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Buccal Cortical Bone Thickness in Iraqi Arab Adults by Cone Beam Computed Tomography for Orthodontic Mini-Implants

A Thesis

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By

Saad Abdulale Abbas

B.D.S.

Supervised by

Prof. Dr. Akram F. Alhuwaizi

B.D.S., M.Sc., Ph.D.

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ABSTRACT

Anchorage control is considered as a major challenge faced by orthodontists in their clinical practice which decides the success of orthodontic treatment. Mini-implants, as an alternative to traditional anchorage techniques, can be used effectively and will provide absolute skeletal anchorage with minimal patient cooperation. The cortical bone thickness is very important for the stability of mini-implant. Placing mini-implants in sites of favorable cortical bone thickness would ensure better initial stability and long-term success.

The aim of this study was to investigate gender, side and jaw differences of the buccal cortical bone thickness as a guide for orthodontic mini-implants placement using cone beam computed tomography (CBCT).

The sample of this study consisted of patients attending the Specialized Health Center in Al-Sadr City / 3D radiographic department from December 2014 till May 2015. Thirty patients (15 males and 15 females) were selected and CBCT images were done using Kodak 9500 3D System. Then the buccal cortical bone thickness was measured at thirteen inter-radicular sites in the maxilla and mandible from the mesial side of the right second molar to the mesial side of the left second molar at 2, 4, 6 and 8mm from the alveolar crest.

The buccal cortical bone thickness in males was significantly greater than females in both jaws at 4 to 8mm from the alveolar crest and showed no significant difference between the right and the left sides of the jaws. The mandibular cortical bone thickness was significantly thicker than the maxillary. There was gradual increase in the cortical bone thickness from the anterior to the posterior region of both jaws. The cortical bone becomes thicker with increasing distance from the alveolar crest in all sites of the mandible and in areas mesial to the first premolar in the maxilla.

Based on findings of this study, it is recommended to use wide mini-implants in the anterior region of both jaws and short ones in the mandibular posterior region. The sites more suitable for mini-implant placement is 4 and 6mm from the alveolar crest in the maxilla and at 6 and 8mm in the mandible. The CBCT was very useful in bone measurements in addition to it gives 3D image with high resolution and less patient radiation dose.