Abstract

Objectives: Early neonatal cheiloplasty is a new modified surgery protocol for treating patients with bilatelar cleft lip and palate (BCLP). Althought there are known a lot of benefits of this surgery, its influence on facial growth is still studied. Goals are to evaluate: (1) palatal morphology before and one year after neonatal cheiloplasty, (2) growth maxilla and palate using classic and geometric morphometry, (3) morphological differences between complete BCLP (cBCLP) and BCLP with combined bridge (BCLP+B), (4) effect of premaxillary size on the growth of maxilla and palate.

Materials and methods: Fifty virtual dental models of 25 cBCLP and BCLP+B patients were analysed using metric analysis, a coherent point drift – dense correspondence analysis (CPD-DCA) and multivariate statistic. Two plaster casts were taken from each patient, the first before neonatal cheiloplasty (mean age 4,5 days) and the second before palatoplasty (mean age 11,5 months).

Results: The upper jaw segments converge towards premaxilla. This fact leads to reduction of alveolar cleft widht but the upper jaw segments has grown in lenght direction. There is no decrease of the dentoalveolar arc after early neonatal cheiloplasty. The size of premaxilla affects dimensions of anterior parts of the upper jaw segments. According to geometric morphometry palatal form variability is greater in neonatal group and is reduced due to undisturbed growth during observed period. Colour-coded maps and maps of significance indicate areas with the greatest growth potential. These areas are located on premaxilla and partly on anterior and on posterior ends of both segments.

Conclusions: According to our results neonatal cheiloplasty has no negative effect on the growth of maxillary segments in transversal and sagital direction. CPD-DCA method is suitable for detailed evaluation of palatal morphology and development.

Key words: neonatal cheiloplasty, bilatelar cleft lip and palate (BCLP), geometric morphometry, classic morphometry, craniofacial growth, palatal development.