Title: Long-term Lip Height Asymmetry Following Primary Unilateral Cleft Lip Repair

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Background – Cleft lip repair aims to minimize vertical lip height asymmetry between the cleft and non-cleft side. Few studies have quantitatively examined how the repaired cleft lip changes in the years after surgery. Understanding this is necessary in order to counsel patients and families and aid in evaluating the need for surgical revision. The purpose of this study is to characterize the long-term changes in lip height asymmetry after primary unilateral cleft lip repair.

Methods – Twenty patients who underwent primary unilateral cleft lip repair were retrospectively reviewed. Three-dimensional photographs of subjects at various time points were analyzed for lip height asymmetry. All photographs were obtained prior to secondary cleft lip revisions. Lip vertical height was measured from the subnasale to the peaks of Cupid's bow. Lip asymmetry was defined as the ratio of the absolute difference between the vertical lip heights to the mean of the vertical lip heights and given as a percentage. The trend in lip asymmetry over time was analyzed using a random coefficients model. Early and late postoperative measures were compared using paired t-tests.

Results – All patients had an early postoperative photograph within 1.5 years after surgery. The final photograph was taken between 2.8 years to 9.1 years after surgery (mean 5.4 ± 1.8 years). Nine patients had a diagnosis of incomplete cleft lip and 11 had complete cleft lip. Twelve subjects had unilateral cleft lip and palate. Cleft lip repairs were done using either the Millard technique with modifications (n=15), two-stage lip adhesion cheiloplasty and modified Millard (n=3), or Fisher (n=2) technique. Initial absolute difference in vertical lip height between the cleft and noncleft side was significantly greater than the final absolute difference (1.09 mm vs 0.64 mm, p=0.004). The mean improvement in absolute difference between the initial and final photographs was 0.45 ± 0.62 mm. Initial asymmetry was significantly greater than final asymmetry (11.27% vs 5.46%, p=0.006), and mean overall improvement in lip height asymmetry was 5.8 ± 7.0%. The random coefficients model yielded an estimated reduction in vertical lip height asymmetry of 0.77 ± 0.27% per year (p=0.011). This effect was independent of initial asymmetry.

Conclusions – Lip height asymmetry shows continued, gradual improvement years after primary cleft lip repair.