Abstract

Human face is not perfectly symmetrical, slight asymmetry is common in every individual in early childhood. The thesis deals with the evaluation of facial asymmetry in children aged 3 to 15 years on a transversal data set. As a material was used three-dimensional virtual models of the faces of children from Prague and Central Bohemia. The database contained 442 3D facial scans of girls and 396 3D facial scans of boys, divided into the following age categories: 3 – 5 years (116 girls, 98 boys), 6 – 8 years (117 girls, 100 boys), 9 – 11 years (80 girls, 80 boys) and 12 – 15 years (129 girls, 118 boys). Geometric morphometry methods were used to analyze the data, comparing the morphometric data of the corresponding paired structures on the left and right sides of the original image with its mirror counterpart. The results were visualized using super-projected color maps and significance maps.

In both sexes, right-side protrusion of facial structures was found in all age categories, which was the assumption of the first hypothesis. The only exception was the nose area in boys aged 12–15. Significant asymmetry of the forehead area was observed in the youngest children and it diminished with age and receded laterally. On the contrary, asymmetry of the cheeks area occurred in older children, later in girls also in the chin and jaws area. Thus, the trend of facial asymmetry with increasing age was the retreat in the upper third of the face and, conversely, the accent in the middle and lower third. However, the hypothesis assuming the most pronounced asymmetry in the middle third in prepubertal children and in the lower third in puberty children was not confirmed. In terms of sexual dimorphism of the facial asymmetry, significant differences between girls and boys were evident in the 6 to 8 year olds in the forehead and eye area and subsequently in the nose area from the age of 12 to 15 years. The results of this study did not confirm a more pronounced facial asymmetry in boys between 12 and 15 years of age compared to girls of the same age. The final comparison of asymmetry results based on longitudinal and transversal data showed that the results obtained by the different data collection varied.

Keywords

Facial asymmetry of the child, directional asymmetry, development of asymmetry, sexual dimorphism, geometric morphometry