

## **Obstructive Sleep Apnea**

Obstructive sleep apnea (OSA) is a very common disorder.<sup>1 2</sup> It has been reported the OSA incidence in middle-aged people is 4% for men and 2% for women.<sup>2</sup> However, OSA is undiagnosed due to complex characterized by cessation or shallow breathing during sleep. The complete or partial collapse of upper airway causes episodes of obstructive sleep apnea. The respiratory results from sleep are associated with loud snoring, nocturnal awakening, daytime sleepiness and oxygen desaturations.

There are serious potential consequences to undiagnosed or untreated obstructive sleep apnea. It can lead and aggravate to high blood pressure, heart disease, stroke, diabetes and even result in early death.<sup>3 1</sup>

According to the prevalence of OSA risk in drivers, 26% of OSA patients was considered at high risk in a motor vehicle crash.<sup>4</sup> Diagnosed or undiagnosed OSA establishes a risk factor for motor vehicle accidents. Prevalence of OSA increases with coexisting medical conditions like – atrial fibrillation, stroke, congestive heart failure (CHF) and Chronic Obstructive Pulmonary Disease. Moderate or severe OSA should be treated due to significantly increased risk of other medical comorbidities if untreated.

The severity of OSA is usually determined by polysomnography (PSG) with apnea hypopnea index (AHI). If patients had been diagnosed with obstructive sleep apnea, and unfortunately, they could not have complied with continuous positive airway pressure (CPAP) or weight loss. Other considerations could be nonsurgical and surgical treatments which can be provided by our oral and maxillofacial surgery at UABMC.

## **Nonsurgical Treatment Options for Adult OSA**

### **Oral Appliance Therapy (OAT)**

Oral appliance (OA) is a mandibular repositioning appliance (MRA) which is designed to treat OSA. It is offered to enlarge the upper airway by advancing the lower jaw forwarded. It was reported the success rate of 54% to reduce apnea/hypopnea index to less than 10. (Review of oral appliances for treatment of sleep-disordered breathing.<sup>5 6</sup>

Although not as efficacious as CPAP therapy, oral appliance therapy (OAT) can be an acceptable alternative treatment for snoring, mild OSA, and even moderate OSA. Because of subsidiary efficacy, OAT may only be used as alternative therapy in patients with severe OSA after they have been given a trial of CPAP and failed.



### Surgical Treatment for Adult OSA

There are many surgical options for the treatment of OSA. The goal is to bypass the site of obstruction.

Uvulopalatopharyngoplasty (UPPP) is a common surgery. It consists of a reduction of the uvula and part of the soft palate. It decreases soft palate (retropalatal) obstruction but does not address tongue base obstruction. The success rate of UPPP alone is not high. Approximately 40-50% if surgical success is defined as 50% reduction in RDI and/or apnea index.<sup>7-10</sup>

Maxillomandibular advancement (MMA) is a procedure to open the airway in obstructive sleep apnea patients by moving both upper and lower jaws forward and addressing the airway obstruction behind the soft palate and tongue. It increases the retrolingual and retropalatal space (Figure 1). The region around the base of the tongue is the most increased space by MMA. MMA surgery helps sleep apnea patients breathe easier or take less effort to breathe.<sup>11,12</sup>

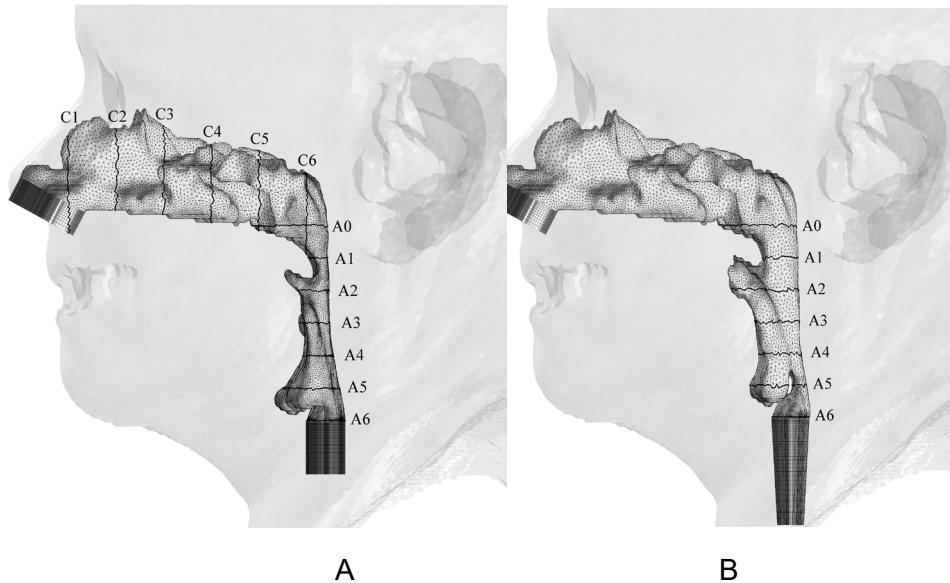


Figure 1: Comparing hybrid meshes of upper airway models in preoperative and postoperative MMA. Postoperative airway (B) at the retrolingual and retropalatal space is increased comparing with the preoperative one (A).

MMA is the most successful surgical procedure for OSA. It has been reported to be curative in 80% to 90% of patients.<sup>13-17</sup> It is second to tracheostomy. However, tracheostomy potentially causes some issues of social acceptance, communication, and integration.<sup>18,19</sup> Therefore, maxillomandibular advancement (MMA) is an alternative surgical option that is highly effective for treating patients with moderate and severe OSA.