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College of Dentistry**



**Evaluation of Dental Implants Primary Stability in Different
Treatment Protocols and the Permissible Teeth Mobility
Utilizing Periotest M Device
(A Comparative Study)**

A Thesis Submitted to the Council of College of Dentistry/ University of
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Master of Science in Periodontics

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Abstract

Background:

Dental implant is the most reliable method to replace missing teeth. Implant placement immediately following tooth extraction, and placement of implant in healed site at least six months after tooth extraction are two treatment protocols for the implant placement in extraction sockets. Primary implant stability and bone density are variables that have long been considered to be essential to achieve predictable osseointegration and long term clinical survival. Evaluation of primary stability could be achieved by several methods, including the Periotest M device. Periotest M designed to measure the damping characteristics of periodontal ligament of the teeth and evaluate their mobility.

Aims of the study:

To determine the difference in primary stability of dental implants measured by Periotest M device between immediate and delayed treatment protocols groups according to bone density, jaws, gender and age. Evaluate and compare the permissible mobility of natural teeth corresponding to dental implants with primary implants stability in both treatment protocols groups using Periotest M. To evaluate the reliability of tooth mobility measurements of corresponding teeth to dental implants by manual judgment according to Miller`s classification with their values utilizing Periotest M.

Materials and methods:

A total of (80) Iraqi patients, (35) males and (45) females, received (100) dental implants, age ranged from (20 – 59) years, participated in this study. They were divided into two groups as follows: group of (40) patients with (50) dental implants in the delayed treatment protocol and group of (40) patients

with (50) dental implants in the immediate treatment protocol were placed in both jaws and distributed in anterior and posterior sites.

Pre-surgical general examinations were done, and a special case sheet form was used for data collection. The clinical periodontal parameters (Plaque index, Gingival index and Probing pocket depth) were evaluated for (100) corresponding natural teeth to dental implants. The primary stability of dental implant fixture was measured by Periotest M device after complete installation of dental implant in osteotomy site. Bone density was determined according to the typical anatomical location of bone density based on Misch criteria, and then specified the bone type according to resistance to drilling by the surgeon's perception in delayed group, the bone density type (1) as oak or maple, type (2) as white pine or spruce wood, while the type (3) as balsa wood and the type (4) as styrofoam. The corresponding teeth to dental implants measured their mobility by Periotest M and manually according to Miller's classification.

Results:

Statistical analysis showed highly significant differences in mean periotest values between delayed and immediate groups as well as in delayed group among bone density types (2, 3, and 4). Highest mean periotest values were found only in delayed group (-2.902), in anterior site of mandible (-4.200), in type 1 bone density (-4.2), in males (-3.081), at age range (30 - 39) years which was (-3.193). The mean permissible movement of (100) teeth using Periotest M device was (+2.248). There was a non - significant positive correlation between mean Periotest values of teeth with gingival index and plaque index. The reliability was (80%) between the grades of manual judgment of teeth mobility with the scores of Periotest values.

Conclusions:

Primary implants stability measured by Periotest M device were higher in delayed treatment protocol group, in mandible than maxilla, in males in delayed group. The greater the bone density, the higher the primary implants stability. Miller`s method is reliable for manual tooth mobility measurement, as well as it`s easy, and not costly as compared to the Periotest M device. Periotest M device is simple, useful and reliable to perform an objective evaluation of an implant`s stability and tooth mobility.