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Radiomorphometric indices of mandibular bones in an 18th century population sample

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Thickness and shape of cortical mandible on orthopantompographs can be expressed using radiomorphometric indices, which reliably reflect the systemic condition associated with sex or age related bone mass loss. The aim of this study was to estimate four radiomorphometric indices of mandible in an 18th century population sample. Thirty six skulls (31m, 5f), recovered from the crypt of Požega Cathedral were chosen for radiomorphometric analysis. Sex was determined based on the shape of osseus structures, and age on abrasion patterns (<25, 25-34, 35-44, 45+). Vertical and horizontal dimensions were reproducible (Eichner classes I and II). The parameters in recording analogue dental orthopantompographs were set to constant current of 16mA, exposure time of 14.1sec, and voltage between 62-78 kV (Sirona model no. 5968573 D3 200; Siemens, Munich, Germany). Radiographic films (ORTHO CP-G PLUS Agfa; Agfa-Gevaert Group, Mortsel, Belgium) were processed in an automatic dark chamber processor (XR 24 Nova; Dürr Dental GmbH u. Co KG, Bietigheim-Bissingen, Germany) for 12 minutes, scanned at 8-bit, 300 DPI, and analysed for: MI- thickness of the mandibular cortex below the mental foramen; AI- thickness at antegonion; GI- thickness at gonion; MCI- mandibular cortex index (1=sharp endosteal margin of the inferior cortex; 2=semilunar defects; 3=thick cortical residues on endosteal margin). Average values of MI, AI and GI were 3.97±0.94 mm, 2.98±0.56 mm, and 1.99±0.55mm, respectievly. Statistically significant differences between males and females were found for AI right ($t=2.601, df=34, p=0.014$), GI left ($t=2.714, df=34, p=0.010$) and GI aveargе ($t=2.963, df=34, p=0.006$), and were in all cases higher in males.There were no statistically significant differences between age groups for either index. Considering MCI, the differences were not significant between males and females ($\chi^2=2.54, df=2, p=0.281$) and age groups ($\chi^2=4.306, df=6, p=0.635$). Considering Eichner classification the differences were not significant for MI ($\chi^2=36, df=35, p=0.422$), AI ($\chi^2=31.02, df=32, p=0.516$), and GI ($\chi^2=33.5, df=33, p=0.443$), but in Eichner classes II, MCI was significantly higher ($\chi^2=7.845, df=2, p=0.02$).

Keywords**:** bone mass loss; mandible; orthopantompograph; adiomorphometric index; 18th century