Symposium 2

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Obstructive sleep apnea following mandibular setback

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Skeletal Class III malocclusion is corrected by a combination of orthognathic surgery and orthodontic treatment. Orthognathic surgery may affect not only soft and hard tissues in the maxillofacial region but also the upper airway. Narrowing of the posterior airway space (PAS) after mandibular setback surgery was implicated in the development of obstructive sleep apnea (OSA). Several studies on lateral cephalometric radiographs and cone-beam computed tomograph (CBCT) had indicated decreased PAS after mandibular setback with or without maxillary backward movement procedures and the changes were persistent for at least 1 year after surgery.

However, its potential role in OSA development is still much debated and another controversy is whether changes in airway space caused by the procedure are permanent. According to the recent systemic reviews, meta-analyses, clinical trials and cohort and case-control studies, the nasopharyngeal space does not undergo significant changes after either of the two surgical procedures. In the oropharynx and hypopharynx, none of the measurements changed significantly with maxillary advancement; however, persistent and significant decreases in the area, horizontal linear dimensions, and volume of these spaces are encountered after mandibular setback alone. No long-term changes in oximetric indices were found. Morphological changes are more pronounced following exclusively mandibular surgery. A decrease in the UA does take place but appears not to affect the patient's sleep quality. The postoperative findings for arterial oxygen saturation, the O2 desaturation index, and the apnea/hypopnea index show no long-term changes in ventilation. Consequently, there is no evidence to confirm that bimaxillary or mandibular orthognathic surgery predisposes to obstructive sleep apnea development.

Nevertheless, bimaxillary orthognathic surgeries including maxillary posterior movement procedures could result in narrowed upper airway and anatomic alterations at the retropalatal and retroglossal level caused a significant reduction of total upper airway volume. These could make snoring and obstructive sleep apnea in some subjects. The reduction in dimension at the retropalatal and retroglossal levels and total upper airway volume were more extensive in subjects who developed snoring and OSA following surgery. In particular, more increase of horizontal and vertical movements of maxilla or mandible were observed in class III malocclusion subjects developing snoring and apnea after orthognathic surgery, and a redundant uvula or soft palate was more often present in subjects with postoperative snoring and apnea. Therefore, operators have to reduce the amount of mandibular or maxillary setback in order to prevent the risk of sleep breathing disorder. In patients with moderate OSA, oropharyngeal exercises improved objective measurements of OSA severity and subjective measurements of snoring, daytime sleepiness, and sleep quality. These results suggest that this set of oropharyngeal exercises is one of the promising preventive treatments for the sleep breathing disorder - late complication of mandibular setback surgery.