

Natural History of Midface Hypoplasia in the Unoperated Cleft Lip and Palate: Studying a Global Cohort

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Purpose

- Midface hypoplasia is a well-recognized sequela of cleft lip and palate, yet its underlying etiology remains incompletely understood, with ongoing debate regarding intrinsic growth disturbance versus restriction from early surgical repair.
- This study aims to define the prevalence and severity of midface hypoplasia in an unoperated cleft lip and palate population and to characterize the associated demographic and clinical factors, providing insight into the natural history of craniofacial growth in the absence of surgical intervention.

Methods

- Review of patients presenting to Operation Smile surgical programs from 2015–2023.
- Inclusion criteria: patients with no prior cleft lip or palate repair and documented facial profile assessment. Primary outcome of interest: presence of midface hypoplasia at screening.
- Clinical characteristics of interest included cleft phenotype, cleft palate location, and cleft lip and/or palate severity measurements.
- Statistical analysis included univariate and multivariate logistic regression.

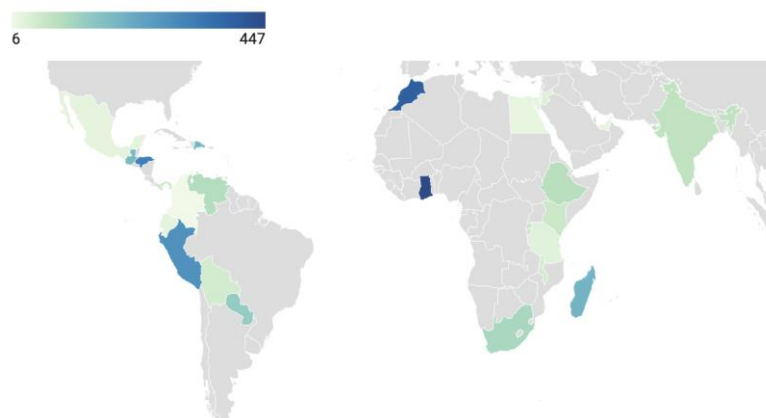


Figure 1: Heatmap of Patient Country Representation

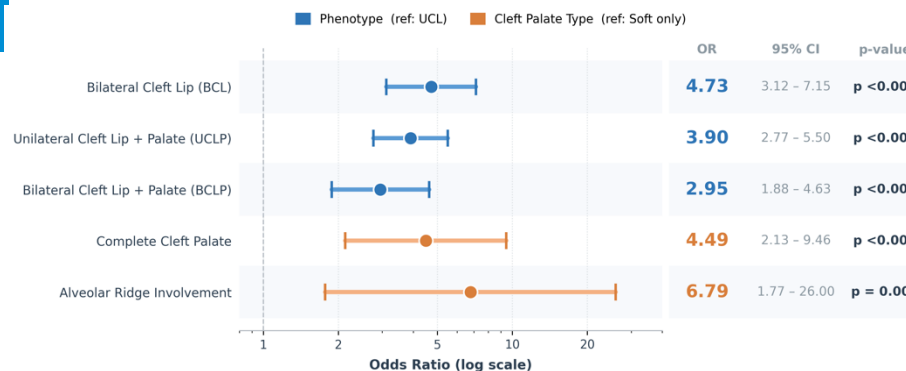


Figure 2: Significant Predictors of Midface Hypoplasia

Results

- A total of **2,948** unoperated patients with cleft lip and/or palate were included in the analysis.

Results Continued

- Midface Hypoplasia was identified in **12.7%** of unoperated patients.
- Cleft phenotype was a strong predictor of midface hypoplasia on multivariate analysis, with increased odds observed in bilateral cleft lip (**OR 4.73**), unilateral cleft lip and palate (**OR 3.90**), and bilateral cleft lip and palate (**OR 2.95**) compared to unilateral cleft lip (all p < 0.001).
- Complete cleft palate and alveolar cleft involvement were both significantly associated with midface **hypoplasia (OR 4.49)** and (**OR 6.79**), respectively; (p < 0.01).
- Regional variation in midface hypoplasia was significant, with higher prevalence observed in Latin America and the Caribbean and lower adjusted odds in sub-Saharan Africa and South Asia on multivariate analysis (p < 0.05).
- Greater cleft width in unilateral cleft lip patients was associated with midface hypoplasia (p = 0.003), with no consistent associations observed across other anatomical severity measurements.

Conclusion

- Further prospective data collection is necessary define how cleft severity, timing of surgical intervention, and other clinical factors influence the development and progression of midface hypoplasia over time.