ARTICLES FROM CURRENT ORTHODONTIC LITERATURE, SELECTED AND REVIEWED BY: RESIDENTS, DEPARTMENT OF ORTHODONTICS, UNIVERSITY OF OKLAHOMA, OKLAHOMA CITY

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Prevalence of malocclusion in children with obstructive sleep apnea

Galeotti A, Festa P, Viarani V, et al. Prevalence of malocclusion in children with obstructive sleep apnoea. Orthod Craniofac Res 2018;21:242-7.

Obstructive sleep apnea (OSA) and the airway are the focus of multiple research projects and discussions in the current orthodontic environment. This prospective study aimed to identify specific aspects of malocclusion that could be used in the initial examination to identify patients at risk for OSA. This study from Rome, Italy, in 2016 involved a population of children ranging in age from 2 to 10 years. The final sample evaluated 139 children diagnosed with OSA and a control group of 137 children. Patients with a history of adenoidectomy/tonsillectomy were excluded from the study. An orthodontist, blinded to the study protocol, examined all of the patients and recorded the same occlusal variables for each patient. They included primary canine relationship, presence of posterior crossbite, overjet (mm), and overbite (mm). Other data collected included age, sex, body mass index, and the presence of allergies. The patients were further divided to allow for multivariable logistic regression models to assess independent variables associated with OSA with age <6 years (n = 204) versus age ≥ 6 years (n = 72). The subgroup ≥ 6 years of age was too small to conduct a multivariable logistic regression analysis. When comparing OSA children with the control group, the authors found statistically significant differences for the presence of malocclusion, presence of posterior crossbite, increased overjet, and decreased overbite (P <0.001). This study supports the concept that early orthodontic evaluation is pertinent not only for dental benefits, but also for the overall health of the patient.

Reviewed by: Avery Gil

Does headgear treatment in young children affect the maxillary canine eruption path?

Hadler-Olsen S, Pirttiniemi P, Kerosuo H, et al. Does headgear treatment in young children affect the maxillary canine eruption path? Eur J Orthod 2018;40:583-91.

This study aimed to test whether early facebow headgear treatment and space conditions in the dental arch affect the eruption pathway of the permanent maxillary canines in children aged 7-8 years with early transitional dentition. Data from 2 randomized controlled trials were summarized. The investigation included a total of 99 children with Angle Class II or a cusp-to-cusp malocclusion. The long outer bows of the headgear were bent 10 degrees upward in relation to the inner bows, which were expanded 5-10 mm in relation to the maxillary first molars. A mean force of 400-700 g was applied 8-10 hours per night. Digital 3-dimensional models and panoramic radiographs were taken before (T0) and after (T1) treatment, and changes in the maxillary canine eruption angle and interdental spaces were measured at T0 and T1. The authors concluded that early headgear treatment in children with Angle Class II malocclusion may improve the eruption pattern of permanent maxillary canines to a more vertical direction. This effect, however, was more pronounced in children with spaced dental arches compared with those with crowded dental arches as estimated by means of the mixed dentition analysis of Moyers. The relatively young age of the subjects could be considered to be too early to detect or predict any future ectopic eruption. Although the use of panoramic radiographs allow for analysis of canine positions in 2 planes of space, this could be considered a limitation of the study. Future studies using 3-dimensional cone-beam computed tomography technology to assess changes in canine angulation in 3 planes of space are warranted.

Reviewed by: Rachel Soyland

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Cervical vertebral maturation method and mandibular growth peak: A longitudinal study of diagnostic reliability

Perinetti G, Primozic J, Sharma B, Cioffi I, Contardo L. Cervical vertebral maturation method and mandibular growth peak: a longitudinal study of diagnostic reliability. Eur J Orthod 2018;40:666-72.

The ability to accurately predict the mandibular growth peak, especially in skeletal Class II malocclusions, has the potential to greatly enhance the efficiency of orthodontic treatment. Hand-wrist radiographs, the third middle finger phalanx, and the cervical vertebral maturation (CVM) are commonly used methods for this prediction. The purpose of this study was to determine the diagnostic reliability of the CVM stages 2, 3, and 4 in the 6-stage CVM method for identification of the mandibular growth peak. The authors selected 50 cases (26 female and 24 male) from the Oregon and Burlington Growth Studies, in which data was originally collected from the 1950s to the 1970s. Selection was based on having a series of lateral cephalograms from ages 9 to 16 years with cervical vertebrae clearly visible on all films. These lateral cephalograms were used to assess CVM stages by determining the presence or absence of concavity and shape of cervical vertebrae 2, 3, and 4. They were also used to assess mandibular growth peak by recording the annualized incremental linear increase between condylion (Co) and gnathion (Gn). Results showed that CVM stages 3 and 4 taken together were unable to identify more than 56% of the mandibular growth peaks, which contradicts the 2016 study by Perinetti et al that showed a diagnostic accuracy of 67-91% in predicting imminent growth peaks. In several cases, very early or late peaks in mandibular growth were observed. The authors concluded that the diagnostic reliability of CVM stages was not satisfactory in identification of imminent mandibular growth peaks. In addition, the authors reported that the duration of the stages was unpredictable, and in some cases a jump of 1 or 2 stages was observed, which could further limit clinical application of the method.

Reviewed by Kramer Sherman

Panoramic radiographs and interceptive extraction for impacted canines

Naoumova J, Kjellberg H. The use of panoramic radiographs to decide when interceptive extraction is beneficial in children with palatally displaced canines based on a randomized clinical trial. Eur J Orthod 2018;40:565-74.

Early diagnosis of palatally displaced permanent canines (PDCs) and subsequent interceptive extraction of the primary canines by the age of 10-13 years have been previously demonstrated to be beneficial. The aim of this prospective clinical trial was to determine whether predictors could be identified on a panoramic radiograph (PAN) to indicate whether interceptive extraction of the primary canines would be advantageous for patients in the transitional dentition with unilateral or bilateral PDCs. Sixty-seven patients (40 girls, 27 boys) with unilateral (45) or bilateral (22) PDCs were randomly assigned to the extraction or nonextraction group. Clinical examinations and PANs were recorded at baseline, after 6 months (T1), and after 12 months (T2). Results indicated that both the alpha angle and sector measurements, previously described by Ericson and Kurol (1988), are good predictors of spontaneous PDC eruption. The alpha angle is formed by the long axis of the canine and the midline. Sectors are designated by the mesiodistal crown position of the canine relative to erupted anterior teeth (sector 1, primary canine; sectors 2 and 3, permanent lateral incisor; sectors 4 and 5, permanent central incisor). Extraction is recommended for PDCs with an alpha angle of 20-30° located in sectors 2 and 3. For PDCs located in sector 2 with an alpha angle of $<20°$, extraction is typically unnecessary. In severe cases (alpha angle $>30°$, located in sector 4), surgical exposure, extraction of the primary canines, and orthodontic treatment are indicated. Notably, almost 80% of patients with PDCs presented with other dental malformations (ectopic eruption, agenesis of premolars, small lateral incisors, and invaginations), which may be useful as early clinical predictors of PDCs.

Reviewed by Benjamin Schneider