

**Republic of Iraq  
Ministry of Higher Education  
And Scientific Research  
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College of Dentistry**



# **Evaluation of osseointegration of dental implants sites prepared by piezosurgery (Clinical study)**

A Thesis

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By

**Younus Jabbar Jiheel**

B.D.S

Supervised by

**Assistant prof. Dr. Jamal Abid mohammed**

B.D.S., M.Sc.

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# Abstract

**Background:** The surgical technique regarded as one of the important factors affecting osseointegration and success of dental implants. Piezosurgery is a new innovation characterized by precision and selectivity, increase surgical control; blood free surgical operation site produced by the cavitations effect, favorable osseous response and reduced operation stress used in implantology to overcome the limitation of the conventional technique.

**Aims of the study:** the objectives of the current investigation was to study the survival rate, stability of the implants inserted by piezoelectric tips and to follow their changes during the period of 16 weeks, and the effect of many variables including age, gender, sites, bone density, diameter/length of implants, insertion tips, and to evaluate the postoperative pain intensity following the insertion of implants for 7 days.

**Materials and methods:** A total of (24) patients, (6) males and (18) females, age ranged (19-51) years old subjected to pre and postoperative clinical and radiographic evaluation, were contributed in this study. Receiving a total of (42) implants (sandblasting with large grit and acid etching, endosseous, Implantium®), all of these implants sites were prepared by means of special tips mounted in piezosurgery device (Mectron CO. Italy) using the two stages surgery option. Implant stability quotient changes were measured by Osstell™ (Goteborg, Sweden, 4<sup>th</sup> generation) at surgery and at the 8<sup>th</sup> and 16<sup>th</sup> week of healing period to predict the osseointegration process. Bone density was determined according to radiographic evaluation and bone resistance to drilling according to a well-known classification proposed by Misch, 2008. Verbal intensity pain scale was used for the estimation of the intensity of the postoperative pain. A special case sheet form was used for collection of data and all results subjected to statistical analysis to see their significance and its effects on the stability of the inserted implants.

**Results:** all the implants after 16 week were osseintegrated with survival rate 100%, no drop out and complication occur to any of the inserted implants. The mean primary stability were (74.32) ISQ, at the 8<sup>th</sup> week (72.62) ISQ, at the 16<sup>th</sup> week were (76.68) ISQ, there were a significant change in the implants stability (P=0.004). Rate of implants achieving elevated stability (ISQ $\geq$  70) and (ISQ<70) at the time of surgery were with low stability (ISQ<60) 2 (4.76%), 8 (19.05%) with medium stability (60-70 ISQ), 32 (76.195%) with high stability (ISQ>70), at the 8<sup>th</sup> week implants with low, medium, high ISQ were 5 (11.95%), 11 (26.19%), 26 (61.9%), at the 16<sup>th</sup> week the results were, 1 implant (2.38%), 6 implants (14.29%) and 35implants (83.3%) respectively. Age, gender, length of implant, and bone density were show no significant on the implants stability. The implants inserted in the mandible show higher stability (ISQ) than the implants inserted in the maxilla. The diameter of the implants, the type of the insertion tips were showed a significant correlation with the implants stability (ISQ).

**Conclusion:** piezosurgery is a relatively new, reliable and safe technique used for implants site preparation. Within the limit of this study, the results suggest that the preparation of the implants sites with piezosurgery results in high primary stability and decrease the healing time and result in earlier shifting of the implant stability when the implant osteotomy site prepared by piezosurgery.