Republic of Iraq
Ministry of Higher Education
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University of Baghdad
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Evaluation of related factors affecting stability and survival rate of dental implants (meta-analysis of retrospective study)

A thesis
submitted to the council of College of Dentistry at the University of Baghdad, in partial fulfillment of requirements for the degree of Master of Science in Oral and Maxillofacial Surgery

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2017 A.D. **1438 A.H.**

Abstract

Background: Dental implants denote one of successful treatment modalities in dentistry. On the other hand, failures do occur in routine procedures, so new technique and different procedures and also new materials are used to minimize failure and help to reduce time of healing. Implant stability is certainly associated with a successful implant integration and long-term positive clinical outcome. Thus, it is essential to evaluate the stability at different intervals to certify a successful osseointegration.

Aims: To evaluate the survival rate of dental implants, which were investigated on the basis of patient related factors (age and gender), implant related factors (length and diameter), site related factors (anterior or posterior region in maxilla or mandible) and bone related factor (bone density). Also to determine the correlations between bone density and stability of dental implants and to determine which intervention to dental implant that increase stability.

Materials and methods: Retrospective study for three years for the patients receiving dental implants in dental implant unit in educational hospital of collage of dentistry /Baghdad University during period of October 2012-October 2015. During this period 152 patients (104 females, 48 males) with 299 dental implants were included in this study, the data collected from 7 researches that met the inclusion criteria which are : recording the data of age, gender, implant length and diameter, location of implant, and bone density, recording type of surgical procedure, drugs used and measurement of stability (primary and secondary) by using Osstell implant stability quotient (ISQ) device. Individual data meta-analysis of stability of dental implants using different interventions. A control group was based on the sum of all control

implants used in these studies. The interventions used were: Bone morphogenetic proteins, Immediate dental implant, Ridge splitting procedure, Test drug (simvistatin), Platelet-Rich Plasma and Piezosurgery.

Results: Cumulative survival rate was 98.33% and failure rate (1.67%) with observation period 4-6 months according to studies, in 152 patients 299 dental implants were placed, 5 of them failed (3 male patients had 4 failed implants and 1 female had 1 failed implant) all of them with early failure. In control group 51.5% achieved high stability after 3 months but after 4 months 97.8% achieved high stability. Among the variables: Implant length and posterior location in the jaw had a statistically significant effect on achieving high stability in control group. Posterior location was statistically significant increase primary stability. When comparing interventions to control group after 2 months of surgery show only the test drug (P <0.001) increase stability and among the variables that affected after 2 months: diameter, length and mandibular location were statistically significant increase stability. After 3 month Test drug (P<0.001) and Bone morphogenetic proteins (P=0.005) increase stability and among the variables mandibular location, length and diameter increase stability. After 4 months Piezosurgery was associated with a statistically significant lower ISQ (P=0.004), and among the variables that statistically significant increase stability: diameter.

Conclusions: Cumulative survival rate achieved in this study was high. There were no significant effect of any variables on failure rate of dental implant. Test drug and Bone morphogenetic proteins reduce the healing time and improve stability but Piezosurgery was associated with lower stability compered to control group. Only the posterior location affected primary stability but length and diameter increase secondary stability. Bone density had no effect on

primary stability and secondary stability of dental implants. No statistically significant difference in secondary stability when compared with control group(delay type implant) and immediate dental implant.