Dear Alumni and Friends,

Airway is the new TMD! Has anyone noticed the similarity between orthodontics and airway that we went through with orthodontics and TMD? What I see is that a few charismatic, but ill-informed, dentists make unsubstantiated treatment claims. They convert ingenuous listeners who drink the Kool Aide and become disciples. A movement follows. Referral patterns alter. Years later, the quacks are exposed, cry persecution, and move on to new crusades. How do we deal with these patterns of misinformation? By conducting excellent scientific research to seek the truth and then apply this research in caring for our patients. In this issue, Dr. Marshall answers two questions addressing orthodontics and airway based upon current best scientific evidence.

Q: Does orthodontic treatment with premolar extractions cause or predispose an individual to sleep-related breathing disorders?

A: The best scientific evidence suggests that orthodontic treatment with premolar extractions, by and large, does not affect airway dimension and does not cause, nor predispose, an individual to obstructive sleep apnea. In cases where maximum retraction of anterior teeth is planned (similar to when planning mandibular setback surgery), airway function should be considered.

Currently there are 6 studies in the orthodontic literature that address the effect of extraction on airway size. Four of the studies find extraction of premolar teeth does not result in airway changes when evaluating airway volume using CBCT (3 studies) or airway linear dimensions on lateral cephalograms (1 study). Two studies evaluating the airway linear dimensions on lateral cephalograms found that premolar extraction with maximum retraction of anterior teeth results in reduced airway linear dimensions in the oropharynx. With respect to retraction of maxillary anterior teeth, two recent studies suggest use of cervical headgear in non-extraction treatment does not affect airway dimensions, and total distalization of the maxillary arch using a TAD-supported distalization appliance does not affect airway dimensions.

One study, which addresses the relationship of premolar extraction and obstructive sleep apnea (OSA), found no difference in the incidence of OSA in 2792 adults with previous extraction of 4 premolars, compared to 2792 adults matched for age, gender and BMI. This is the best evidence currently available that premolar extractions do not cause or predispose and individual to OSA.

It is important to note that no single cause of OSA has been identified. Airway dimension is one of multiple structural and physiologic factors considered risks for OSA. These include:

Structural:
- Retrognathic mandible
- Enlarged adenoids and tonsils
- Enlarged tongue

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Enlarged lateral pharyngeal walls
Obesity (enlarges lateral pharyngeal walls and posterior surface of the tongue)

Physiologic:
Collapsibility of the passive upper airway (low muscle tone)
Stability/instability of the overall ventilator control system
The arousal threshold to hypoxia and hypercapnia (excess blood CO2)
Reflex response to negative intraluminal pressure in the upper airway

The interplay of these factors in the pathogenesis of OSA is unknown.

Q: What is the orthodontist’s role in detecting and managing sleep-related breathing disorders?

A: The most important role of the orthodontist is recognizing airway problems and providing the appropriate physician referral.

A medical history questionnaire should include questions pertaining to potential risk factors.


The clinical exam should include an evaluation of risk factors:
- Craniofacial form
- Tonsils
- Space between soft palate and tongue
- Tongue size/form

If referral to a physician is warranted, include your list of patient risk factors in your communication to the physician.

References:
We eagerly await the arrival of our newest full-time faculty member, Dr. Shankar Rengasamy Venugopalan, in January 2019. Shankar will be joining us from UMKC where he serves as staff orthodontist and researcher. His research interests include craniofacial development, genetics/genomes, and mineralized tissue biology. In addition, he has worked to identify factors affecting clinical outcomes in patients hospitalized for cleft lip/palate repair and orthognathic surgeries. We look forward to the knowledge and experience Dr. Venugopalan brings to the University of Iowa Orthodontic program.

Dr. Venugopalan’s Degrees:
2016 – 2017 UMKC School of Dentistry, Kansas City, MO
  Doctor of Dental Surgery (D.D.S)
2010 – 2014 Harvard School of Dental Medicine, Boston, MA
  Certificate in Orthodontics and Dentofacial Orthopedics
2010 – 2014 Harvard University, Boston, MA
  Doctor of Medical Science (D.M.Sc) in Oral Biology
2005 – 2010 Texas A&M University Health Science Center
  Baylor College of Dentistry, Dallas, TX
  Doctor of Philosophy (Ph.D.) in Biomedical Sciences
1998 – 2003 The Tamil Nadu Dr.MGR Medical University, Chennai, India
  Bachelor of Dental Surgery (B.D.S)

Post–Doctoral Training:
2011 – 2014 Forsyth Institute, Cambridge, MA
  Research Scholar in Dr. Henry Margolis Laboratory
2010 – 2014 Harvard School of Dental Medicine, Boston, MA
  Residency in Orthodontics

Alumni News

Chris Carlson (Class of 2003) and family in Scandinavia for two weeks.