NON-SURGICAL, UPPER AIRWAY REMODELING FOR OBSTRUCTIVE SLEEP APNEA IN ADULTS WITH CRANIOFACIAL DEFICIENCIES

Cortes M\textsuperscript{1}, Wallace-Nadolski ME\textsuperscript{2}, Singh D\textsuperscript{3}

\textsuperscript{1}Cortes advanced Dentistry, New York, NY, \textsuperscript{2}Clinilabs/Sleep Disorders Institute, Clinilabs/Sleep Disorders Institute, NY, \textsuperscript{3}BioModeling Solutions, Inc., BioModeling Solutions, Inc., OR

Introduction: Obstructive Sleep Apnea (OSA) is the most common form of sleep disordered breathing. The causes of OSA vary, and include decreased pharyngeal muscle tone, craniofacial obesity, and craniofacial deficiencies amongst others. Current methods used to manage these characteristics include continuous positive airway pressure (CPAP) therapy and/or mandibular advancement appliances. However, both of these methods are life-long therapies, which may not be appealing to certain patients. Therefore, the aim of this study is to test the hypothesis that biomimetic oral appliance therapy (BOAT) can be used in patients who have craniofacial deficiencies for upper airway expansion to provide optimal functioning and reduce the need for life-long therapy.

Methods: This pilot study included 3 adults: 1 female and 2 males (mean age 40yrs.) diagnosed with mild to moderate OSA who were treated with FDA-cleared BOAT (mRNA appliance\textregistered). Prior to the treatment the craniofacial region was imaged using 3D cone-beam CT scans. After 22 months of treatment, the apnea hypopnea index (AHI) of each study subject was reassessed, without the appliance in the mouth during sleep, by means of a home sleep study (HST). In addition, the upper airway volume was reassessed by follow-up 3D cone-beam CT scans and upper airway analysis.

Results: For case 1, the mean AHI decreased from 11hr-1 to 7hr-1. Simultaneously, the upper airway volume (from the posterior nasal spine to the epiglottis) prior to treatment was 9.28cm\textsuperscript{3} and increased to 15.9cm\textsuperscript{3}, representing a 42% increase in upper airway volume. For case 2, the AHI decreased from 22.2hr-1 pre-treatment to 12hr-1 post-treatment, while the upper airway volume increased from 16.7cm\textsuperscript{3} prior to treatment to 20.5cm\textsuperscript{3} post-treatment, showing a 19% increase in upper airway volume. For case 3, the mean AHI decreased from 27hr-1 to 7hr-1. The upper airway volume prior to treatment was 19.7cm\textsuperscript{3} and increased to 25cm\textsuperscript{3} representing 27.3% increase in the upper airway volume.

Conclusion: This preliminary study putatively suggests that decreases in AHI maybe associated with non-surgical, upper airway remodeling for obstructive sleep apnea in adults with craniofacial deficiencies.