

ABSTRACT

The objective of the Dissertation was to describe, quantify and interpret to which degree the shape and size of the facial skeleton of people living in the territory of today's Czech Republic in the period from the Early Middle Ages to the present day, i.e. in the course of the approx. last 1200 years, have changed. In this time period, morphological differences between populations, changes in the sexual dimorphism, modularity and allometry of the facial skeleton were examined.

The evaluation was based on CT-images of skulls from three historical populations, specifically from the Early Middle Ages, High Middle Ages and the early modern period. The current population was represented by CT-images of living people. We studied the facial skeletons of a total of 329 individuals, of which 183 were men and 146 women. The CT-images were used as a base for the creation of virtual 3D surface models. The facial skeleton was divided into three morphological units, which were further examined. These were the skeleton of the upper face, lower jaw and palate. The statistical processing was carried out applying methods of geometric morphometrics allowing the separate studying of the shape and size variability of the examined units.

When comparing the size and shape differences between studied populations it is clear that the current population differs most from all of the others. The facial skeleton of the current population is of the largest parameter of size. The most noticeable shape changes include the narrowing and lengthening of the skeleton of the upper face found in the current population. It is probably a consequence of significant changes in external conditions that have been occurring since the industrial revolution. These changes include not only climatic changes, but also consumption of a different diet, improvement in medical care, urbanisation and life-style changes etc.

It was affirmed that the examined parts of the facial skeleton show modularity and are independent to a certain degree. Since the lower jaw demonstrated greater differences both in the size and shape between the populations and matched the favourable conditions of the external environment more than other studied parts of the facial skeleton, we assume that it is influenced by the working of the external environment more than the skeleton of the upper face.

Although there was a statistically significant sexual dimorphism in size and shape in all populations, substantial inter-population diversity in the sexual dimorphism of the facial skeleton was found. There was not only a difference in the degree of dimorphism in size and shape between the populations, but also in specific features distinguishing men from women in individual populations. Areas of identical differences between men and women in all of the examined populations were located on the lower jaw and probably are connected with insertions of muscles of mastication. Subsequently, these results corroborated that the sex estimation purely on the basis of a facial skeleton is problematic and it is also necessary to take into account the population affiliation of the examined individuals.

Moreover, allometric relations showed population and sex affiliation. They have been established in the instance of the skeleton of the upper face in women of the High Middle Ages and the lower jaw of current day man.