Regenerative Surgery of Residual Defect After Non-Surgical Periodontal Treatment in a Patient with Advanced Periodontitis

İleri Periodontitis Hastasının Cerrahisiz Periodontal Tedavi Sonrası Rezidüel Defektin Rejeneratif Cerrahisi

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ABSTRACT

Periodontitis is a chronic inflammatory disease with destruction of tooth supporting tissues. There are multiple factors that affect the rate and pattern of destruction of this disease. Depending on the type of defect, various resective and regenerative surgical methods can be applied. In our case, regenerative surgery was performed on the tooth with a residual 2-walled defect after initial periodontal treatment. The platelet-rich fibrin membrane obtained from the patient's blood together with the bovine-derived granular bone graft was used in the operation area. The case, whose clinical and radiological results were successful in 6 months, showed that it can be beneficial to use these sources in combination.

Keywords: *Periodontitis, Regenerative periodontal surgery, Gingival recession, Platelet-rich fibrin, Acrylic temporary prosthesis*

ÖZ

Periodontitis diş destek dokularında yıkımla giden kronik enflamatuar bir hastalıktır. Bu hastalığın yıkım hızını, paternini etkileyen birden fazla faktör vardır. Defektin tipine göre çeşitli rezektif ve rejeneratif cerrahi yöntemler uygulanabilir. Olgumuzda başlangıç periodontal tedavi sonrası kalan rezidüel 2 duvarlı defekti bulunan dişin rejeneratif cerrahisi yapılmıştır. Sığır kaynaklı granüler kemik grefti ile beraber hasta kanından elde edilen trombositten zengin fibrin membran haline getirilerek operasyon alanında kullanılmıştır. 6 aylık sonucu klinik ve radyolojik sonucu başarılı olan vaka, bu kaynakların kombine olarak kullanılmasının faydalı olabileceğini göstermiştir.

Anahtar Kelimeler: *Periodontitis, Rejeneratif periodontal cerrahi, Dişeti çekilmesi, Plateletten zengin fibrin, Akrilik geçici protez*

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INTRODUCTION

Periodontitis is a chronic inflammatory disease that affects the supporting structures of the teeth, including the gingiva, periodontal ligament, alveolar bone, and cementum. The etiology of periodontitis involves multiple groups of bacteria. The destruction process begins with the induction of the host's immune response by pathogenic bacteria found in dental plaque, leading to irreversible damage in the surrounding tissues. Due to its chronic nature, this condition often begins and progresses without pain, making it difficult for patients to notice. Typically, patients seek clinical attention due to acute conditions such as periodontal abscesses.[1]

The severity of periodontitis varies from person to person, across different regions of the same individual and at different times in the same region.[2] Studies have shown that in areas where periodontal disease is active, there is a higher accumulation of plaque, and its removal becomes increasingly difficult. The effectiveness of the host's defense system is one of the main factors influencing the course and severity of the disease. While bacterial plaque is the primary factor in the development of periodontitis, local factors such as maladaptive restorations, tooth anatomy, the presence of caries, and root resorption facilitate plaque accumulation or exacerbate its effects, thus playing a secondary role in periodontal disease. Additionally, systemic factors, including smoking, genetic factors, stress, and dietary habits, are known to be risk factors for the initiation and progression of periodontal disease.[3,4]

The primary goals of periodontal treatment are the elimination of pathogenic microflora to prevent periodontal infections and the treatment of defects caused by active periodontitis. In defects resulting from destruction, the regeneration of the lost tissue can be achieved through guided bone regeneration.[5] The main aim of guided bone regeneration is to restore the supportive tissue lost due to disease and prevent early epithelial migration to ensure healing does not occur via repair. Bone grafts used for this purpose can be applied both independently and in combination with other regenerative materials.[3]

Bone defects, which arise in various types and widths in the alveolar bone due to periodontal disease, have been classified into three main categories based on morphological criteria to assist clinicians in diagnosis, treatment, and prognosis: 1. Suprabony defects, 2. Infrabony defects, a. Intrabony defects, b. Craters, 3. Interradicular defects (Furcation defects).[6] Clinically, the diagnosis of periodontal defects is made by measuring clinical attachment levels and radiographic evaluation. Due to the superimposition in radiographic evaluation and the limited information provided by two-dimensional images, it is essential to support the findings with clinical data.[7]

CASE PRESENTATION

A 34-year-old systemically healthy, non-smoking male patient presented to the Periodontology Department of Ege University Faculty of Dentistry with complaints of gingival hyperplasia, mobility, and pain in his teeth. Clinical and radiological examinations revealed widespread attachment loss in the maxillary anterior teeth, periodontal abscess, and malposition of the teeth. The clinical diagnosis of the case was stage 4 periodontitis with bone loss extending to the apical third of the root and grade C due to the progression of destruction. (Figures 1, 2)

The initial periodontal treatment of the patient began with tooth surface cleaning. Subsequently, following the extraction of teeth #21 and #23, which had Miller Class 3 mobility, and after the healing of the extraction sites, the periodontal treatment was completed without surgery. This included root surface planing at each session for one half of the arch, along with antibiotic support (Tetracycline 500 mg tablet, twice daily for 8 days). The probing depths at the beginning of treatment and at the second-month follow-up are shown in the table. (Table 1)

On a percentage basis, the area with a probing depth of 7 mm or greater, initially 14%, reduced to 2% following the extraction of hopeless teeth and periodontal therapy of the remaining teeth. The area with probing depths between 4 to 6 mm decreased from 10% to 4%.

At the 2-month follow-up after non-surgical periodontal treatment, probing depths in tooth #13, which showed insufficient reduction, were measured as mesial 6.5 mm, distal 7.2 mm, buccal 7.5 mm, and palatal 4 mm. The presence of healthy tissue on adjacent teeth suggested a possible intrabony defect topology, leading to the planning of periodontal regenerative surgery. (Figure 3)

For the regeneration of the intrabony defect in tooth #13, along with the closure of the buccal surface gingival recession, a coronally positioned flap technique was chosen.8 (Figure 4). To avoid creating a second surgical site, Platelet-Rich Fibrin (PRF) was selected as an alternative to connective tissue grafts for covering the root surface.[9]

Figure 1.

Figure 1, 2: Photographs and radiographs taken at the time of the patient's first visit to the clinic.

Table 1. Periodontal measurements of the patient before and after treatment.

	Initial			Post operative		
Probing depth	**Mean (mm)**	**Number of sites**	**%**	**Mean (mm)**	**Number of sites**	**%**
Full mouth (mean)	3,5	168	100	2,9	150	100
0-3	2,6	128	76	2,7	141	94
4-6	5,1	16	10	4,3	6	4
≥7	7,2	24	14	7,1	3	2
Bleeding of probing			83			6

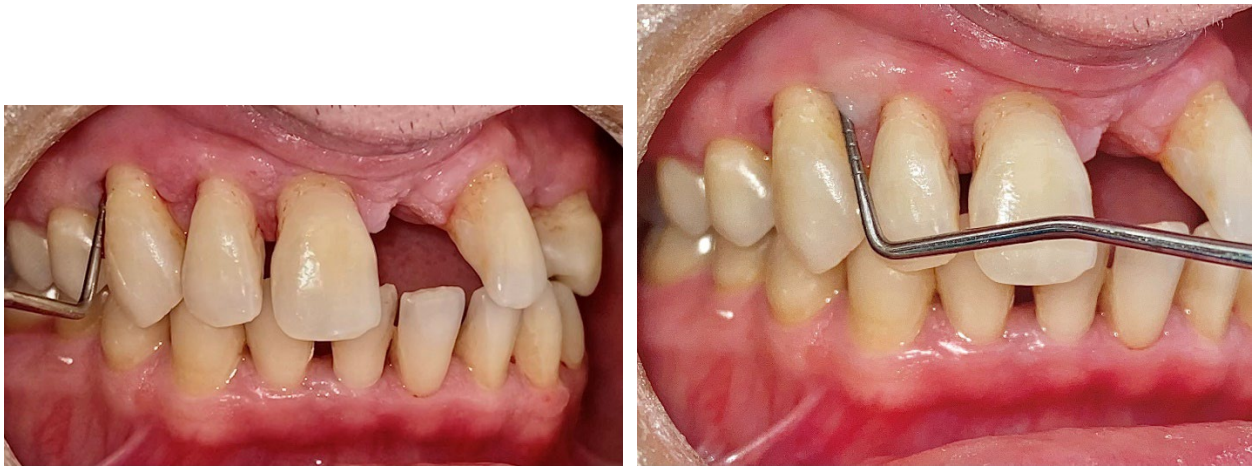

Figure 3. Clinical appearance after non-surgical periodontal treatment.

The flap was elevated, and granulation tissue was cleaned. During the same session, a blood sample was collected from the patient in a non-coagulant, glass-coated 10 ml plastic tube. The blood samples were centrifuged at 2700 rpm for 12 minutes. The prepared PRF membrane was compressed in the PRF BOX (Kruger, Istanbul, Turkey). A fine granular bone graft (Cerabone Botiss, Berlin, Germany), hydrated with the plasma exudate, was applied along the borders of the intrabony defect.1 The prepared membrane was placed over the graft, and the flap was released and repositioned coronally to cover the defect and close the recession. The wound was closed with 5-0 and 6-0 polypropylene sutures. (Figures 3,4)

No complications were observed post-surgery. Sutures were removed on the 10th day. The patient was recalled for follow-up visits at 1, 2, 3, and 6 months, and the case was evaluated both clinically and radiographically. (Figures 5,6)

Pre-surgical probing depth in the affected tooth was 7.3 mm, and at the 6-month follow-up, it measured 4.2 mm. The average clinical attachment level, initially 8.8 mm, reduced to 3.4 mm. The mobility, initially classified as Miller Class 1, was reduced to 0, and the vestibular gingival recession, initially 3 mm, was reduced to 0.25 mm. The root coverage achieved was approximately 91%.

Due to aesthetic concerns arising from the loss of teeth #21 and #23 for periodontal reasons, a temporary acrylic palatal prosthesis was fabricated. (Figure 7)

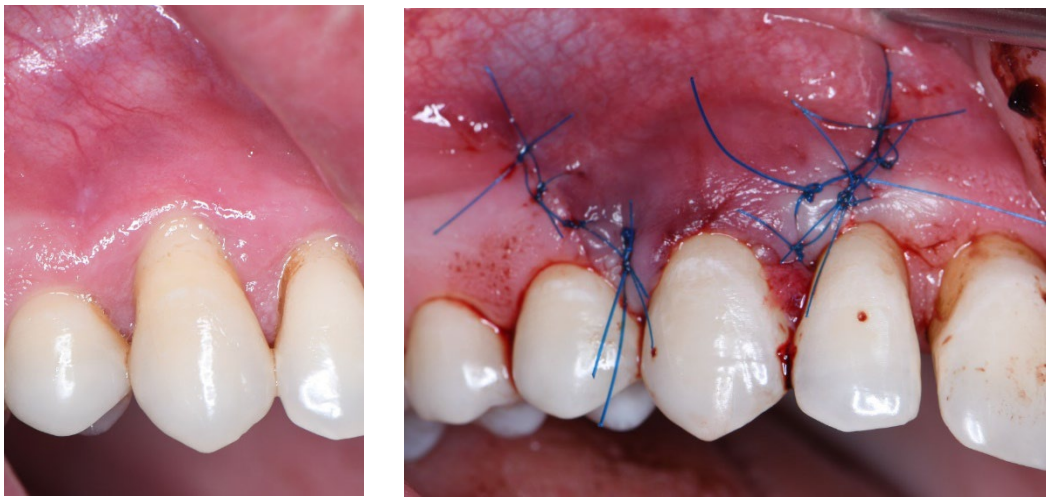

Figure 4. Pre-operative and post-operative photographs.

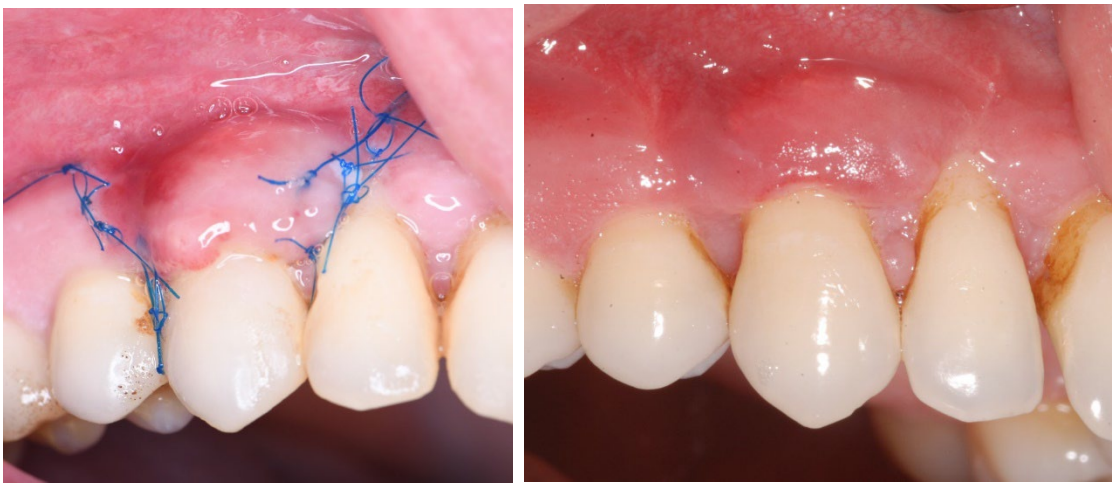

Figure 5. Photographs taken on the 10th day and at the 6-month follow-up after the surgery.

Figure 6. Radiographs taken at the beginning of treatment and at the 6-month follow-up.

Figure 7. Temporary prosthesis.

DISCUSSION

One of the main aesthetic concerns following periodontal regenerative surgery is the occurrence of gingival recession in the soft tissues. Although minimal invasive surgical techniques aim to reduce this issue, it remains a potential problem. The use of connective tissue grafts during surgery has been shown to yield more aesthetic results.8 In our study, the goal was to achieve root surface coverage along with periodontal regeneration; however, we aimed to utilize Platelet-Rich Fibrin (PRF), an alternative to connective tissue, for this purpose.[9]

In the early stages of healing in periodontal regeneration, stabilization of the blood clot in the defect site is crucial for the success of regeneration. After the preparation of PRF, its hemostatic effect, which helps stabilize the bone graft and clot in the defect site, contributes to improved wound healing. Additionally, PRF application prevents epithelial cell migration by inhibiting the adherence of the clot to the tooth structure. Literature indicates that there is an increase in clinical attachment gain and bone filling in direct proportion to the depth of the intrabony defect treated with regenerative therapy.[4]

Aroca et al. compared the use of a coronally advanced flap combined with a PRF membrane to a coronally advanced flap alone in the treatment of gingival recession. They reported that while the addition of PRF did not have a positive effect on root surface coverage, it did increase gingival thickness.[10] While subepithelial connective tissue grafts are more successful for root surface coverage, PRF can be used as an alternative.[9]

CONCLUSION

Within the limitations of our study, the coronally advanced flap technique, combined with PRF membranes as an alternative to connective tissue grafts, can be used for the treatment of intrabony defects with the aim of achieving root surface coverage. Further clinical controlled studies on more patients are needed to support these preliminary findings.

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