

Background Oculo-orbital disproportion in patients with craniosynostosis have similarities and dissimilarities between syndromic and nonsyndromic cases. We hypothesize these two conditions have specific individual influences as it relates to development of the orbital and periorbital skeletons.

Method A total of 133 preoperative CT scans (nonsyndromic bicoronal synostosis, n=38; Apert syndrome bicoronal synostosis subtype, n=33; Crouzon syndrome bicoronal synostosis subtype, n=10; controls, n=52) were included. Craniometric and volumetric analyses related to the orbit and periorbital anatomy were performed.

Results The orbital cavity volume is mildly restricted in nonsyndromic bicoronal synostosis (7%, $p=0.147$), but more so in Apert and Crouzon syndromes, 17% ($p=0.002$) and 21% ($p=0.005$), respectively. The sphenoid side angle in Apert syndrome is wider than when compared to Crouzon syndrome ($p=0.043$). The ethmoid side angle in Apert patients however is narrower ($p=0.066$) than that in Crouzon patients. Maxilla anteroposterior length is more restricted in Apert syndrome than Crouzon syndrome (21%, $p=0.003$) and nonsyndromic cases (26%, $p<0.001$). The posterior nasal spine position is retruded in Crouzon syndrome (39%, $p<0.001$), yet the anterior nasal spine position is similar in Apert and Crouzon syndromes.

Conclusion Orbit and periorbital malformation in syndromic craniosynostosis is likely the combined influence of syndromic influences and premature suture fusion. Apert syndrome expands the anteriorly contoured lateral orbital wall associated with bicoronal synostosis, while Crouzon syndrome has more infraorbital rim retrusion, resulting in more severe exorbitism. Apert syndrome develops maxillary hypoplasia, in addition to the maxillary retrusion, observed in Crouzon syndrome and nonsyndromic bicoronal synostosis patients.

QS4

A Quantitative Analysis Of The Upper Airway Volume In Patients With Attention Deficit Hyperactivity Disorder: A Cone-Beam Computed Tomography Study

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Purpose: Attention deficit hyperactivity disorder (ADHD) is a developmental disorder affecting the quality of life. The etiology of ADHD is unclear, yet it has been believed to be multifactorial. The aim of this Cone-beam computed tomography (CBCT) study was to assess the upper airway morphology in adolescents with ADHD compared to controls.

Methods: A total of 454 patients who had CBCT taken as part of their initial orthodontic records were reviewed for eligibility. 87 subjects were included in the study. CBCTs volumes were utilized for three-dimensional evaluation of volumetric, minimum cross-section area and linear measurements of the upper airway in different planes. Two sample T-test and Man-Whitney U test were used to calculate and compare the mean values of the airway measurements between ADHD and control groups.

Results: There were significant differences in airway widths at planes A ($p=0.002$), C ($p=0.042$) and D ($p<0.001$), and in airway area at plane D (lower hypopharynx) ($p<0.001$), with the ADHD group showing narrower widths and area compared to controls. The mean overall airway volume in the ADHA group was smaller than in the control group but the difference was not significant.

Conclusion: ADHD-affected adolescents have narrower upper airway dimensions compared to controls. Further investigations with larger samples are warranted to further elucidate the relationship between sleep-disordered breathing and ADHD.

QS5

Pharyngoplasty Is Associated With Long-term Sleep-related Impairment In Patients With Cleft Palate

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Purpose: Velopharyngeal insufficiency (VPI) occurs in approximately 11-50% of patients born with cleft palate (CP). Correction of VPI with pharyngoplasty decreases the size of the nasopharyngeal airway, increasing the risk of obstructive sleep apnea (OSA) symptoms, which leads to port-revision in 2-3% of cases. While previous studies have examined the short-term effect of pharyngoplasty on OSA symptoms within a five-year postoperative period, the long-term impact of pharyngoplasty is unknown. Polysomnograms are the gold standard for diagnosis of OSA, but they are not cost-effective and are resource-limited for screening. Thus, we aimed to utilize validated patient-reported outcomes measures (PROMs) to examine the effect of pharyngoplasty on long-term OSA symptoms among patients with CP who are over the age of 14 years.

Methods: Patients over the age of 14 years with cleft palate were enrolled from the craniofacial clinics at the University of California, Los Angeles and the Cleft Palate Program at the Orthopaedic Institute for Children. 53 patients were prospectively administered the Patient Reported Outcomes Measurement Information Systems (PROMIS) pediatric version 1.0, sleep-related impairment short form 4a. Retrospective chart review was conducted to collect patient demographic, surgical, and past medical data. PROMIS measures were compared between patients with and without sphincter pharyngoplasty and other potential medical or surgical risk factors of sleep-related impairment, using independent sample *t* tests. Correlation between PROMIS measures and patient demographics was measured using Pearson's correlation coefficient.

Results: Overall, 53 CP patients (mean age: 21.1 ± 4.5 years, 26 males) over the age of 14 were administered the PROMIS short form. 26 patients (49.1%) were diagnosed with VPI and 20 patients (37.7%) underwent pharyngoplasty. CP patients with history of pharyngoplasty showed significantly increased levels of sleep-related impairment compared to patients who had not undergone pharyngoplasty ($p = 0.01$). No significant differences were found between patients with and without other potential surgical risk factors, including distraction, hyoid advancement, Le

Fort advancement, or septorhinoplasty. Similarly, PROMIS measures did not significantly differ among patients with or without other potential contributing medical risk factors, including preterm birth, congenital cardiac condition, reactive airways disease, or depression. In addition, PROMIS measures did not significantly correlate with BMI values.

Conclusions: Pharyngoplasty among patients with CP is associated with increased sleep-related impairment, even after the age of 14 years. While pharyngoplasty cannot be considered causal of long-term OSA, our current study suggests that increased vigilance in long-term validated, quantitative sleep screening may be necessary for patients who have undergone pharyngoplasty with potential considerations for intervention.

QS6

Developing The Psychosocial Growth Chart: Prospective Longitudinal Psychosocial Functioning Of Children With Craniofacial Anomalies

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Background: While improvement in quality of life has long been the ultimate goal in the care of children born with craniofacial anomalies, the intersection between surgical care and psychosocial functioning has not been well understood. A major reason for this discrepancy is the lack of consistent, systematic, validated, and quantitative assessments of psychosocial functioning incorporated as standard of care. Traditional screening within multi-disciplinary teams has relied upon qualitative evaluations by pediatricians, social workers, and psychologists. However, qualitative exams do not allow for the comparison of psychosocial outcomes accurately over time. One of the first steps in establishing psychosocial functioning as a measured health outcome in children with craniofacial anomalies is to chart their typical psychosocial development longitudinally. Our group