

PRF An Enrapture For Dental Implant Stability Quotient.

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Abstract

The aim of this article is to demonstrate the influence of PRF as a great aid in implant rehabilitation, especially in the bone deficient site with long standing periapical defect, where bone regeneration is required. Platelet rich fibrin (PRF) has a great potential for bone and soft tissue regeneration. In the present case study the stability of the implant was assessed using RFA device and changes in the ISQ (implant stability quotient) were demonstrated. In this article we report a immediate implant placement done in the extraction sockets along with PRF membranes in one surgical session under local anesthesia. Immediately after implant placement the ISQ was noted and after 3 months of the healing period, at stage II the ISQ was measured. A 12-month follow-up was made, and satisfactory esthetic and functional results were obtained.

Introduction

A dental implant is a titanium screw which is placed into missing tooth site. The implant mimics the root of a tooth in function. It is not only biocompatible, but actually fuses to the bone by osseointegration.¹ After healing is complete and the implant is anchored in the bone, an implant post or abutment and prosthetic crown can be attached in variety

of designs with intraosseously placed implant.² PRF is an autologous leukocyte-platelet-rich fibrin matrix composed of a tetra molecular structure, with cytokines, platelets, cytokines, and stem cells within it, which acts as a biodegradable scaffold that favors the development of micro vascularization and is able to guide epithelial cell migration to its surface. It has a complex architecture of strong fibrin matrix with favorable mechanical properties and is slowly remodeled, similar to blood clot . Some studies have demonstrated that PRF is a healing biomaterial with a great potential for bone and soft tissue regeneration, without inflammatory reactions and may be used alone or in combination with bone grafts, promoting hemostasis, bone growth, and maturation.³ Therapeutic applications of platelet-rich products have led to improved bone regeneration and faster titanium implant osseointegration, which improve the stability and maintenance of dental implants by increasing BIC. Studies have shown that the cation of growth factors via platelet-rich plasma (PRP), platelet-rich fibrin (PRF), or plasma rich in growth factors (PRGF) in the treatment of intrabony defects with or without bone grafts may lead to faster healing rates and enhanced bone formation.⁴ PRF is

a second-generation autologous platelet concentrate and is a fibrin mesh consisting of leukocytes and cytokines.

Case Report

A 42-year-old female patient presented with a mobile tooth 11. History revealed that the patient allegedly met with trauma and fractured 11. There was periapical infection in 11 which was confirmed with Orthopantomogram (Fig. 1). There was no relevant medical or surgical history. The treatment plan proposed was extraction of 11 and immediate implant placement with PRF. (Fig. 4)

The patient was informed about the relevant aspects of the treatment. Written consent was obtained from the patient for the same.

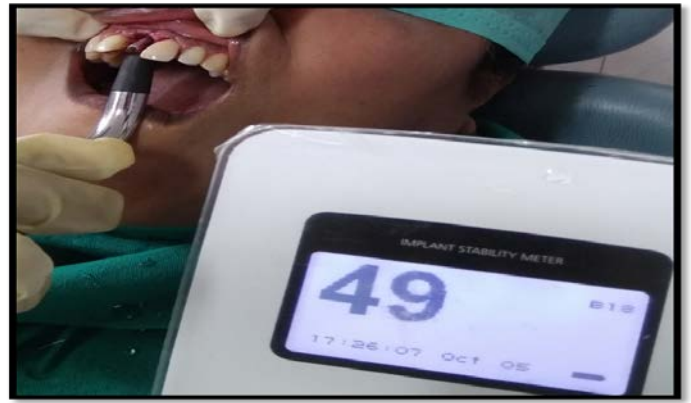


Fig. 3: ISQ value at Stage I



Fig. 4 : Implant placed with PRF



Fig. 1 : Pre op OPG of the patient



Fig. 2: Extraction of 11

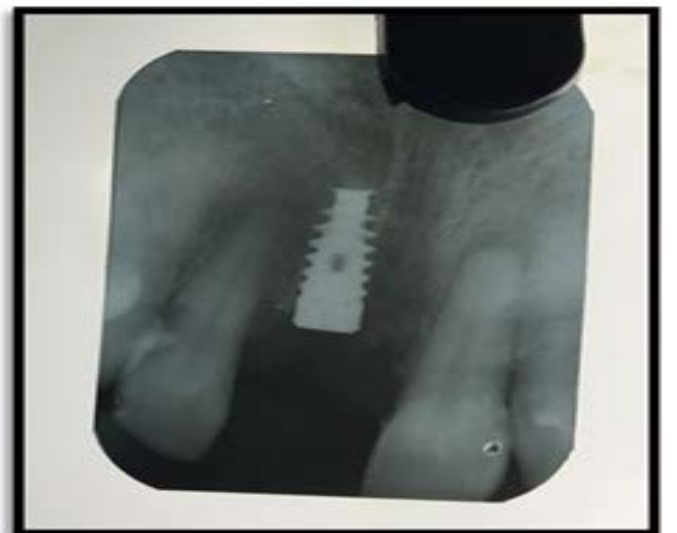


Fig. 5 : Postoperative IOPA



Fig. 6: ISQ value at Stage II

Procedure

An aseptic surgical technique was followed. The surgical procedure was done under local anesthesia. Extraction of tooth 11 was done (Fig.2) than With copious irrigation, implant osteotomy site was prepared in a sequential order. Implant placement was performed with PRF which is known as stage I surgery (Fig. 4). A Torque wrench was used to insert the implant in the osteotomy site. For Ostell ISQ values smart peg was placed over the implant and magnetic probe was placed near to smart peg to stimulate it and ISQ values were noted (Fig.3). A PRF membrane was placed to cover the implant placement site and final closure was done using sutures. A post-operative Intraoral Periapical Radiograph was taken to confirm the correct placement of implant (Fig.5).Sutures removal was done after 10 days post surgery. After the nonloaded osseointegrated period of 4-6 months, stage II surgery was performed. Smart peg was placed and using Ostell ISQ values were noted (Fig. 6). Then implant loading was done based on the readings.

Discussion

Implant stability is achieved at two different stages: primary and secondary. Primary stability of implant comes

from mechanical engagement with cortical bone. Bone quality, quantity, surgical technique, implant geometry, length, diameter and surface characteristics affect the primary stability. Secondary stability of implant comes from biological stability through bone regeneration and remodeling after the healing period. It begins to increase at 4 weeks after implant placement⁵. It is important for the clinician to know the implant stability at various time of osseointegration.

Presently, various diagnostic analysis have been suggested to define implant stability, but in this case we have taken insertion values and ISQ values to assess the implant stability objectively after the placement of implant and prior to loading of implant.

In this case, a significant correlation was seen between ISQ values for stage I and stage II, at stage I the ISQ was 49 and at Stage II it was 74. This clearly suggests that placement of PRF leads to higher secondary stability. It has been reported by **Huang HM, Chiu CI et al (2003)**⁶ that implants with better initial stability would result in higher secondary stability and required reduced healing periods than those placed with a lower stability. Similar results were shown by **M.Granic et al (2016)**⁷ in their study that higher initial stability results in higher secondary stability.

Conclusion

PRF application during implant surgery enhanced the stability of implants. Achieving early implant stability is beneficial for early loading and rehabilitation. Good secondary stability is attained by dense bone formation, which increases the longevity of the implant. In the present study, stability values in PRF treated implant showed significant difference. Initial burst of growth factors and their effect on healing and bone formation can be assumed to be the cause for significant raise in stability.

PRF can be successfully used as an adjunct with implant for better and early function. It is safe due to its autologous origin as there is no risk of immunogenic reaction or transmission of diseases and it has an early but short-term beneficial effect on the process of osseointegration as reflected by increased implant stability.

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