Van Diş Hekimliği Dergisi
Van Dentistry Journal
Cilt 3 (2022) ~ Sayı 2 Sayfa: 37-41
ISSN(Online): 2757-6868 e-ISSN: 2757-6868

Olgu Sunumu / Case Report

Treatment of Intra-bony Defect Using Platelet Rich Fibrin: A 2 Years Follow-Up Case Report

Kemikiçi Defektin Trombositten Zengin Fibrin ile Tedavisi: 2 Yıllık Takip Vaka Raporu

Mohammed F.A ALKHATIB [1], Hacer ŞAHİN AYDINYURT [1], Nasser SHOSHAA[2]

[1] *Department of Periodontology, Faculty of Dentistry, Van Yuzuncu Yil University, Van, Turkey*
[2] *Department of Endodontisc, Faculty of Dentistry, Van Yuzuncu Yil University, Van, Turkey*

ABSTRACT: Periodontitis is a disease that causes progressive destruction of the tooth-supporting tissues. Clinical attachment loss, radiographic alveolar bone loss, periodontal pockets, and gingival bleeding are all symptoms of periodontitis. It is a poly-microbial disease with an inflamatory burden which can lead to tooth loss in the absence of proper treatment. The gold standard treatment of periodontitis is scaling and root planning, the purpose of periodontal therapy, both during the initial phases and during maintenance stages, is to make biologically acceptable tooth surfaces through subgingival and supragingival cleaning, which enables binding of the connective tissue to the biggest extent possible. Deep pockets usually need surgical intervention to provide a sufficient and enough cleaning to the root surface, open flap debridement along with the use of regenerative materials whether it is autologous or synthetized have given better results. Platelet-rich fibrin (PRF) is a next-generation autologous platelet treatment with a wide range of applications. Because of its fibrin matrix, cellular components, and sustained release of growth factors, PRF can be used as a primary or auxiliary approach in wound healing. Also the original L-PRF protocol allowed making larger clots / membranes and a more intensive releasing of growth factors than the modified A-PRF protocol. L-PRF is easy to get, can be used topically or in combination with other surgical procedures. In this case study open flap debridement along with L-PRF had been used and a 2 years follow up result showed the effectiveness of this treatment protocol.

Keywords: Intrabony defects, platelet rich fibrin, regeneration

ÖZET: Periodontitis, dişi destekleyen dokuların ileri derecede yıkımına neden olan bir hastalıktır. Klinik ataşman kaybı, radyografik alveolar kemik kaybı, periodontal cepler ve diş eti kanaması periodontitisin semptomlarındandır. Tedavi edilmediğinde diş kaybına yol açabilen inflamatuar yükü olan polimikrobiyal bir hastalıktır. Periodontitisin altın standart tedavisi diş taşı temizliği ve kök yüzeyi düzleştirmesidir, hem başlangıç aşamalarında hem de bakım fazında periodontal tedavinin amacı, bağ dokusunun mümkün olan en büyük ölçüde bağlanmasını sağlayan biyolojik olarak kabul edilebilir diş yüzeyleri oluşturmaktır. Derin cepler genellikle enfleme kök yüzeyine ulaşabilmek ve enfekte dokuları uzaklaştırmak adına cerrahi müdahaleye ihtiyaç duymaktadır, açık flep debridmanı ile otolog veya sentetik rejeneratif materyallerin kullanımı daha iyi sonuç vermektedir. Trombositten zengin fibrin (TZF), çok çeşitli uygulamalara sahip yeni nesil otolog trombosit tedavisidir. Fibrin matrisi, hücresel bileşenleri ve büyüme faktörlerinin sürekli salınımı nedeniyle, TZF yara iyileşmesinde birincil veya yardımcı bir yaklaşım olarak kullanılabilir. Büyüme faktörlerinin A-TZF'den daha yavaş salınması nedeniyle L-TZF kullanıldı. Ayrıca orijinal L-TZF protokolü, A-TZF protokolünden daha büyük pıhtıların/membranların üretilmesine ve büyüme faktörlerinin daha yoğun salınmasına izin vermektedir. TZF'nin elde edilmesi kolaydır, ucuzdur ve topikal olarak veya diğer cerrahi prosedürlerle birlikte kullanılabilir. Bu vaka çalışmasında açık flep debridmanı ile birlikte TZF kullanılmış ve 2 yıllık takip sonucu bu tedavi protokolünün etkinliğini göstermiştir.

Anahtar Kelimler: Kemikiçi defektler, rejenerasyon, trombositten zenginleştirilmiş fibrin

Sorumlu Yazar: Mohammed F.A Alkhatıb, DDS e mail: mohamedfawaz.1@hotmail.com

Gönderim Tarihi: 6 Nisan 2022; Kabul Tarihi: 1 Haziran 2022

INTRODUCTİON

Periodontal disease is a chronic inflammatory disease of the periodontium, and its advanced form is characterized by loss of the periodontal ligament and destruction of the supporting alveolar bone (1). The basic goal of periodontal treatment is to maintain a healthy functional periodontium in order to preserve the natural dentition. It includes patient encouragement and dental hygiene recommendations, as well as mechanical plaque and calculus removal, correction of plaque-retentive elements (such as overhangs), and risk factor reduction (eg. quitting smoking). Various terms have been used to explain this process such as mechanic therapy, cause-related periodontal treatment, nonsurgical periodontal treatment, initial periodontal treatment and hygiene phase treatment.

The regenerative technique selection is based on characteristics of the intra-bony defect location, including bony defect form, root surface topography, and gingival phenotype, that can affect the potential for regeneration. Shallow intrabony defects (less than 3mm) are best treated with a non-regenerative therapy. The number of bony walls is the most typical way to define the anatomy of an intrabony defect (1, 2, or 3 wall). Intrabony defects with three walls, especially those that are small and deep, appear to have the highest inherent potential for periodontal regeneration (2,(3). As a result, intrabony defects (such as the 1 and 2 wall) are frequently treated with a combination of regenerative techniques.

Regeneration in periodontal treatment can only restore a portion of the original tissue, while whole periodontal restoration still exemplary (4). Enamel matrix derivative (EMD) was developed to aid periodontal regeneration by simulating periodontal attachment tissue production (5). The advent of autologous platelet concentrates represents a new era in the use of chemical-biological components in periodontal therapy (6,7). Due to the development in the platelet rich concentrate formulations in the last decades, PRF was introduced and has been utilized as an autologous physiological concentration of growth factor without addition of anticoagulants (7,8), while in the first generation of the PRF bovine thrombin and calcium chloride (anticoagulants) were used, however the second generation platelet concentrates exclude the disadvantages of the use of bovine thrombin (9).

The platelet rich fibrin is a product that helps wounds heals faster. The effectiveness of platelet-derived growth factor (PDGF'S), transforming growth factor beta (TGF-beta) and other growth factors which found in the platelets not only seen in the early phases of wound healing, but they can also last for a long period and appear at a slower rate (6,10). It is also functions as an immune node, stimulating defensive systems (10). The role of fibrin matrix of PRF is that the fibrin is the innate guide of angiogenesis and creates a natural support to immunity. The metabolism of epithelial cells and fibroblasts is influenced by the fibrin matrix, which guides the covering of wounded tissue (8). There are a lot of PRF types such as (L-PRF, I-PRF, T-PRF, A-PRF and CGF). Standard leukocyte-rich PRF (L-PRF) and advanced A-PRF are excellent sources of leukocytes that influence chemokine and growth factor release directly (11), I-PRF is injectable and CGF is a concentrated growth factor. In vitro, the L-PRF membranes have potent impacts on the proliferation of most cell types (fibroblasts, keratinocytes, osteoblasts, bone mesenchymal stem cells) (12,13), and on the differentiation of the bone cells (12). No trace of bone morphogenetic protein (BMP2) could be found in the A-PRF, while slow release of BMP2 was revealed at least 7 days in the original L-PRF, also in vitro A-PRF

Sorumlu Yazar: Mohammed F.A Alkhatıb, DDS e mail: mohamedfawaz.1@hotmail.com

Gönderim Tarihi: 6 Nisan 2022; Kabul Tarihi: 1 Haziran 2022

membranes resorbes after less than 3 days, while the L-PRF membrane stayes in its shape at least 7 days. This study had done to show the ability of the PRF to stimulate bone regeneration in the intrabony defects.

CASE REPORTS

A 35 years old male patient applied to the Department of Periodontology, Faculty of Dentistry, Van Yuzuncu Yil University, he was complaining from a hypersensitivity and food accumulation in the posterior mandibular region between teeth, and he had no any systemic diseases. In the radiological examination a vertical bone loss was detected in the distal aspect of tooth #46 and the mesial aspect of tooth #44 (Figure 1d). In clinical examination 11 mm and 7 mm pocket depth was detected in tooth #46 and #44 respectively, and a class I furcation involvement was detected from the buccal aspect of tooth #46 (according to Glickman's classification of furcation defects).

Before starting the treatment a consent form was taken from the patient. Treatment protocol had done in two phases; the first was scaling and root planning (SRP) using ultra-sonic scaler and hand instruments (Gracey Curettes) and also oral hygiene instructions was given, the second phase was an open flap debridement, a sulcular incision was done and envelope flap was reflected (Figure 1a) from tooth #43 to tooth #47 using no.15 surgical blade, after that scaling and root planning, de-granulation, and irrigation using chlorhexidine and normal saline were done, then L-PRF (Figure 1b) applied in the vertical defects (L-PRF was prepared using centrifuge device, 2700 rpm for 12 minutes), and finally an interrupted suture was done using 5/0 non resorbable suture (polypropylene) (Figure 1c). After 10 days the patient came for control and taking out the sutures. An endodontic treatment for tooth #46 and new restoration was done.

Seven months later the patient came for follow up appointment, in radiological examination bone formation was detected (Figure 1e), the pockets were checked, the pocket depth had decreased from 11mm to 7mm in tooth #46, and from 7mm to 3mm in tooth #44. After 2 years from the surgery the patient came again for the follow up and it was detected that the pocket in tooth #46 had become 4mm and in tooth #44 stayed 3mm (Figure1f).

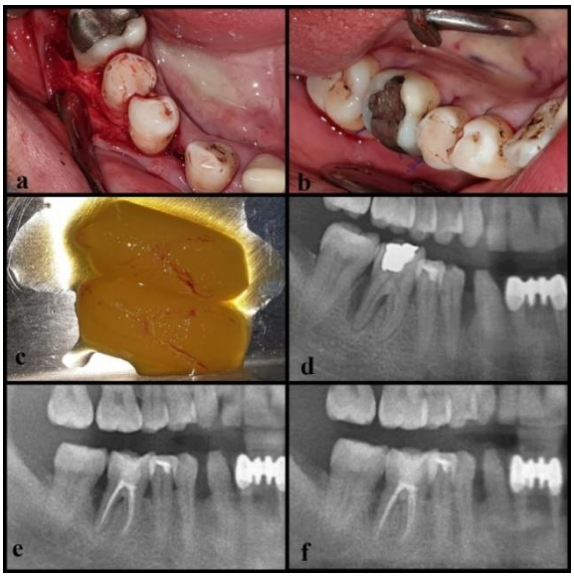

Figure 1. a) Flap release, b) Suturing directly post-operative, c) L-PRF, d) Pre-operative radiograph, e) Seven months post-operative radiograph, f) Two years post-operative radiograph showing complete healing and bone formation in the mesial defect of tooth #44 and also a bone formation in the distal defect of tooth #46.

DİSCUSSİON

In this case, treatment of intra-bony defects and deep pockets had been done applying L-PRF into the defects which is rich of leukocytes. As a result of this treatment a long term stable results were obtained, the patient have no longer sensitivity, pocket depths were healed and bone formation seen.

one of the most significant advantages of L-PRF is that it has a fibrin network which

Sorumlu Yazar: Mohammed F.A Alkhatıb, DDS e mail: mohamedfawaz.1@hotmail.com

Gönderim Tarihi: 6 Nisan 2022; Kabul Tarihi: 1 Haziran 2022

improves the blood clot formation and tissue repair mechanisms (14). More and more researches are pointing to the favorable effects of leukocytes on wound healing, tissue regeneration, and appropriate blood flow.

The use of PRF in the repair/regeneration of periodontal intra-bony defects has been studied in a lot of controlled randomized clinical trials (15,16). All of these studies showed that the use of L-PRF enhanced pocket depth reductions and clinical attachment loss gains, when make a comparison with open flap debridement without the use of PRF.

When placed into the periodontal pocket, L-PRF serves largely as a scaffold and may encourage tissue regeneration (10). More research is needed to understand which elements in L-PRF clots (leukocytes, growth factors, or fibrin matrix) are most important in accelerating periodontal tissue regeneration.

It's important to note that a histological examination would be required to know if the findings indicate periodontal regeneration or periodontal repair.

Most of the auxiliary canals are located in the apical portion of the root and lateral canals in the tooth furcation area. The connection between the root canal and periodontium can happen when dentinal tubules being exposed to the periodontium because of the lack of covering cementum. These are the causes that can provide the ways by which pathogens pass between the pulp and periodontium, thus forming the perioendo lesion (17,18). For this reason in this case root canal treatment was done.

CONCLUSİON

We concluded from this case report study that open flap debridement and L-PRF application in the management of intra-bony defects can be a good choice for bone formation and pockets healing especially because of long term sustainability of healing and bone formation that seen on radiologic x-rays.

REFERENCES

1. De Pablo P, Chapple ILC, Buckley CD, Dietrich T. Periodontitis in systemic rheumatic diseases. Nat Rev Rheumatol. 2009;5(4):218.

2. Garrett S. Periodontal regeneration around natural teeth. Ann Periodontol. 1996;1(1):621–66.

3. Wang H-L, Cooke J. Periodontal regeneration techniques for treatment of periodontal diseases. Dent Clin. 2005;49(3):637–59.

4. Bosshardt DD, Sculean A. Does periodontal tissue regeneration really work? Periodontol 2000. 2009;51(1):208–19.

5. Hammarström L, Heijl L, Gestrelius S. Periodontal regeneration in. J Clin Periodontol. 1997;24:669–77.

6. Choukroun J, Adda F, Schoeffler C, Vervelle A. Une opportunité en paro-implantologie: le PRF. Implantodontie. 2001;42(55):e62.

7. Miron RJ, Choukroun J. Platelet rich fibrin in regenerative dentistry: biological background and clinical indications. John Wiley & Sons; 2017.

8. Choukroun J, Diss A, Simonpieri A, Girard M-O, Schoeffler C, Dohan SL, et al. Platelet-rich fibrin (PRF): a second-generation platelet concentrate. Part IV: clinical effects on tissue healing. Oral Surgery, Oral Med Oral Pathol Oral Radiol Endodontology. 2006;101(3):e56–60.

9. Raja VS, Naidu EM. Platelet-rich fibrin: evolution of a second-generation platelet concentrate. Indian J Dent Res. 2008;19(1):42.

10. Dohan DM, Choukroun J, Diss A, Dohan SL, Dohan AJJ, Mouhyi J, et al. Platelet-rich fibrin (PRF): a second-generation platelet concentrate. Part II: platelet-related biologic features. Oral Surgery, Oral Med Oral Pathol Oral Radiol Endodontology. 2006;101(3):e45–50.

11. Cabaro S, D'Esposito V, Gasparro R, Borriello F, Granata F, Mosca G, et al. White cell and platelet content affects the release of

Sorumlu Yazar: Mohammed F.A Alkhatıb, DDS e mail: mohamedfawaz.1@hotmail.com

Gönderim Tarihi: 6 Nisan 2022; Kabul Tarihi: 1 Haziran 2022

bioactive factors in different blood-derived scaffolds. Platelets. 2018;29(5):463–7.

12. Ehrenfest DMD, Diss A, Odin G, Doglioli P, Hippolyte M-P, Charrier J-B. In vitro effects of Choukroun's PRF (platelet-rich fibrin) on human gingival fibroblasts, dermal prekeratinocytes, preadipocytes, and maxillofacial osteoblasts in primary cultures. Oral Surgery, Oral Med Oral Pathol Oral Radiol Endodontology. 2009;108(3):341–52.

13. Ehrenfest DMD, Doglioli P, Giuseppe M, Del Corso M, Charrier J-B. Choukroun's platelet-rich fibrin (PRF) stimulates in vitro proliferation and differentiation of human oral bone mesenchymal stem cell in a dose-dependent way. Arch Oral Biol. 2010;55(3):185–94.

14. Toffler M, Toscano N, Holtzclaw D, Corso M Del, Ehrenfest DD. Introducing Choukroun's platelet rich fibrin (PRF) to the reconstructive surgery milieu. J Implant Adv Clin Dent. 2009;1(6):21–30.

15. Sharma A, Pradeep AR. Treatment of 3-wall intrabony defects in patients with chronic periodontitis with autologous platelet-rich fibrin: A randomized controlled clinical trial. J Periodontol. 2011;82(12):1705–12.

16. Patel GK, Gaekwad SS, Gujjari SK, SC VK. Platelet-rich fibrin in regeneration of intrabony defects: a randomized controlled trial. J Periodontol. 2017;88(11):1192–9.

17. Christie WH, Holthuis AF. The endo-perio problem in dental practice: diagnosis and prognosis. J Can Dent Assoc. 1990;56(11):1005–11.

18. Whyman RA. Endodontic-periodontic lesions. Part I: Prevalence, aetiology, and diagnosis. N Z Dent J. 1988;84(377):74–7.

Mohammed F.A Alkhatıb, DDS " Treatment of Intra-bony Defect Using Platelet Rich Fibrin: A 2 Years Follow-Up Case Report" Van Diş Hekimliği Dergisi 2022:3(2); 37-41.

Sorumlu Yazar: Mohammed F.A Alkhatıb, DDS e mail: mohamedfawaz.1@hotmail.com

Gönderim Tarihi: 6 Nisan 2022; Kabul Tarihi: 1 Haziran 2022