Abstract

**Introduction:** Obstructive Sleep Apnea (OSA) is common in children and risk factors include adenotonsillar hypertrophy, obesity, and genetic conditions with craniofacial abnormalities such as Down Syndrome (DS). Our primary study aim was to describe the craniofacial morphology in children with suspected OSA referred for polysomnography (PSG) in 2 cohorts: DS and obesity. The secondary aim was to identify clinical and/or cephalometric predictors of OSA in these two cohorts.

**Methods:** This was a cross-sectional study of children with DS or obesity referred for PSG at The Hospital for Sick Children, Toronto. An orthodontic examination, PSG, lateral cephalogram, and sleep questionnaires were completed. OSA was defined as a PSG determined Obstructive Apnea Hypopnea Index (OAH) > 1 event/hour.

**Results:** The sample included 42 children (20 DS, 22 obese) aged 5-18 years (mean = 11.9 ± 3.6 years). The prevalence of OSA was 85% in the DS group and 63.6% in the Obesity group (p = 0.12). The DS group with OSA had increased palatal depth (p = 0.04); OAH score was correlated with intercanine distance (r = 0.48, p = 0.03). ANB angle was increased in the
Obesity group with OSA (p = 0.03); OAHI scores were correlated with ANB angle (r = 0.58, p < 0.01) and upper incisor retrusion (r = -0.53, p = 0.01).

**Conclusions:** Based on our results, OSA in children with DS is associated with maxillary dimensions. Upper incisor position and maxillo-mandibular relationships are associated with OSA in children with Obesity.