



Research Article

APPLICATION OF INJECTABLE PLATELET-RICH FIBRIN IN COMBINATION OF HYDROXYAPATITE FOR EXTRACTION SOCKET OF IMPACTED MANDIBULAR PREMOLAR

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ABSTRACT

Background: Different augmentation techniques are used in maxillofacial surgery to recover lost bone structures. Recent studies have suggested a new combination between bone graft materials and injectable Platelet-Rich-Fibrin (i-PRF) for bone augmentation.

Aim: The aim of this case report is to assess the possibility of combination of bone graft material and injectable platelet-rich-fibrin (i-PRF) for extraction socket of impacted mandibular premolar.

Materials and methods: An 22 year-old female with impacted 44 was treated with grafting of extraction socket using hydroxyapatite and injectable platelet-rich-fibrin (i-PRF). Patient was reviewed 3 months after the grafting.

Results: The postoperative period was uneventful. OPG showed adequate healing of the socket.

Conclusion: The successful clinical and radiographic result of the case suggest that using i-PRF can be beneficial for healing of extraction sockets.

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INTRODUCTION

Use of platelets in regeneration was demonstrated in the 1970s. Platelets produce various growth factors, which lead to cell division, differentiation, induction, and migration. It also helps in neovascularization and collagen synthesis. Therefore considered as potentiated cells for regeneration. Platelet-rich plasma (PRP) and platelet-rich fibrin (PRF) have been proposed for tissue regeneration in several studies.

In 2014, by adjusting spin centrifugation speed, an injectable platelet-rich fibrin (I-PRF) was proposed. The blood was centrifuged in non-glass centrifugation tubes at lower centrifugation speed and this resulted in a flowable PRF called I-PRF. I-PRF platelet concentrate is enriched with leukocytes and studies suggest it can promote both soft and hard tissue regeneration. PRF also helps in integration and modulation of bone structure. Using the PRF membrane accelerates the healing of soft tissues. The aim of this case report is to assess the possibility of combination of bone graft material and injectable platelet-rich-fibrin (i-PRF) for extraction socket of impacted mandibular premolar.

Case Report

An 22-year-old female was referred for treatment to the Department of Oral Surgery with impacted 44. Patient had previously sought orthodontist opinion and was advised to undergo extraction of the impacted premolar. On clinical

examination 44 was missing. To evaluate this further investigation were done. A CBCT was ordered and tooth was found to be buccal/labial impacted with a thin amount of bone covering the occlusal surface.

Surgical Treatment

After achieving adequate local anesthesia, incision was given and a full-thickness mucoperiosteal flap was raised. After adequate flap reflection, tooth was exposed. Adequate amount of bone was removed and tooth was sectioned and removed (fig 2a). Post extraction grafting of extraction socket was done using hydroxyapatite and injectable platelet-rich-fibrin(i-PRF) (fig 2b). The flap was adapted and tightly sutured. The patient was prescribed antibiotic and analgesics for 5 days. Patient was reviewed after a week for suture removal. Patient was again reviewed at 3 months after the grafting. The postoperative period was uneventful. OPG showed satisfactory healing of the bone (fig 3).

Preparation OF I-PRF

After the venipuncture 10 ml of blood was withdrawn from the patient. The blood was then immediately put into vacutainer without any anticoagulants. The tubes were then placed in a centrifugal machine at a 700 rpm for 3 minutes. i-PRF was then separated from the tube using a 5ml syringe. Aspirate was then mixed with hydroxyapatite crystals 5

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minutes later and was left for 15 minutes. The obtained membrane was then placed in extraction socket.

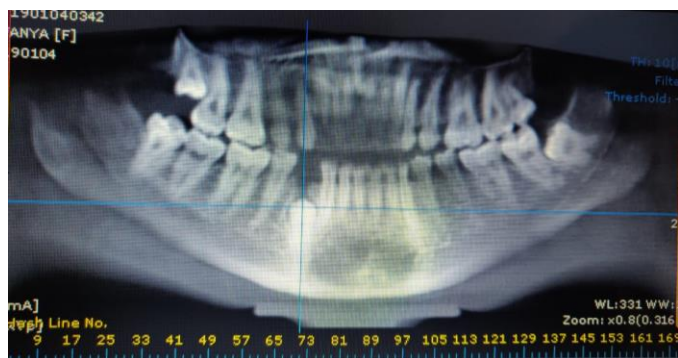


Fig 1 Preoperative radiograph



Fig 2a Extraction socket



Fig 2b Extraction socket with graft



Fig 3 Follow up radiograph 3 months

DISCUSSION

To form new bone structure, the bone graft material must possess biocompatibility and adequate strength to withstand the biomechanical stress. Bone grafts have a better fate if it is the region of good vascular supply. Adequate primary wound

closure is always advocated to maintain the vascularity and the condition of the adjacent bone also plays a vital role in integration of the graft. Adequate vascularity assures the necessary cells, growth factors and promoters required for bone formation. PRF promotes angiogenesis, stem cell activity and migration of osteoblasts in the central part of the graft.

According to Toffler *et al.* using PRF is beneficial in healing of the soft tissues. Some studies suggest that the use of PRF helps in reduction of postoperative pain, minimizes swelling and reduces the chance of any infection.

Yilmaz D *et al.* suggested that the use of PRF in combination with bone grafts could accelerate new bone formation when compared with the use of bone grafts alone.

Ozdemir H *et al.* conducted a study with use of PRF as a bone graft material in combination with rigid titanium membranes in calvarial defects for regeneration of bone defects in rabbit. The results of the combination of PRF and titanium membrane showed the better quantity and quality of new bone formation when compared with xenografts.

The clinical results in our case report shows that the addition of i-PRF to bone graft materials may enhance their properties. Mixing of bone graft material with i-PRF leads to increase bioavailability of growth factors within the wound. This combination helps in the migration of osteoblasts and enhances angiogenesis. Adding i-PRF to the bone graft reduces the required bone graft material volume and improves its handling properties. This also reduces the need to use a membrane after bone grafting. The use of PRF accelerates the healing of hard and soft tissues.

CONCLUSION

The clinical results achieved in this case report support the data found in the literature that the use of i-PRF may increase the amount of growth factors at the surgical site and possibly improve the qualities of the bone graft material. Further research and more clinical cases are needed to confirm the achieved results.

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