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making for improved postoperative outcomes. Additional patients are needed to confirm these findings.

Is Narrow Maxilla Associated with Complete Concentric Collapse?

Mariane Sayuri Yui, MD (presenter); Eric Rodrigues Thuler, MD; Stanley Yung-Chuan Liu, MD, DDS

Objectives: Complete concentric collapse (CCC) of the velum from drug-induced sleep endoscopy (DISE) is a key finding in sleep surgical selection, particularly for upper airway stimulation. We aimed to correlate facial computed tomography (CT) morphometric measurements with CCC of the velum to locate at-risk anatomic regions of the upper airway.

Methods: This was a retrospective case-control study at university medical centers. Subjects with obstructive sleep apnea (OSA) who underwent DISE and facial CT were selected from Stanford University and Hospital Alemão Oswaldo Cruz (Sao Paulo, Brazil). DISE was rated with the VOTE classification (velum, oropharynx, tongue, epiglottis). Morphometric measures of the maxilla and mandible were compared between subjects with and without concentric collapse of the velum.

Results: A total of 138 subjects met the inclusion criteria. Ninety-nine subjects had nonconcentric velum collapse (12 women, 87 men), and 39 had concentric velum collapse (3 women, 36 men). The nonconcentric group had a mean age of 36.9 ± 11.8 years, a mean body mass index (BMI) of 26.1 ± 4.4 kg/m², and mean Apnea-Hypopnea Index (AHI) of 21.8 ± 19.9 events/h. The mean values for age, BMI, and AHI of the concentric group were 38.9 ± 11.8 years, 26.1 ± 4.4 kg/m², and 21.8 ± 19.9 events/h, respectively. No differences were seen in measurements such as sella-nasion-A point (SNA) or sella-nasion-B point (SNB). After multivariate analysis, the width of the nasal floor, corresponding to the palatal width at the internal nasal valve level, was significantly different between the 2 groups ($P = .01$).

Conclusion: Narrow nasal floor width, corresponding to the palatal width skeletally, may be associated with increased risk of CCC.

Long-term Efficacy and Potential Predictors of Uvulopalatopharyngoplasty in Adult Patients with Obstructive Sleep Apnea: A Systematic Review and Meta-analysis

Mu He (presenter); Jingying Ye, MD; Guoping Yin

Objectives: To determine the long-term efficacy and potential predictors of uvulopalatopharyngoplasty (UPPP) in patients with obstructive sleep apnea (OSA).

Methods: PubMed/Medline, Embase, Web of Science, and the Cochrane Library were systematically searched from August 1, 2017, to December 12, 2017. Full-text articles were selected that studied adult patients who underwent phase I UPPP alone or combined with other surgery for OSA and had a long-term follow-up (≥ 34 months) with objective sleep

study results. Studies that had no objective outcomes or that performed maxillomandibular advancement or previous surgery for OSA were excluded.

Results: We included 23 of 2579 studies. Meta-analyses comparing preoperative and long-term postoperative outcomes including Apnea-Hypopnea Index, Respiratory Disturbance Index, lowest oxygen saturation (LOS), Oxygen Desaturation Index (ODI), Apnea Index (AI), and proportion of sleep time with an oxygen saturation $< 90\%$ (CT90) showed significant improvement. Meta-analysis of long-term surgical effective rate revealed an effectiveness of 58.89% (95% confidence interval [CI] 49.73%-67.74%, Q statistic $P < .0001$, $I^2 = 82\%$) for UPPP \pm other surgery and 43.722% (95% CI 36.337%-51.249%, Q statistic $P = .33$, $I^2 = 13\%$) for UPPP alone. Subanalysis of individual patient data showed significant associations between preoperative AI, ODI, LOS, and CT90 and long-term surgical effectiveness.

Conclusions: This study demonstrated long-term efficacy of UPPP in OSA adults and possible predictors.

Neutrophil/Lymphocyte and Platelet/Lymphocyte Ratios before and after Obstructive Sleep Apnea Surgery

Hsin-Ching Lin, MD, FACS (presenter); Michael Friedman, MD



Objectives: Neutrophil-to-lymphocyte (N/L) ratio and platelet-to-lymphocyte (P/L) ratio are strongly associated with severity of obstructive sleep apnea (OSA) and cardiovascular disease in OSA patients. This study investigated the changes in the N/L and P/L ratios in OSA patients before and after OSA surgery.

Methods: Patients with OSA who failed continuous positive airway pressure therapy and underwent upper airway surgery were enrolled. We retrospectively collected N/L and P/L ratios before and after OSA surgery. Paired t test was used to compare the changes in N/L and P/L ratios.

Results: A total of 176 OSA patients (149 men, 27 women; mean age 42.9 years; mean Apnea-Hypopnea Index [AHI] 43.1) were enrolled to assess the outcomes. AHI significantly improved postoperatively. The overall N/L and P/L ratios decreased significantly before and after OSA surgery: N/L 1.85 ± 0.83 to 1.65 ± 0.63 , $P = .0004$; P/L 7.84 ± 3.2 to 6.92 ± 2.64 , $P < .0001$.

Conclusions: This study demonstrated that surgical modifications of the upper airways for patients with OSA can improve not only AHI but also N/L and P/L ratios.

New App “Apnea Bye” Increases Adherence in Myofunctional Therapy to Treat Sleep Disorder Breathing

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Objectives: Myofunctional therapy is a therapeutic option to treat sleep disorder breathing (SDB). Most publications do not

refer to the adherence of patients to this treatment. We designed a study in which 2 groups of patients suffering from obstructive sleep apnea syndrome were randomized and assigned to 2 different ways of receiving myofunctional therapy: 1 group consisted of 18 patients with diagrams and videos and in the other group were 10 patients using a new app called “Apnea Bye.”

Methods: A total of 28 patients were recruited. Eighteen patients underwent conventional myofunctional therapy with books and didactic videos with a consultation with our physiotherapist. Ten patients had a consultation with the physiotherapist and a new app was installed on their phones. In both groups, exercises were to be performed half an hour a day for 3 months, at least 5 days a week. All patients were evaluated by age, IMC, visual analog scale (VAS), IAH pre and post, and finally to adherence to treatment.

Results: In the first group, 5 women and 13 men were included. Their mean age was 41.8 years, body mass index (BMI) pre was 23.5 ± 1.95 , BMI post was 23.8 ± 2.28 , and 30% showed adherence to treatment. In the conventional therapy group, the IAH changed from 23.9 ± 9.9 to 18.23 ± 8.03 ($P = .0023$); The VAS score changed from 8.8 ± 0.47 to 5.7 ± 0.29 ($P = .0001$). In the app group, 8 men and 2 women were included. Their mean age was 28.5 years, BMI pre was 24.41 ± 3.07 , BMI post was 24.2 ± 3.31 , IAH pre was 16.3 ± 2.5 , IAH post was 12.8 ± 3.8 , and VAS changed from 8.9 ± 0.8 to 5.8 ± 0.9 . Ninety percent showed adherence to treatment.

Conclusions: The new phone app, Apnea Bye, could be a useful tool to treat SDB, eliciting better adherence to treatment compared with conventional myofunctional therapy.

Patient-Reported Side Effects of Upper Airway Stimulation in the Treatment of Obstructive Sleep Apnea

Benedikt Hofauer, MD (presenter); Armin Steffen, MD; Andreas Knopf, PhD; Katrin Hasselbacher, MD; Clemens Heiser, MD

Objectives: In large studies on the adherence to continuous positive airway pressure therapy, the current standard in the treatment of obstructive sleep apnea (OSA), low values have been reported. The aim of this study was to analyze adherence of patients with OSA to the new treatment modality of upper airway stimulation (UAS) and to identify possible reasons for nonadherence.

Methods: Patients from 2 German implantation centers were included. Besides the collection of demographic data and measurement of parameters for the severity of OSA, patients answered a questionnaire on subjective sensation of the stimulation, use of different functions, side effects, and an inventory for the description of their attitude toward UAS. The daily use of UAS was evaluated by analysis of the implanted pulse generator.

Results: We included 106 patients in the study. Analysis of the IPG resulted in an average nightly usage of 5.7 hours. Patients

reported that they used UAS on on 6.8 nights/wk. The attitude toward UAS treatment resulted in strong agreement toward the statement “UAS reduces the problems caused by my sleep apnea.” Information on side effects of the neurostimulation as well as qualities of utilization could be gathered.

Conclusions: This investigation of UAS therapy in patients with OSA revealed high adherence to therapy. The reported adherence did not differ during the observation period, and neither the Apnea-Hypopnea Index, Oxygen Desaturation Index, nor Epworth Sleepiness Scale seemed to have an influence on adherence. Patients expressed a positive attitude toward UAS.

Preliminary Assessment of Maxillo-Mandibular Advancement for Patients with Down Syndrome and Refractory Obstructive Sleep Apnea

Mathieu Bergeron, MD (presenter); Brian Pan, MD; Haithem Elhadi Babiker, MD; Stacey L. Ishman, MD, MPH

Objectives: While maxillo-mandibular advancement (MMA) is reported to be more than 90% effective in treating obstructive sleep apnea (OSA), there are no reports of its use for children or adults with Down syndrome (DS). Our aim was to determine the effectiveness and safety of MMA for patients with DS and OSA.

Methods: Case series of all patients with DS and OSA who underwent MMA with polysomnographic data at a single institution.

Results: We identified 5 patients (4 males) with a mean age of 20.9 years (95% confidence interval [CI]: 14.5-22.7) and a body mass index (BMI) percentile of 88.5 (95% CI: 77.5-99.5). Before MMA, the mean Apnea-Hypopnea Index (AHI) was 41.6 events/h (95% CI: 0.7-82.7) and the mean obstructive AHI (oAHI) was 38.9 events/h (95% CI: 2.9-74.9), with 2 patients with a final oAHI <5 events/h. After MMA, AHI improved to 21.4 events/h (95% CI: 8.4-34.4, $P = .34$), and the oAHI improved to 17.9 events/h (95% CI: 0-37.9, $P = .36$). Oxygen saturation nadir improved from 83.5% to 88.7% (95% CI: 80.5-86.5, $P = .89$). Sleep efficiency, arousal index, and total time spent with a CO_2 greater than 50 mm Hg stayed similar before and after surgery. One case was complicated by upper airway edema, requiring a tracheostomy another day.

Conclusions: This is the first report to evaluate MMA for patients with DS and OSA. All had a significant improvement in oAHI and other sleep parameters, although this change was not statistically significant.

Prevalence of Otolaryngology-Related Diseases in Patients with Obstructive Sleep Apnea

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Objectives: To investigate the prevalence of otolaryngology-related diseases in patients with diagnosed obstructive sleep apnea (OSA).