Three-dimensional airway volumes and most constricted areas in children

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Abstract

Objective: The objectives of this retrospective study using cone beam computed tomography (CBCT) were to determine if there are differences in the volume of various airway segments and the most constricted area (MCA) of children with different dentoskeletal patterns.

Methods: The initial CBCTs of 83 orthodontic patients (30 Angle's Class I; 26 Class II; and 27 Class III) were collected from a private orthodontic office. Following reliability studies, various parameters of the craniofacial complex, airway volume, and MCA were measured utilizing Dolphin 3D software. Comparisons among the three dental and the skeletal malocclusion classes were performed using one-way ANOVA and Fishers Protected Least Significant. Associations of the airway volumes and the MCA with other parameters were determined using correlation coefficients, accepting $p \leq 0.05$ as significant for all tests.

Results: Maxillary right sinus volume was the only airway segment showing significant difference among different dental classes. Maxillary sinus volume also correlated moderately with anterior facial height and mandibular length. No significant differences were found between the MCA and different dentoskeletal classifications.

Conclusions: The only significant difference in airway parameters among the dentoskeletal classes was that the dental Class II subjects had greater right sinus volume than the other classes. Shorter anterior facial height or mandibular length could be indicators for decreased airway volume in children.