Lateral Incisor Agenesis Predicts Maxillary Hypoplasia and Le Fort I Advancement Surgery in Cleft Patients

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Purpose: Maxillary dental agenesis in cleft patients frequently correlates to orthognathic surgery at skeletal maturity due to both intrinsic growth deficiencies and iatrogenic compensatory maneuvers. In this work, we investigate anatomic deficiencies in dentition in predicting Le Fort I advancement and maxillary hypoplasia in cleft patients.

Methods: 114 cleft lip/palate and cleft palate patients older than 14 years of age were reviewed for demographics, dental anomalies, and Le Fort I advancement at the UCLA Craniofacial Clinic between 2008-2013. Chi square tests, t tests, and multivariate logistic regression analyses were performed to delineate the contribution of quantity and position of dental agenesis to maxillary advancement surgery.

Results: 114 patients were reviewed (mean age 18.9 years, range 14-23). In this cohort, 64.0% were male, 71.9% had some form of dental agenesis, and 59.6% required Le Fort I advancement. The types of clefts were isolated cleft palate (10.5%), unilateral cleft lip and palate (66.7%), and bilateral cleft lip and palate (22.8%). The type and laterality of clefts did not demonstrate any statistically significant correlation to Le Fort I advancement. In patients who did not exhibit dental agenesis, 18.8% required Le Fort I advancement versus 74.4% of patients with dental agenesis ($p<0.0001$). Requirement for Le Fort I advancement surgery was increased to 76.3% when dental agenesis was specifically at the lateral incisor position ($p<0.0001$) and 86.4% when patients were missing two or more teeth ($p<0.0001$). Using standard cephalometric measurements, both SNA and ANB were decreased in patients missing dentition at the lateral incisor position ($p=0.003$, $p=0.04$). Adjusting for multiple missing teeth and canine substitution, multivariate logistic regression analyses demonstrated that lateral incisor agenesis is an independent predictor for Le Fort I advancement surgery (OR 4.4, CI 1.42-13.64, $p=0.01$).

Conclusions: Lateral incisor agenesis correlated to maxillary hypoplasia and independently predicted the need for Le Fort I advancement in cleft patients, potentially as an anatomic readout of intrinsic growth deficiency. We suggest its utility as part of a treatment algorithm for cleft patients.

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