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Title: Stress analysis of unilateral cleft palate using a three dimensional finite element model of pediatric subject-specific maxilla

Abstract:
For children with cleft palate, oral function is impaired. The hypothesis is that the stress and strain distribution within the affected maxilla with a cleft during functional tasks such as biting and chewing is abnormal and can significantly affect bone development in the growing child. To test this hypothesis, a three-dimensional finite element model of a pediatric subject-specific maxilla with and without unilateral cleft palate was established based upon pediatric subject-specific bony geometry. The stress and strain distribution of the maxillary alveolar region subjected to typical functional loads was analyzed. The preliminary results revealed that both Von Mises stress and maximum principle stress as well as principle strain distribution were unevenly distributed between the hemi-maxillae.

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