

## **Abstract**

Age estimation is a common requirement in forensic, bioarcheological and biomedical practice. This master thesis deals with age estimation based on permanent tooth mineralization according to Demirjian et al. (1973). The research material consisted of orthopantomograms of 716 Czech and 743 French children aged between 4 and 15 years. The purpose of this study was to analyse the suitability of the original French-Canadian standards for age estimation (Demirjian and Goldstein, 1976) and the recent Belgian standards (Willems et al., 2001) in Czech and French population. Another aim of the study was to evaluate the accuracy of the neural network method that represents a completely new approach in data prediction. In order to express the accuracy of estimate we used mean and median of difference between chronological and dental age, and RMS error. Using logistic regression, differences in tooth mineralization between Czech and French population and between girls and boys were also evaluated. Our results indicate that the French-Canadian standards gave a consistent overestimation of dental age compared with chronological age. Mean difference was 0,33 years for Czech children and 0,45 and 0,46 years for French girls and boys, respectively. We found that Willem's method and neural network method were more accurate for both populations than Demirjian's method. Using the Belgian standards, the mean difference was -0,04 and 0,08 years for Czech girls and boys, and 0,09 and 0,14 years for French girls and boys, respectively. Neural network showed the lowest mean difference between chronological and dental age – mean difference was less than 0,001 years in both populations, but no significant difference was found between absolute errors of estimate of Willem's method and neural network method. Statistically significant differences between dental age of girls and boys were confirmed. Girls reached the majority of developmental stages ahead of boys. The largest sexual dimorphism was found in canines. Comparing dental development between Czech and French population, statistically significant differences were found, so we recommend establishing new population-specific standards for both European populations.