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Morphometric analysis of implant-related anatomy in Caucasian skulls.

Neiva RF, Gapski R, Wang HL.

Department of Periodontics/Prevention/Geriatrics, School of Dentistry, University of Michigan, Ann Arbor, MI 48109-1078, USA.

BACKGROUND: Sequelae related to implant placement/advanced bone grafting procedures are a result of injury to surrounding anatomic structures. Damage may not necessarily lead to implant failure; however, it is the most common cause of legal action against the practitioner. This study aimed to describe morphological aspects and variations of the anatomy directly related to implant treatment. **METHODS:** Morphometric analyses were performed in 22 Caucasian skulls. Measurements of the mental foramen (MF) included height (MF-H), width (MF-W), and location in relation to other known anatomical landmarks. Presence or absence of anterior loops (AL) of the inferior alveolar nerve (IAN) was determined, and the mesial extent of the loop was measured. Additional measurements included height (G-H), width (G-W), thickness (G-T), and volume (G-V) of monocortical onlay grafts harvested from the mandibular symphysis area, and thickness of the lateral wall (T-LW) of the maxillary sinus. The independent samples t test, and a two-tailed t test with equal variance were utilized to determine statistical significance to a level of $P < 0.05$. Multiple regression analyses were performed to determine if each one of these measurements was affected by age and gender. **RESULTS:** The most common location of the MF in relation to teeth was found to be below the apices of mandibular premolars. The mean MF-H was 3.47 ± 0.71 mm and the mean MF-W was 3.59 ± 0.8 mm. The mean distance from the MF to other anatomical landmarks were: MF-CEJ = 15.52 ± 2.37 mm, MF to the most apical portion of the lower cortex of the mandible = 12.0 ± 1.67 mm, MF to the midline = 27.61 ± 2.29 mm, and MF-MF = 55.23 ± 5.34 mm. A high prevalence of AL was found (88%); symmetric occurrence was a common finding (76.2%), with a mean length of 4.13 ± 2.04 mm. The mean size of symphyseal grafts was: G-H = 9.45 ± 1.08 mm, G-W = 14.5 ± 3.0 mm, and G-T = 6.15 ± 1.04 mm, with an average G-V of 857.55 ± 283.97 mm³ (range: 352 to 1,200 mm³). The mean T-LW of the maxillary sinus was 0.91 ± 0.43 mm. **CONCLUSION:** Implant-related anatomy must be carefully evaluated before treatment due to considerable variations among individuals, in order to prevent injury to surrounding anatomical structures and possible damage.