

An otherwise healthy 46 year old male (BMI 24.6, neck circumference 40cm) with treated hypertension, and complaints of troublesome snoring was diagnosed by polysomnography (PSG) (details unknown) in the community with "severe" obstructive sleep apnea (OSA). Facial/cranial structure appear normal and without obvious retrognathic quality. The mandibular protrusive range is - 6mm + 6 mm from an edge to edge position. Body weight appeared normally distributed and there was no documented upper airway abnormality.

He was treated with interactive (auto) continuous positive airway pressure (CPAP). After briefly trying a conventional nasal interface he claimed to be unable to breathe through his nose. He was provided a full-face mask and based on the interactive data, converted to 12 cmH2O fixed pressure. He completed the trial however became disgruntled with the CPAP provider and obtained his own 60 series *Philips-Respironics* AUTO CPAP machine set to fixed pressure of 12 cmH2O from an Internet supplier. He kept the full-face mask he had been fitted with by the home care provider and purchased a variety of interfaces online.

Over the next two years he struggled to use CPAP successfully and ultimately was referred to a Respiratory/Sleep Specialist for investigation of OSA and respiratory symptoms related to his diaphragm and possible hiatal hernia. The patient claimed to become dizzy when breathing through his nose and was deemed a chronic mouth breather. The machine derived residual apnea–hypopnea index (AHI) was considered 'very high'.

Formal PSG was conducted for the purposes of CPAP titration. During the PSG the patient's own full-face mask proved problematic and was switched to a newer oral/nasal hybrid full-face mask, *Philips-Respironics* AmaraVIEW. Pressures were titrated from 9 to as high as 12 cmH2O with intermittent leak, persistent flow limitation and refractory AHI 9 - 11/hr. A positional component was identified. The head of the bed was elevated in order for the patient to tolerate the air pressure though there were complaints of aerophagia.

Post PSG the patient was prescribed interactive CPAP (8-16 cmH2O), maximum A-FLEX with an AmaraVIEW full-face mask. After several nights' adjustment, he continued to struggle with therapy. Both patient and wife were unhappy describing therapy as, "not working at all".

Given his current therapy was failing and in effort to "rescue" the patient he was brought in for review. Though struggling with CPAP, he demonstrated good adherence using CPAP: more than 90 percent of 31 nights, averaging over 5 hours with refractory machine detected AHI at 19/Hr and the 90th percentile at 13 cmH_2O.

Despite repeated claims by the patient of being unable to breathe through his nose, no oral breathing was observed while awake in the clinic. His voice did not have a nasal quality. When asked, he was able to voluntarily move air through his nose. Though somewhat restricted, the nasal passages appeared sufficiently patent to support airflow at rest as well as facilitate a reasonably unrestricted 'sniff maneuver'.

It was thought best to start over, from the beginning and the patient was encouraged to attempt using a simple nasal interface. While in the clinic, CPAP was reduced to 5 cmH_2O and applied to the patient. He was reassured, coached, and coaxed to breathe through his nose. The CPAP was disconnected and reconnected while the patient wore the mask so he could become familiar with the sensation of breathing against air pressure and build confidence.

The nasal interfaces he had collected over the years were reviewed. All were poor choices and improperly sized. He was fitted with an appropriate nasal interface.

Over the following weeks he got on to therapy well. Contrary to his belief, he discovered he was able to comfortably breathe through his nose. His wife was very pleased with the abolition of snoring and oral leak.

Over the following weeks, adherence with therapy proved excellent at 100 percent averaging near 6 ¼ hours nightly. The

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machine detected AHI at 5 per hr. with the 90th percentile at 7.5 cmH_2O. Additionally, the patient considered his abdominal (questionable hernia) difficulties improved.

DISCUSSION:

Full-face masks are obtrusive, and prone to leak. Risk of aerophagia and aspiration is increased, and full-face masks have been reported to be less effective than nasal masks. [1] In terms of CPAP compliance and comfort, comparative studies of CPAP interfaces consistently identify full-face mask limitations. [2-4]

Despite the literature, community CPAP providers, physicians, and sleep technologists are sometimes hasty to use full-face interfaces. Reasoning may include:

- Patient claims of being unable to breathe through their nose
- Prior uvulopalato reduction surgery
- Complaints of oral leak with nasal interface
- Inability to fit the patient with a conventional nasal interface.

This case illustrates the potential deleterious effect of full-face masks (including late model interfaces) specifically, excessive CPAP pressure requirements. With limited and conflicting reports [5-7] the phenomenon is not clearly understood. One theory is the full-face mask applies posterior pressure against the lower mandible causing retrusive positioning and reduced oropharyngeal patency. [8-9]

Identifying patients vulnerable to this problem has yet to be described. It is unknown how such patients may respond to mandibular advancement appliance treatment.

Another potential problem caused by full-face masks (not recognized or studied) is a "draft effect" caused by the placement of the vent. Most modern full-face masks integrate the vent into the mask itself, directly adjacent to the patient's nose. Continual airflow through the vent causes excessive drying and irritation of the nose and sinuses, despite supplemental heated humidity.

In conclusion, though full-face masks are warranted in select cases, technologists and physicians should be aware of potential difficulties and be prepared to re-evaluate patients experiencing difficulty.

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