



Surgical Management of Sleep Related Breathing Disorders *by Edward Zebovitz, DDS*

Airway surgery is a viable option when alternative treatments have been deemed intolerable, ineffective, or if the patient desires correction instead of management of the disease. Dentists are uniquely positioned with a varied skill set to address SRDB in the growing child to develop a normal airway and to manage adults with anatomic airflow restriction. Indications for surgical management include: targeting subjective and objective signs and symptoms, correcting underlying dentofacial deformities, addressing anatomic airflow restrictions, and redirecting airway-related compensations, such as forward head posture and jaw protrusion.

Addressing the airway restriction in the OSA patient requires careful diagnosis by means of direct clinical visualization of airway anatomy while awake or asleep (by drug induced sleep endoscopy) and imaging: CT, CBCT, MRI static and dynamic. Airway restriction can be the results of anatomic issues in any part of the upper airway and oral cavity – the craniofacial respiratory complex.

Airflow restrictions can be located anywhere between the nares and the larynx – including structures bounded by bone such as the piriform aperture and nasal airway, and soft-tissue-defined areas like the naso-, velo-, and oropharynx. If the palate is elon-

gated or the lymphoid tissues (adenoids and tonsils) are hypertrophied, the airway may be narrowed.

Oral cavity airflow restrictions can be related to constriction in available 3D volume for the tongue and the subsequent effects on the oropharynx. The size of the tongue is variable; while it can accommodate the surrounding structures, the available space for the tongue can be restricted by deformity of anatomic oral structures (e.g. palatal or lingual tori, ankyloglossia), narrow maxillary and/or mandibular arches, and deficiencies in the antero-posterior position of the mandible, maxilla, or combination of both.

Intranasal or oropharyngeal soft tissue airflow restrictions are typically referred to our otolaryngologist colleagues to address. Their typical procedures include: adenoidectomy, tonsillectomy and, less often, uvulopalatopharyngoplasty (UPPP). Other options include tongue base or epiglottal surgery, septoplasty, inferior nasal turbinoplasty, nasal valve stenting and palate-stiffening procedures.

Addressing the specific areas of oral airflow restriction related to width or transverse deficiencies can be addressed by techniques to expand the arches: there are three primary approaches for the adult SDB patient. First, expansion orthodontic mechanics by means


of traditional orthodontics or clear aligners. The magnitude of expansion is 1-5mm and limited by maintaining the roots within the alveolar housing. When the roots are close to the buccal or facial cortical plate, root dehiscence and gingival recession are potential complications. The second option, Surgical Facilitated Orthodontics (SFOT) or Periodontally Accelerated Osteogenic Orthodontics (PAOO), is ideal for expansion requirements of 5-8 mm. These involve surgical exposure of the alveolar process and cortical bone scoring of the alveolus, outlining the roots on buccal/facial or palatal/lingual aspect, or both, depending on the proposed vector of tooth movement desired, followed by augmentation with allogenic bone graft material and meticulous soft tissue closure. Early and forceful application of well controlled force vectors is required. A 12-week window of opportunity exists, labeled "regionally accelerated phenomena" (RAP). This procedure also allows for simultaneous connective tissue grafting for root coverage and addressing mucogingival issues. The 3rd option, micro-implant rapid maxillary expansion (MARPE), is indicated for expansion requirements in excess of 8mm and in cases with intact periodontal support. This approach utilizes 1.7mm diameter implants placed to engage palatal bone on both sides of the suture. Additional procedures include surgically assisted rapid palatal expansion (SARPE) which add palatal osteotomy, lateral maxillary wall osteotomies and pterygoid plate release to allow more 3D expansion of the maxilla.

The goal and results of these procedures allow for a more forward and relaxed tongue posture, less restricted nasal airflow and increased oropharyngeal size.

Surgical management of antero-posterior deficiencies are focused on anterior repositioning of the posterior nasal spine, which positions the velum, and the genial tubercle, which directly applies tension on the genio-glossus muscle. This tension results in antero-inferiorly positioning of the hyoid bone and advancement of the tongue base, which increases the posterior pharyngeal space in both antero-posterior and transverse dimensions – a true 3-dimensional enlargement. Decisions of the magnitude of genial tubercle advancement is based upon cephalometric and clinical evaluations to idealize facial proportions and maximize airflow. These

decisions are based on careful, detailed and educationally focused pre-operative consultations with the patient and the oral and maxillofacial surgeon. Additional decision making is influenced by idealizing the occlusion and determining if maxillary repositioning surgery is required to bring the palate forward, away from the posterior pharyngeal wall. If indicated, intranasal issues can be addressed simultaneously (e.g. septoplasty, turbinate reduction or piriform rim widening). This is advantageous in reducing the number of surgeries and recoveries. Maxillomandibular advancement (MMA) surgery differs from traditional two-jaw orthognathic surgery in magnitude and focus, with MMA surgery primarily focused on addressing airway related issues with a goal typically in excess of 10 mm of advancement.

Additional adjunctive airway procedures are available and can be utilized in isolation and in combination with MMA, genial tubercle, or hyoid suspension procedures. Precise assessment of structures, possible with CBCT, MRI and clinical measurements, allows the airway surgeon to maximize increases in posterior pharyngeal space.

In summary, surgical options can be performed with predictable results and should be considered for patients with anatomic issues who are younger, or any who wish to attempt correction of their airway and/or have failed conservative therapies to address OSA. Dentists and surgeons work together to help patients avoid the medical implications of untreated sleep related breathing disorders. 

The goals are a more forward tongue posture, less restricted nasal airflow and increased oropharyngeal size.



Edward Zebovitz, DDS, an accomplished oral surgeon by day, and generous humanitarian, dedicated husband, father and international citizen after hours. Making the most of his gifts and talents, Dr. Zebovitz is as comfortable practicing in his state-of-the-art office as he is in rural primitive facilities, serving the needy across the globe, and across the street. Since 2006, Dr. Zebovitz has served as Chief of Oral and Maxillofacial Surgery at Anne Arundel Medical Center in Annapolis, Maryland. He is certified by the American Board of Oral and Maxillofacial Surgery (ABOMS) and is a Fellow of the American Association of Oral and Maxillofacial Surgeons (AAOMS). Dr. Zebovitz' thriving practice, established in 2000, is located in Bowie, Maryland. He is quick to share his success with his loyal, gentle and patient centered staff.