

Multidisciplinary management of obstructive sleep apnea: Challenges and current perspective

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Introduction

Obstructive sleep apnea (OSA) is characterized by recurrent episodes of partial or complete airway obstruction during sleep associated with a decrease in oxyhemoglobin saturation leading to sleep disruption. This chronic interrupted sleep condition will eventually produce a collection of physiologic derangements. If it is left untreated, OSA can negatively affect the neurocognition leading to impaired concentration and memory, excessive daytime somnolence, and ultimately, increase the risk of cardiovascular morbidity (Kenderska *et al.*, 2014). The global prevalence of OSA in adults is estimated to be around 14% (Benjafeld *et al.*, 2019). Similarly in Malaysia, about 15% to 20% adults presented with OSA features including obesity, snoring, hypersomnolence and interrupted breathing during sleep (Kamil *et al.*, 2007)

There is a wide variety of pathophysiology between children and adults affected by this chronic condition. The most common predisposing factor is obesity. However, in recent years, there is a growing interest among sleep clinicians looking at the structural and functional deformities in the maxillofacial and pharyngeal region that

causes the collapsible airway during sleep (Senaratna *et al.*, 2017). Deformities in the function includes impaired pharyngeal dilator muscle and flaccid tongue (Eckert *et al.*, 2013). Whereas, anatomical deformities include retrognathic mandible, steep mandibular plane angle, narrow maxilla with a high arched palate, increased anterior facial height, and a short anterior cranial base (Kim *et al.*, 2015). If intervention is not initiated early in the growing patients, the likelihood to develop OSA in adult is intensified (Won *et al.*, 2019; Koca *et al.*, 2016).

Owing to its multifactorial pathophysiology and a heterogeneity in the presentation, early detection and screening is the responsibility of all clinicians including physicians and surgeons. Diagnosis of OSA should be made by highly trained and qualified respiratory physicians through polysomnography in a certified sleep facility (American Academy of Sleep Medicine, 2017). Nonetheless, dentists can play an important role in detecting OSA especially when it is associated with dentofacial deformities. Screening during routine dental consultation where features of lethargy, morning headaches, or dry mouth caused by mouth-breathing during sleep can be examined (Quan *et al.*, 2017). It is their

responsibility to arrange appropriate investigations and referrals to sleep clinicians for proper diagnosis, in addition to orthodontists and oral and maxillofacial surgeons for the correction of dentofacial deformity. Lateral cephalogram can also be used as a screening tool to assess the posterior airway space.

Treatment of OSA ideally involves clinicians with a multi-disciplinary background. Continuous positive airway pressure (CPAP) provided by respiratory physicians is conventionally the gold standard treatment. It has excellent treatment outcome in improving sleep quality. However, this mechanical device is not always tolerated by patients in long term. Advancement in minimally invasive sleep surgery has influenced the need and desire for the cure of OSA (MacKay *et al.*, 2020) where the role of surgery is aimed at restoring the anatomy and function of the hard and soft tissues of the upper airway.

The revised Stanford protocol on sleep surgery indicates that when there is evidence of severe OSA with failure of medical management and definite anatomic sites of obstruction, a stepwise approach to surgery should be implemented (Liu *et al.*, 2019). Patients with enlarged nasal turbinates and deviated nasal septum will benefit from nasal reconstructive surgery. Significant obstruction in the retropalatal region can be relieved by uvulopalatopharyngoplasty, or tonsillectomy. Whereas, the tongue base obstruction can be treated by tongue base reduction surgery or a genioglossus advancement surgery. A novel approach aiming at the tongue function is the hypoglossal nerve stimulation where electrical stimulation of the hypoglossal nerve will cause contraction of the genioglossus muscle and lead to opening of the airway (Olson *et al.*, 2021).

Despite all the surgical options, failure to surgery will eventually require a maxillomandibular advancement (MMA) surgery. In this surgery, the maxilla and the mandible is osteotomized from the cranial base, expanded and advanced by as much as

1cm in lateral and anterior direction, respectively. This movement leads to a marked opening of the posterior airway space and can successfully reduce the AHI to less than 5 (Giralt-Hernando *et al.*, 2019).

It is no doubt a challenge to manage obstructive sleep apnea owing to its heterogenous phenotypes. Understanding the different subgroups of OSA presentation is the primary role of all sleep clinicians in order to deliver a more personalized and tailored individual treatment. A multidisciplinary team approach plays a key role in the successful management of this chronic condition. Every specialty has the responsibility to bring their own expertise into integrating the holistic management. Without this, fragmentation of care will complicate the coordination of patient direction to other specialty clinic and leads to missed diagnosis and missed treatment. Therefore, it is prudent for the healthcare service provider to evolve into organizing a multidisciplinary sleep clinic in order to balance the bite, beauty, brain, and breathing for a sound mind and healthy body.

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