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Assessment of Dental Implant Site Dimensions and Alveolar Bone Density of the Mandible using Cone Beam Computed Tomography

A thesis

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by

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Abstract

Background

The quantity and the quality of available bone influence the clinical success of dental implant surgery. Cone beam Computed Tomography is an established method for acquiring bone images before performing dental implant.

Cone Beam Computed Tomography is an essential tool for treatment planning and post- surgical procedure monitoring by providing highly accurate 3-D images of the patient's anatomy from a single, low-radiation scan which yields high resolution images with favorable accuracy; therefore, it is increasingly used to evaluate different jaw areas and measurements.

Aim of study

Measurement of alveolar bone (height and buccolingual width) and density in the mandible among Iraqi adult subject using CBCT for assessment of dental implant site.

Material and method

The study sample includes (60) Iraqi subjects (30 male and 30 females) aged between 20-65 years. The sample collected from patients attending Al-Salawy Center of Implant in Holey Karbala city having cone beam computed tomography scan for different diagnostic purposes from November 2016 to April 2017.

In this study Sagittal view of CBCT for anterior area to measure the bone height ,buccolingual width of the mandible and bone density while coronal view was used to measure the bone height, buccolingual width and bone density assessment of the mandibular premolar and molar areas.

The height of mandible was measured from alveolar crest to the internal border of the inferior cortex of mandible at the anterior area while at premolar area measured from alveolar crest to the superior border of mental foramen and

at molar area the height of mandible measured from the crest of alveolar ridge to the superior border of the mandibular canal.

The bucco-lingual width of mandible measured from external surface of mandibular bone (buccal surface) to the inner surface (lingual surface) at anterior, premolar and molar areas.

The density of mandible was measured at anterior, premolar and molar areas of mandible.

Results

The statistical analysis of linear measurements of mandibular bone which include the bony height, width and density showed that the mean bony height was highest in anterior area followed by molar area and lowest in premolar area and, the effect of age on bony height showed no obvious or statistically significant difference between subjects <50 years old and those older in both premolar and molar areas and the male gender was associated with a statistically significant increase in bony height compared to females. The mean bony width was lowest in anterior area followed by premolar area and highest in molar area and the effect of age on bony width was as strong as that changing the mandibular area examined from anterior to premolar and molar being on older age (+ 50 years old) is associated with a statistically significant increase in bony width compared to younger age group less than 50 years old and the male gender associated with bony width higher than females. The mean bone density was highest in anterior area followed by premolar area and lowest in molar area and the effect of age on bone density was as strong as that changing the examined area from anterior to molar being an older age (+50 years old) is associated with statistically significant increase in bone density when compared to younger age (less than 50 years old) and the male gender associated with bone density higher than females.

Conclusion

Cone beam computed tomography provide precise information about bone height, regional width and density which are essential for assessment of the dental implant site in the mandible.