

GROWTH FACTORS AND FIBRIN NETWORK TO IMPROVE THE PARTICLE BONE GRAFTING CASE REPORT

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ABSTRACT

Researchers are persistently searching for ways to enhance the success of regeneration of periodontium. In studying the dynamics of cell-to-cell and cell-to-tissue interaction, scientists discovered the presence of growth factors. Platelet-rich plasma (PRP) was first introduced, followed by Platelets-rich fibrin. The studies have proved that “through activation of the platelets and the resultant release of growth factors, enhanced wound healing should be expected. This paper aims through a clinical case to demonstrate the efficiency and the facility of use of the modified MPM (Mineralized Plasmatic Matrix).

KEYWORDS: Modified MPM; Growth factors; Platelets

INTRODUCTION

The role of concentrated growth factors in dentistry is not to be demonstrated. The use and the effect of PRP (Platelets Rich Plasma) and the PRF (Platelets Rich Fibrin) is well documented in the literature. It is established that these growth factors, plays an important role in reducing the healing time of the soft and hard tissue.^[1-3] Using growth factors mixed with bone grafting particles may be a promising procedure to improve the healing of the hard tissue. The MPM (Mineralized Plasmatic Matrix), is a way to prepare the particles of bone grafting or bone substitutes, that makes it malleable, stable and enhances the penetration of growth factors inside the graft.

CASE REPORT

A 50 years old healthy patient, presenting a root fracture of the 14. The extraction and immediate implantation was decided. Using flat elevators, after local anesthesia, the extraction was done as non-traumatic as possible (Fig. 1). After the extraction, 4 tubes of 9 ml of patient's blood was taken, to prepare the Modified MPM. The venous blood was placed into the centrifugation machine

(Fig. 2) to separate the red blood cells from the platelets for 12 to 15 min at 2500 RPM. The result obtained after the centrifugation is a liquid yellow plasma on the top of the tube separated from the red blood cells in the bottom of the tube (Fig. 3). The yellow part is collected using a syringe (Fig. 4), and added to cup that contains the bone grafting materials. The whole thing was mixed for few seconds and the modified MPM was obtained (Fig. 4, Fig. 5 & Fig. 6). Once the modified MPM was ready, the implant placement started. The implant chosen was a nobel active 50/10 mm. Because of the root fracture, a part of the buccal plate was lost (Fig. 7 & Fig. 8). The implant was placed but the due to the buccal defect, the implant was not covered completely by the alveolar bone (Fig. 9). After Placing the implant, the modified MPM and its membrane was placed as a bone grafting to correct the bone defect. The implant was completely covered by the modified MPM and sutured (Fig. 10). The bone substitute that was used to prepare the modified MPM was Beta TCP with Hydroxy apatite. Then the suturing didn't cover completely the implant, but the implant was protected by the modified MPM and its membrane (Fig. 11). So the healing was by secondary intention. The patient was controlled one week later (Fig. 12), to check the healing, and then sawn 2 months later to place the healing abatement. While placing the healing abutment, 2 months later, the implant was completely covered by a new tissue (Fig. 13, Fig. 14, Fig. 15, Fig. 16, Fig. 17 & Fig. 18). 10 days later, the impression was taken and one week later the crown was placed (Fig. 19).

DISCUSSION

The modified MPM is a natural evolution of the PRP and the PRF. The interesting part in the modified MPM, is the mineral fraction, which is either autologous bone or any other bone graft or bone substitute. This mineral part is not present in old autologous growth factors membranes such as



Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig. 6



Fig. 7



Fig. 8



Fig. 9



Fig. 10



Fig. 11



Fig. 12



Fig. 13

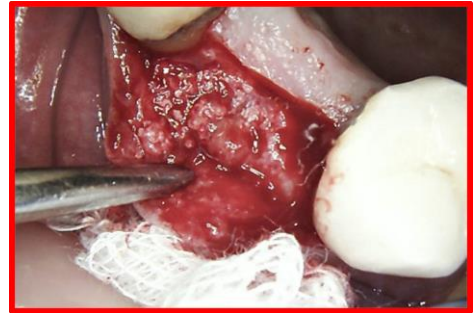


Fig. 14



Fig. 15

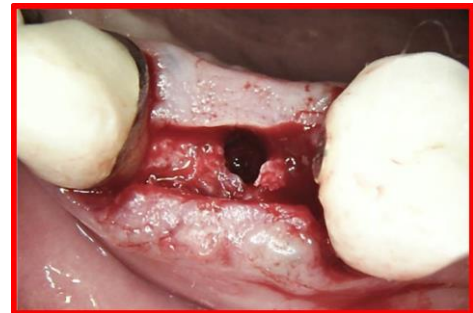


Fig. 16

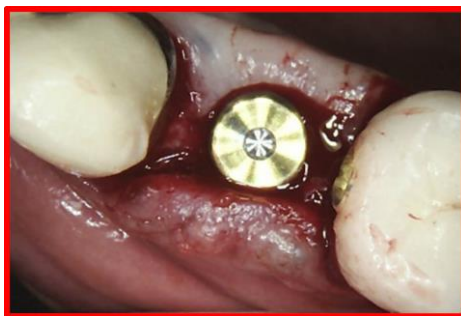


Fig. 17



Fig. 18



Fig. 19

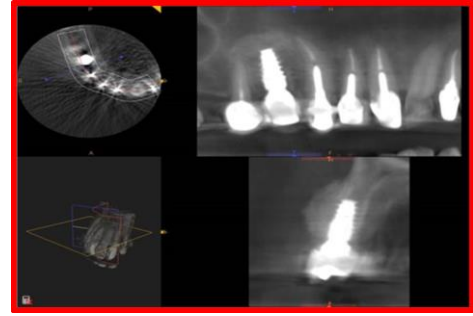


Fig. 20

PRF or PRP. This offers the modified MPM the stability and the resistance to the chewing forces.

In fact the use of PRP or PRF alone, will not conserve the created volume, because they cannot support the chewing forces and the muscles movements due to the pressure of the mimicry's patient.^[4] The plasma obtained after a single spin, is rich in platelets, fibrinogen and monocytes. The fibrinogen is necessary for the formation of the modified MPM. The Fibrinogen will be transformed into fibrin network under than action of calcium coming from the bone substitute, minerals and bone fragments.^[4] The platelets that will offers the growth factors and the monocytes once activated by the interleukins can enhance the production of BMP-2. The BMP-2 is a bone morphogentique protein that induce the bone formation. It is a high inductive protein.^[5] The growth factors, the fibrin network, offers the modified MPM an osteoinductive property.^[4] The use of the modified MPM will promote the healing of bone after the grafting and the healing time will be significantly reduced.^[5-9]

CONCLUSION

The modified MPM improves the grating techniques; either bio-material or autogenously grafting is used. Modified MPM conditioning according to the protocol, and because of the fibrin network produce a homogenous component starting from the mixture of two phases. Bone/Plasma offers advantages of security, reliability, easy handling and efficiency that makes today more predictable the biomaterials grafting. Preparing the filling material in the form of modified MPM is more favorable to a morphological integration of the site. Clinically, the use of grafting material in the form of modified plasma matrix mineralized (MPM) is interesting in all kinds of bone augmentation. Since the modified MPM improve the biomaterial retaining and fit the site. The modified MPM enhance transport of the material by securing its implementation.

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