

ABSTRACT

This diploma theses deals with the effect of biological relatedness on the morphology of the human palate. So far, the effect of heredity on the morphology of the palate has been studied mainly in connection with clefts, there are not many studies dealing with the morphology of a healthy palate. Within this work, two goals were set. The first was to evaluate the variability of the palatal morphology of biologically related individuals compared to the variability of the palatal morphology of unrelated individuals. The second goal was to evaluate the effect of biological relatedness on palatal morphology.

The material for this theses were two samples – a sample of biologically related individuals and a sample of unrelated individuals as a control group. The genealogically documented sample consists of 65 plaster casts of the upper jaw of mutually related individuals of the Czech population. This sample includes 33 men and 32 women. The average age in the sample is 37,65 years. The sample of unrelated individuals includes 52 virtual 3D models of a hard palate. This sample consists of 23 men and 29 women. The average age in this sample is 19,27 years.

This theses combines methods of geometric morphometrics and linear regression models. The plaster casts of the upper jaws were first scanned with a 3D scanner. Next, the obtained virtual 3D models were processed.

The variability of the palatal morphology of biologically related and unrelated individuals was compared using geometric morphometrics. For this part of the theses, it was hypothesized that the degree of similarity of the shape and form of the palate will be higher in biologically related sample than in unrelated sample. On the contrary to our expectations, it was found that the variability of palatal morphology is wider in all aspects within the group of biologically related individuals than among unrelated individuals. This conclusion is attributed to the fact that there is a wider age variation among biologically related individuals compared to the sample of unrelated individuals. Furthermore, greater variability may be due to the fact that several individuals with suspected submucosal cleft palate and morphology of the so-called gothic palate are present in the sample of biologically related individuals.

The second hypothesis was that there is a higher degree of similarity of palatal morphology among closely related individuals than among more distantly related individuals. The effect of biological relatedness on the palatal morphology is not entirely clear, it was demonstrated only for some morphological aspects. The biological relatedness affects the degree of similarity of palatal length and width in the vault area. Furthermore, the biological relatedness affects the degree of similarity of the shape of palatal vault, its rounding from the front view and its

steepness from the side view. An important finding is that biological relatedness affects the part of the palatal morphology that may be responsible for the possible development of the so-called gothic palate.

In addition to biological relatedness, age is also important for the degree of similarity of the palatal morphology among individuals. The relationship between sex and similarity of palatal morphology has not been confirmed, so in our sample, sex is not significant for differences in palatal morphology.

Key words: heritability, palate, palate variability, relatedness, submucous cleft palate, gothic palate