

Abstract

This doctoral thesis is submitted in the form of science publications and conference presentations together with theoretical introduction. It presents several points of view on the variability evaluation in the skull (and postcranial skeleton), with accent on diachronic changes monitoring, asymmetry and sexual dimorphism.

This study concentrates on analysis (using traditional and geometric morphometrics) of size and shape of the skull, limb bones and face in the samples originated in the region of the Czech Republic (Central Europe). The first one is a photographic documentation of the Upper Palaeolithic skulls from Předmostí near Přerov (age 25,000 - 27,000 years). The second material is represented by skulls and limb bones deriving from the Early Mediaeval settlement in Mikulčice (The Great Moravia, 9th – 10th century). The third sample originated in the 1930s in Prague, so called Pachner Collection. The last comparative sample presents radiographs of the head and 3D surface models of faces of the recent society.

Study of skeletal asymmetry of populations (Bigoni et al., v recenzním řízení, 2005; Kujanová et al., 2008), its level and localization, enables us to compare behavioral patterns, living conditions, socioeconomic differences and variability within and between populations (Mikulčice vs. Pachner Collection). Directional asymmetry adverts to asymmetrical using of limbs or masticatory apparatus in consequence of one side preference for some tasks. Fluctuating asymmetry reflects environmental stress and the ability of population to react. Results confirmed high biomechanical and environmental stress in the Pachner Collection deriving from the lowest socioeconomic groups. Furthermore it refers to socioeconomic differences between different regions of Mikulčice settlement and between sexes.

Sexual dimorphism of the shape was evaluated in the skull and face of the Czech adult population from 20th and 21st century (Bigoni et al., 2010 a; Velemínská et al., 2012). Skull sexual differences were not found in the skull as a whole, in the cranial base and the shape of

neurocranium, significant sexual dimorphism was noted in the regions of the midsagittal curve of neurocranium, upper face, orbits, nasal and palatal region. It was the most expressive in the shape of upper face, in the zygomatic arches. Sexual dimorphism of the face is presented of allometric relationship its shape and size. Sexual dimorphism manifests itself the most in the lower part of the face, especially in the chin, and also in the cheeks. Sexual differences were also apparent in the forehead region, orbits, and eyebrow ridges, nose and mouth aperture, in general in length-width parameters.

Diachronic changes of the skull morphology were monitored in the time horizon Upper Paleolithic – Early Middle Ages – the early part of the 20th century – recent time (Velemínská et al., 2008 a, 2009; Bigoni et al., 2010 b). Towards recent inter-population variability confirmed the tendency to the development of neurocranial globularity and the decrease of facial convexity. These changes were more expressive with the increasing time interval between populations.