

Abstract

The morphology of the craniofacial complex is prone to alterations resulting from a wide range of external factors. In the first part of the presented thesis, we analysed the influence of slow long-term changes of the environment and population genome by comparing historical (11-12th century AD) and contemporary skulls using cephalometric X-ray images. The second part focuses on the effects of orthodontic treatment on bone thickness in relevant areas, with the analysis being based on Cone Beam computed tomography.

A comparison of the palatal angle of 115 historical and 75 contemporary skulls revealed a statistically significant decrease of this parameter. The follow-up of 58 patients utilizing three-dimensional diagnostic imaging measurements before and after treatment revealed a statistically significant decrease in vestibular bone thickness, without changes of total alveolar width.

Our analysis revealed a substantial bone response to respective forces, with relevant clinical implications – respecting the anatomical limits of the range of motion is essential to achieve therapeutic success and to avoid alveolar defects.

Keywords: *3D imaging, CBCT, cephalometry, orthodontics, dentistry*