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Effect of Platelet-Rich Fibrin on Dental Implant secondary Stability

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Abstract

Background: Preparation of platelet-rich fibrin (PRF) is a simple, low cost and minimally invasive method to obtain a natural concentration of autologous growth factors that is widely used in different fields of medicine to accelerate soft and hard tissue healing.

Objectives: To evaluate the effect of local application of PRF on implants stability and determine the effect of other factors such as implant dimensions (diameter and length) and bone density on implant stability.

Materials and Methods: Nineteen patients with adequate alveolar bone and two or more adjacent area of extracted teeth and/or bilaterally extracted teeth symmetric to the midline (split-mouth design) were included in this study. At least two dental implants (Dentium Co., Korea) were placed in each patient's jaw. After surgical preparation of the implant sockets, the PRF colt was applied to one of the implant socket before the placement of implant fixture (study group), while the second implant socket implanted without PRF (control group). Implant stability was measured by Osstell™ ISQ (Goteborg, Sweden, 4th generation), at the time of surgery (primary stability), at 4, 8 and 12 weeks postoperatively (secondary stability). Paired t-Test was used to analyze continuous variables that followed prospectively in time. Repeated measure of ANOVA test (Two ways ANOVA) used to compare (study and control) groups at two different periods, to see which of them is significantly better.

Results: The mean implant stability quotient (ISQ) in the study group, was higher especially in the early healing period at the 4th week compared to the control group, but this elevation was not statistically significant (P value > 0.05). On the other hand, PRF showed a significant effect on implants stability by 2.367 folds for

implants that achieved primary stability ≥ 70 and maintained this stability after 12 weeks. For both groups (control and study) no statistically significant correlation present in this study between implant diameter and stability at surgery, however a positive correlation and statistical significance between implant diameter and the ISQ was demonstrated during the healing period progressively at 4,8 and 12 weeks postoperatively in the control group and at the 12th week only in the study group. No significant correlation was found between implants length and (primary and secondary) stability for both groups. No significant correlation was found between local bone density and (primary and secondary) stability for both groups.

Conclusions: Within the limitations of this study, although the mean ISQ in the study group was higher during all the follow up periods and these elevations were not statically significant, the PRF showed a significant effect on implants stability by 2.367 folds for implants that achieved primary stability ≥ 70 and maintained this stability after 12 weeks when compared with the control group. Therefore, the overall effect of PRF seemed to affect the stability of dental implants significantly and keep a high level of stability for implants when achieving primary stability ≥ 70 . Bone density, dental implants diameter and length have no effect on primary implant stability, while dental implants diameter has a significant effect on secondary implant stability.