

***The Diagnostic Accuracy of the
Digital Panoramic Imaging
Modality pre and post Dental
Implant Insertion***

A Thesis

**Submitted to the Council of College of Dentistry
At the University of Baghdad
In Partial Fulfillment of the Requirements for the
Degree of Master of Science in
Oral and Maxillofacial Radiology**

By

**Maisaa Qais AL-Ubaidy
B.D.S**

Supervised by

**Asst. Prof. Dr. Lamia H. AL-Nakib
MSc., B.D.S.**

Iraq- Baghdad

Abstract

Background:

Dental implants are gaining an important role in substituting missing teeth and understanding its installation effect on the surrounding soft and hard tissues is important.

The success of dental implant treatment depends on careful preoperative planning which obtained by having information regarding the volume, quantity and quality of the bone at the site of implant insertion and that obtained by clinical and appropriate radiographs.

Many types of radiographic imaging are recommended for treatment planning for implant. Panoramic radiography is one of these imaging modalities, its readily available and provides a view of many structures in maxilla and mandible and it's the most common single radiographic examination used in implant treatment planning.

Aim of the study:

This study aimed to evaluate the diagnostic perfectibility of digital panoramic image in determination of bone height available in maxilla and mandible prior to implant treatment and to find the effect of possible multivariate (age, gender, type of jaw , jaw sectors and dental presence) on bone height measurements and on the precision of panoramic image as a radiographic tool used in pre implant treatment planning.

Materials and methods:

The sample consisted of 30 Iraqi patients indicated for implant treatment (8 males and 22 females), age range between (19- 71) years old. They were examined during a time period started from August /2009 to March / 2010.

The total sample was attended to the maxillofacial department of Al-Wasity hospital in Baghdad where they were subjected to clinical examination.

Panoramic x-ray machine used in the study was Dimax 3 digital x-ray machine manufactured by Planmeca Oy, Helsinki, Finland, 2003, computer unit type LG. The dental implants used in the study were two-stage Frialit-2 dental implants (Friadent, Germany), and transparent chart of implant kit system.

All patients were examined clinically to evaluate the oral hygiene and the occlusion of the upper and lower jaws and then preoperative panoramic radiograph was taken as a diagnostic image to evaluate the remaining bone height and the proximity to the surrounding vital structures. The 1st vertical bone height measurements were done on screen to the (30) patients subjected to implant treatment in ten areas in both jaws (5) in maxilla and (5) in mandible and determine the area of measurements which was done in missing tooth areas, the same measurements were applied on non-missing tooth areas, according to known reference points in the areas of measurements to have general idea about the jaw condition of each patient, the 2nd bone height measurements were done to the areas of implants insertion preoperatively. The fixture length were determined according to digital panoramic image using the transparent chart of the implant system.

All patients were subjected to implant surgery and a total number of 60 fixtures were inserted to them in maxilla and mandible and 2nd panoramic image (postoperative) was taken to the patient and the 3rd measurements were done on screen also from the end of the inserted fixture to the same limitations of the preoperative measurements.

Results:

The present study showed that bone height measurements were more in mandible than maxilla in anterior, premolar, and molar sector of non missing teeth

areas. In missing teeth areas the bone height measurements was more also in mandible than maxilla in anterior and molar sectors but not in premolar sector.

Also showed that there were variations in the bone height measurements between different age groups of maxilla and mandible, the statistically significant of age was unlikely to be clinically significant, bone height measurements in both mandible and maxilla was more in male than female in non-missing tooth areas.

The most important result in this part of the study which give an idea about the treatment planning of implant surgery was that in missing teeth areas the molar and premolar sectors had the strongest effect on bone height measurements in maxilla and mandible followed by age and maxilla Vs mandible. Gender had no important or significant effect on bone height measurements.

The age of patient, gender, type of jaw and jaw sector had no effect on the measurements of the panoramic image but there effect on the bone height of the maxilla and mandible.

The safest area for implant insertion was seen in the anterior sector of the mandible and maxilla, while the most critical area which must have very careful assessment was the premolar sector of mandible and the molar sector of maxilla.

Lastly, there was significant tendency to underestimation type of error in clearance margin above the anatomical landmarks and there was no significant difference between the types of error with panoramic image precision which means that the panoramic image was not prefer any type of error to other.

Conclusions:

Digital Panoramic image provides a great understanding about bone height in different sites of Maxilla and Mandible giving an idea about the most important information related to implant site pre and post implant insertion.