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Histomorphometric analysis of bone density in the maxillary tuberosity of cadavers: a pilot study.

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BACKGROUND: Maxillary tuberosities have been widely used as a source of autogenous bone for a variety of oral surgical procedures. However, no previous studies have actually demonstrated the histologic and histomorphometric characteristics of this anatomical region in detail. The aim of this study was to evaluate maxillary tuberosities in cadavers histologically and histomorphometrically. **METHODS:** A block section, including the overlying alveolar mucosa, was obtained from a randomly assigned maxillary tuberosity of 20 cadavers (nine females and 11 males). All cadavers were edentulous distal to the second bicuspid teeth, and 14 out of 20 were edentulous distal to the cuspids. A minimum of 35 serial sections were obtained from each cadaver. Description analysis was performed for the presence of either a fibrotic or fatty infiltration of the marrow spaces and thickness and continuity of alveolar bone. Computer-based histomorphometric image analysis of the percentage surface area of bone was also carried out in three sections of each cadaver. Statistical analysis was performed to establish possible differences between genders. The analysis did not control for nutritional status and/or possible systemic or skeletal diseases. **RESULTS:** Little variation existed between specimens, regardless of gender, with respect to thickness of oral mucosa overlying the tuberosity. Descriptive bone analysis revealed thin cortical bone and sparse cancellous bone patterns. In addition, the block specimens exhibited no evidence of osteoid or active bone formation, but large marrow spaces infiltrated with loosely organized fibrous connective tissue and/or lipid cells. Histomorphometric analysis demonstrated a mean percentage of vital bone of 24.23% +/- 5.2%. Stratification of the data revealed statistically significant differences in mean percentage of vital bone between genders (27.15% +/- 4.7% for males versus 20.66% +/- 3.4% for females; $P = 0.003$). **CONCLUSIONS:** Within the limitations of this study, maxillary tuberosities seem to mainly consist of marrow spaces, adipose tissue, and a low vital bone profile. Females demonstrated a statistically significant lower amount of vital bone than males. The results suggest that this specific area may not be an ideal source of autogenous bone for grafting purposes in older individuals. However, it is imperative to note that this investigation did not control for nutritional imbalances and skeletal disorders. Further studies are necessary to control all confounding factors.