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Effect of Platelet-Rich Plasma on Osseointegration Period of Dental Implants

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Submitted by

Mahammed Wasnan Al-Gailani

B.D.S.

Supervised by

Assistant Professor
Dr. Thair Abdul-Lateef
B.D.S., H.D.D., F.I.B.M.S.

Oral and Maxillofacial Surgery

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Abstract

Background: The Preparation of platelet-rich plasma (PRP) from blood is minimally invasive way, simple, and low cost to obtain natural autologous growth factors and is now being widely used in different fields of medicine for its ability to increase the regeneration potential of tissue.

Objectives: To investigate the effect of local application of autologous platelet-rich plasma gel on acceleration rate of osseointegration period by clinical assessment of the implant stability within different intervals of bone healing in combination with determination the effect of other factors on implant stability including mechanical stability of implant at placement time, implant dimension (diameter and length), and local bone density.

Materials and methods: A total of 28 dental implants were inserted into 13 patients (edentulous maxillae or mandibles) using a split mouth design, i.e. each patient was received at least two dental implants at the same session, one implant was implanted in association with PRP which was placed locally in one site, to serve as PRP group, and the other implant was placed without PRP, to serve as a control group. Both groups were followed with repeated implant stability measurement by means of resonance frequency analysis at different time intervals (at the time of surgery then at 8^{th} and 12^{th} week postoperatively). Preoprative standardized interactive CT scans were taken for registering bone density at the implant sites and also estimation of proper implants length and diameter according to local bone width and length present.

Results: Results showed there was no obvious statistically significant difference in mean ISQ between PRP and control groups ($P > 0.05$) at

baseline, 8 weeks, and 12 weeks postoperatively. Bone density and implant length had positive correlation and statistical significance on implant stability at baseline (P value = 0.017, 0.046) respectively, but there was no correlation of these factors on implant stability at 8^{th} and 12^{th} week measurement. Implant diameter had positive correlation and statistical significance on implant stability at 8^{th} and 12^{th} week measurement (P value = 0.01, 0.002) respectively, but with no correlation effect at baseline. No significant changes of stability at 8^{th} and 12^{th} week measurement were seen because both PRP and control groups had high mean stability at baseline (73.21, 70.46 ISQ) respectively,

Conclusions: Within the limitations of the present study, no appreciable clinical effect was observed to accelerate the rate of osseointegration of sandblasted acid-etched endosseous dental implants when using topical application of autologous platelet-rich plasma gel into the prepared drill holes. Bone density and dental implant length are of more influential effect on primary implant stability, while dental implant diameter has more influential effect on secondary implant stability. Primary stability is important determinant and indicator for having adequate secondary implant stability.