



# Flap surgery with bone graft and periodontal membrane in generalized chronic periodontitis patient

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## ABSTRACT

**Objectives:** The aim of this case report is to present a flap surgical procedure with bone graft and periodontal membrane in generalized chronic periodontitis patients.

**Case Report:** A 51-years-old male patient came to RSGM Saraswati bringing a referral from a colleague for dental and periodontal treatment. The patient came with complaints that the lower left gingiva often feels swollen, pain and mobility. Clinical examination revealed edema, sulcus exudate and positive percussion on tooth 36, the deepest pocket depth of 13 mm on the disto-buccal site. X-ray and blood laboratory examinations were carried out

before surgery. Flap surgery is performed by internal bevel, sulcular and horizontal incisions with opening of the envelope flap, cleaning and smoothing of bone defects, application of collagen bone grafts and periodontal membranes, suturing with absorbable suture on the periodontal membrane and nylon on the gingiva flap.

**Conclusion:** Flap surgery with bone graft and periodontal membrane is one of the options for reconstructive surgery to repair periodontal tissue in cases of generalized chronic periodontitis. The results showed the repair of periodontal tissue both soft tissue and alveolar bone of tooth 36.

**Keywords:** Flap surgery, bone graft, periodontal membrane, chronic periodontitis

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## INTRODUCTION

Chronic periodontitis is a destructive inflammatory process that originates from an unequal interaction between oral microflora in plaque and host defense mechanisms, affecting and causing damage to the periodontal tissue, and the level of tissue damage is directly proportional to oral hygiene.<sup>1</sup> Progressive attachment loss in the form of gingival pockets, damage Periodontal ligament and cementum and alveolar bone destruction are advanced stages of chronic periodontitis that often occur at any age with characteristics of horizontal bone destruction.<sup>2</sup>

Regenerated periodontal flap is a histological concept in which all the supporting tissues of the tooth namely gingiva, cementum, periodontal ligament, and alveolar bone are reconstructed according to the condition of the tissues at the initial condition.<sup>1,3,5</sup> The ultimate goal of periodontal treatment is to maintain teeth in relatively functional condition and in good health. Periodontal flap surgery is one of the regeneration surgeries of the periodontal tissue to gain visibility and accessibility in cleaning granulation tissue, applying bone grafts and membranes periodontal/guide tissue regeneration (GTR).

Bone graft material functions as a scaffolding structure and matrix for attachment and proliferation of osteoblast cells to form new bone

structures.<sup>4</sup> The function of bone graft is osteoinduction by adding chemical molecules such as BMP (Bone Morphogenetic Protein) to induce mesenchymal and osteoprogenitor cells to activate osteoblasts. Osteoconduction is a physical effect in which the matrix forms a scaffold so that new bone can form (osteogenesis). Osteogenesis contains living cells capable of differentiation and bone formation.<sup>4,5,6</sup> The surgical procedure in this case uses a type of bone graft alloplast with collagen and can function as osteoinduction and osteoconduction.

In addition to requiring a bone graft as a scaffold to achieve new bone formation, the regeneration flap surgery procedure requires a periodontal membrane or Guided Tissue Regeneration (GTR) to maintain the shape of the gingiva and provide opportunities for bone growth. The periodontal membrane is a barrier to hold the gingival epithelium and corium from the root surface. Barrier membranes are also useful for achieving the primary intention of wound healing, isolating the defect from the gingiva and stabilizing the blood clot.<sup>6,7,8,9.</sup>

The main goals of periodontal therapy are to treat infections caused by periodontal pathogenic biofilms and restore periodontal tissue attachment and bone loss, ultimately preventing tooth loss. The

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purpose of this case report is to present a flap surgical procedure with bone graft and periodontal membrane in a chronic periodontitis patient and control the progress of treatment and the results obtained.

**CASE REPORT**

A 51 year old male patient came to RSGM Sarasawati bringing referrals from colleagues for dental and supporting tissue treatment. Patients come with complaints of gums and lower back teeth often feeling swollen and painful. Previously the patient had been scaling but still felt sick and the patient denied having a systemic disease, the patient wanted further treatment. Clinical findings

include signs of inflammation throughout the upper and lower jaw, swelling of the gingiva region 36 accompanied by purulent exudate in the buccal area of the tooth (Figure 1(A) and (B)). Pocket depth on 36 teeth mesio-buccal 3mm, median-buccal 6mm, disto-buccal 13mm then mesio-lingual 3mm, median-lingual 3mm, disto-lingual 6mm. Examination of region 36 percussion is positive, mobility grade 1, there is recession in the disto-buccal region, and there is a gold crown on the crown of the tooth. The diagnosis in this case was generalized chronic periodontitis (36 Stage III Grade A). Complete blood count showed no abnormalities.

The treatment plan for this case was comprehensive, starting with removing the etiology of plaque and calculus by scaling and root planing (Figure 3(A)). Then adjuvant local antibiotic therapy (Figure 3(A)).



**Figure 1.** (A) Front view of clinical conditions and (B) Left side view of clinical conditions



**Figure 2.** Panoramic radiographic image of tooth 36 shows a radiolucent image along the root, illdefined border, periodontal ligament space and lamina dura disappear, vertical alveolar bone resorption. radiodiagnosis revealed a periodontal abscess on tooth 36



**Figure 3.** (A) Scaling and root planing of all regions and (B) Adjuvant therapy (25% metronidazole gel) region 36



**Figure 4.** (A) Anesthesia 37, 36, 35. (B) Modified Widman technique incision (internal bevel, sulcular and horizontal). (C) Open the flap with a periosteal elevator



**Figure 5.** (A) Cleaning of granulation tissue with a surgical excavator and gracey curette accompanied by root planing on teeth 37, 36, 35. (B) Cleaning and smoothing of bone defects from granulation tissue in the periosteum with a file. (C) Bone graft application with Ossteon II Collagen brand



**Figure 6.** (A) Periodontal membrane in areas 37, 36, 35. (B) Suturing the periodontal membrane with absorbable suture, suturing regions 37,36,35 with interrupted technique with nylon thread. (C) Installation of periodontal dressing



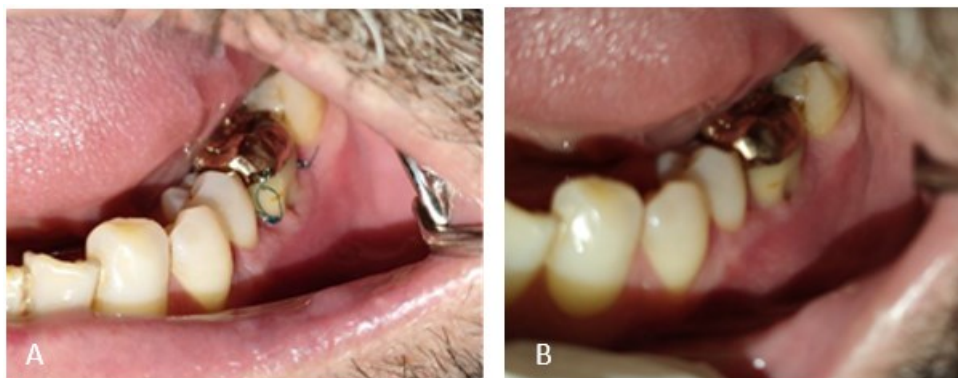
**Figure 7.** (A, B, C) Control 1 week postoperatively, the dressing is intact, open the dressing, the stitches are still good, 0.9% NaCl irrigation

(25% metronidazole gel) was performed in region 36.

After the evaluation of the initial phase followed by the surgical phase. Periodontal flap surgery with a combination of bone graft (Ossteon II) and GTR (Guided Tissue Regeneration) periodontal membrane in regions 35, 36, 37. The patient then signed the consent form for medical action after

being explained about the treatment procedure and the patient did not mind if the case was published.

Local anesthetic measures were in the form of supraperiosteal injections in the buccal region 37, 36, 35, and injections in the lingual area using supraperiosteal techniques (Figure 4(A)). The shape of the incision uses a modified Widman technique, the internal bevel follows the shape of the cervical



**Figure 8.** (A) Control at 3 weeks; (B) After suture removal with 0.9% NaCl irrigation and oral hygiene instruction



**Figure 9.** Control of 3 months in gear 37-35 pockets has been reduced

surface of the teeth both on the buccal and lingual surfaces in regions 37, 36, 35, followed by sulcular and horizontal incisions (Figure 4(B)). The gingiva and alveolar mucosa are detached from the bone as deep as 1-3 mm apical to the crest of the alveolar bone using a periosteal elevator. The periosteal elevator was inserted between the gingiva and the tooth and the flap was reflected via blunt dissection (Figure 4(C)). Debridement action to take granulation tissue in the outer pocket and take part of the necrotic alveolar bone until it is clean so that the surface of the bone or periosteum looks clean, the edges of the bone are flattened with a bone file (Figure 5 (A and B)).

The bone graft material was then applied up to the crest of the alveolar bone and then the periodontal membrane was applied as a barrier to the bone graft (Figure 5(C) and 6(A)) and suturing was performed (Figure 6(B)). Application of periodontal dressing after suturing (Figure 6(C)).

## DISCUSSION

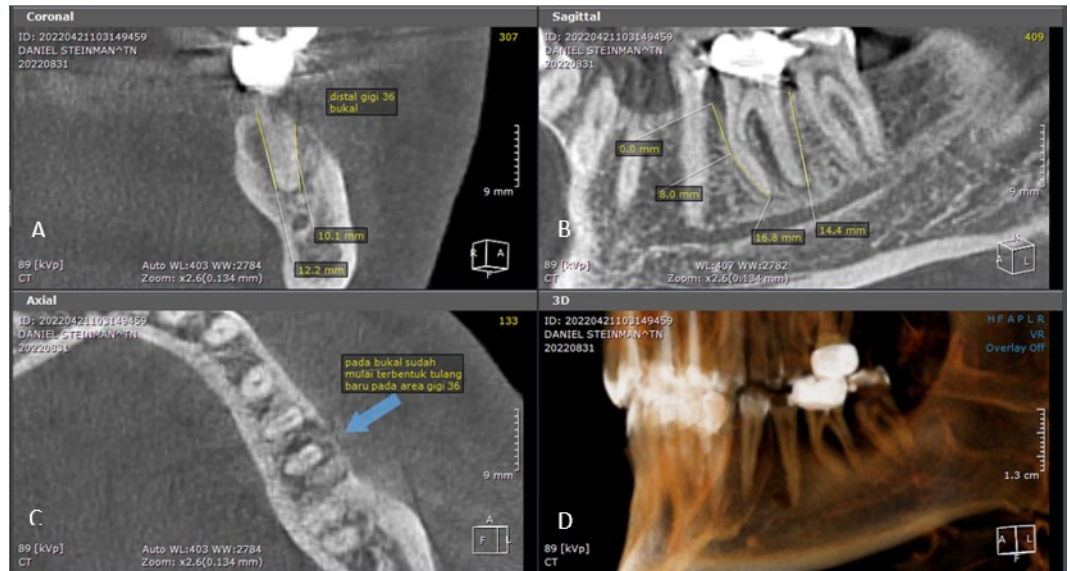
Patient evaluation was carried out at 1 week (Figure 7 (A, B, C)), 3 weeks (Figure 8(A and B)), 3 months post-therapy (Figure 9 (A)), and 6 months post-surgery to see the radiographic results alveolar bone repair. The results of regenerative periodontal flap surgery with a combination of bone graft and periodontal membrane (alloplastic collagen) in region 36 showed good results in pocket elimination from a pocket depth of 6-13 mm, while

the control pocket depth was 3-4 mm in the control 1 month and 2-3mm in control at 3 months. Bleeding on probing (BOP) and signs of inflammation were not found again (Figure 9). Probing examination showed pocket depth from 13mm to 3mm.

Control 6 months after surgery, alveolar bone height in disto-buccal region alveolar bone defect 36 showed good results. Figure 10 (A) CBCT coronal view shows the distance from the alveolar bone apex to the apical disto-buccal 10.1 mm, the distance from the alveolar bone crest to the apical disto-lingual is 12.2 mm. Figure 10(B) sagittal view shows the alveolar crest to apical mesial distance of 16.8 mm, alveolar crest to apical distal distance of 14.4 mm.

The successful treatment of regenerative flap surgery is clinically proven by reduction of probing pocket depth and reduction of bleeding on probing score together with reformation of the dento gingival environment enabling effective oral hygiene measures. This clinical improvement should ideally be accompanied by an increase in clinical attachment level (CAL) and bone filling seen radiographically.<sup>10</sup> Three factors that affect the success of this bone formation are scaffold (bone graft), barrier (periodontal membrane), growth factor.<sup>11</sup>

The use of autogenous bone graft is one of the best types where the donor is taken from the patient's own body, for example from the iliac bone which has osteogenic properties and is identical as a bone former. However, the synthetic Alloplastic bone graft used in this case report contains collagen



**Figure 10.** Controls 6 months postoperatively by CBCT radiography, (A) Coronal view, (B) Sagittal view, (C) Axial view, and (D) 3D view

and hydroxyapatite and is good enough as a scaffold that allows osteoblasts to occupy the graft space to stimulate repair and new bone formation. A good synthetic bone graft is a bone graft that is structurally and compositionally similar to natural bone. The collagen-hydroxyapatite composite is a synthetic bone graft that closely resembles bone from many perspectives.<sup>6,12,13,14,15</sup>

The periodontal membrane is very important as a barrier that limits the connective tissue and bone or bone graft to allow sufficient time for alveolar bone regeneration and repair. The important requirements of the periodontal membrane as a barrier are biocompatibility, space making, cell-occlusiveness, mechanical strength, degradability, and most of these conditions are present in the periodontal membrane used in this case report.<sup>7,8,9,16,15,17</sup>

Growth factor is also an important factor in the success of periodontal reconstructive surgery and is naturally present in blood cells in vascularization, so that the three success factors for the formation of bone and periodontal tissue can be achieved. The results obtained in flap surgery with bone grafts and periodontal membranes show very good results. Clinically, there is a decrease in periodontal pockets, signs of inflammation disappear, BOP (bleeding on probing) decreases, new gingival attachment is achieved and bone formation occurs well, seen from radiographs. with 6 month control.<sup>17</sup>

## CONCLUSION

Flap surgery with bone graft and periodontal membrane gives good results in cases of generalized chronic periodontitis, as seen from the healing of the periodontal tissue, decreased signs of inflammation, decreased BOP (Beeding on Probing) clinical pocket reduction as well as new gingival attachment and increased bone regeneration seen

from The maximum height of the alveolar bone peaks seen radiographically can be seen from the 6-month control CBCT image that appears coronal to increase at the apical disto-buccal 10.1 mm, previously the pocket depth was 13mm. Periodic control is essential for long-term maintenance of surgical results.

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## FOOTNOTES

All authors have no potential conflict of interest to declare for this article. Informed consent was obtained from the patient for being included in this case report.

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