

OP12 THREE-DIMENSIONAL ANALYSIS OF CRANIAL GROWTH IN THE FIRST YEAR OF LIFE – AN OROFACIAL-ORTHOPAEDIC APPROACH

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**AIMS:** The laying induced head asymmetry in infants (posterior deformational plagiocephaly) is accompanied by craniofacial growth aberrations resulting in orofacial-orthopaedic malformations. Against the background of the currently observed increase of a 25 per cent prevalence of posterior deformational plagiocephaly in infants a database of normative parameters of normal cranial growth must be obtained. Therefore the aim of this study was to generate a three-dimensional (3D) reference database of the physiological growth of the infant's cranium in the significant growth phase in the first year of life.

**MATERIALS AND METHOD:** In a longitudinal clinical controlled trial, non-invasive 3D data using an optical surface scanner were generated of the entire head of 40 Caucasian infants (21 females, 19 males). All infants were scanned longitudinally four times in the first year of life. The initial scan was at the age of four months following by an eight-week interval. To quantify the growth of the cranium, growth-related and symmetry-related cephalometric-parameters were defined in all three dimensions.

**RESULTS:** All growth related parameters showed a significant increase with the highest dynamic growth peak from the fourth to the sixth month of life. The highest increment observed was in the total volume of the cranium, with an increase of 12.94 per cent from fourth to sixth month of age and a 29.61 per cent increase throughout the entire observational period. Only the Cephalic-Index (width to length ratio) showed less dynamic growth with a total decrease from -1.85 per cent.

**CONCLUSION:** The high growth rate of the cranium in the first year of life suggests that this is a critical period in which the disruption of developmental processes may have long-lasting effects on the morphology of the cranium with a prognostically unfavourable effect on the further growth of the viscerocranium. Based on these growth data, it is possible to develop standard definitions for 'normal' baseline head symmetry for the first time. The orofacial-orthopaedic growth control represents a medical expansion of the range of orthodontic treatment with the aim of early identification of head asymmetries and prevention of potential consequences on the growth of the viscerocranium.