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CASE REPORT

Are We Overlooking Our 'Gold Mine'? Use of Symphysial Autograft for Treatment of Periodontal Osseous Defect

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ABSTRACT

This case report presents a technique for utilizing autogenous corticocancellous graft from the mandibular symphysial area to fill a three-walled infrabony defect in a patient diagnosed with generalized aggressive periodontitis. After debridement, a 9 mm defect was present distal to the mandibular first molar. Autogenous bone graft harvested from the mandibular symphysial region was placed in the defect. There was a significant fill at the site 9 months postoperative and a reduction in probing depth was recorded at 4 mm.

Keywords: Autogenous bone grafts, Osteogenesis, Periodontal defects.

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INTRODUCTION

Periodontal regeneration refers to the restoration of supporting tissues of teeth, such as bone, cementum and periodontal ligament to their original healthy levels before damaging effects of periodontal pathogens resulted in tissue loss.[1] The key to tissue regeneration is stimulation of a cascade of healing events which in a coordinated manner result in completion of integrated tissue formation.[1] Periodontal regeneration has been achieved most successfully using either osseous grafting or guided-tissue regeneration (GTR).[2] The conventional approach of surgical debridement and respective procedures for correction of periodontal pockets resulted in healing by formation of the long junctional epithelium.[3]

CASE REPORT

A 32-year-old male patient reported to the Outpatient Department of SGT Dental College, Hospital and Research Institute, Gurgaon. His chief complaint was mobility of the lower right posterior teeth for the past 1 month. The patient gave no relevant medical history. Patient did not give any relevant medical history and there was no systemic condition that could interfere with physiological wound healing. The patient had undergone oral prophylaxis procedure once around 4 years ago. There was no history of dental trauma or orthodontic treatment, and no injurious habit was reported by the patient. The patient's comprehensive intraoral examination, revealed no abnormalities in the lining mucosa, tongue, floor of the mouth, hard and soft palate. Gingiva was reddish pink in color, while gingiva in relation to lower right mandibular first molar was erythematous and slightly enlarged. There was generalized bleeding on probing present but no swelling and no pus exudation was noticed. No mobility was detected in relation to 46 and fremitus was found to be negative precluding the possibility of trauma from occlusion. There was a periodontal pocket of 9 mm distal to the mandibular right first molar. Intraoral periapical radiographs (IOPA) confirmed the presence of a three-walled infrabony defect distal to 46. Hard tissue examination did not reveal any other significant finding. An extraoral examination revealed no deviation of mandible and no clicking of temporomandibular joint. The right submandibular lymph nodes were palpable, mobile, soft in consistency and slightly tender on palpation. Keeping all the findings in the mind, a thorough treatment plan was decided, including the following series of therapeutic procedures:

1. Oral hygiene instructions and motivation of the patient in performing effective oral hygiene measures.
2. Nonsurgical periodontal therapy after a period of 1 week by means of conventional scaling and root planing, using curettes and ultrasonic instruments.
3. Recall after 2 weeks and reexamination of the patient after the completion of healing after 2 weeks following nonsurgical periodontal therapy. Pocket probing depth (PPD) was measured found to be 8 mm.
4. Surgical periodontal therapy was done 2 weeks after the reexamination of the patient after completion of healing following nonsurgical periodontal therapy.

The surgical treatment plan for the patient was to perform an open flap debridement in the region of 46 and use of bone graft to fill the osseous defect. The patient was given an option of use of an alloplast but due to his economic constraints the patient refused this option, but he still did not want an extraction.

An alternative treatment plan of utilizing an autogenous bone graft from the mandibular symphysis region was given to the patient for whom he agreed/gave his consent. As there

were economic considerations, an orthopantomograph (OPG), IOPA X-rays of mandibular anterior region and a lateral cephalogram were taken for the patient to assess the feasibility of obtaining a symphysial graft instead of a single cone-beam computed tomography (CBCT). The radiographic assessment revealed enough bone depth in the region to safely obtain a graft.

SURGICAL TECHNIQUE

Intraoral antisepsis was performed with 0.2% chlorhexidine digluconate rinse and iodine solution was used to carry out extraoral antisepsis. Both the donor and recipient sites were examined (Figs 1 and 2). Following administration of local anesthesia, a flap was raised using vestibular incision to expose the symphysial region (Fig. 3). A 3 mm trephine drill was utilized to obtain a corticocancellous graft from the region (Figs 4 to 6). The donor site was then sutured using a 2-layer technique consisting of internal suturing for a tension-free flap closure (Fig. 7). The periosteum and muscle layers were sutured using resorbable a vicryl sutures (4-0, ethicon) using a horizontal mattress technique, the external flap was suture during nonresorbable silk sutures (3-0 ethicon).

In the region of the recipient site, a full thickness mucoperiosteal flap using Kirkland incision was reflected

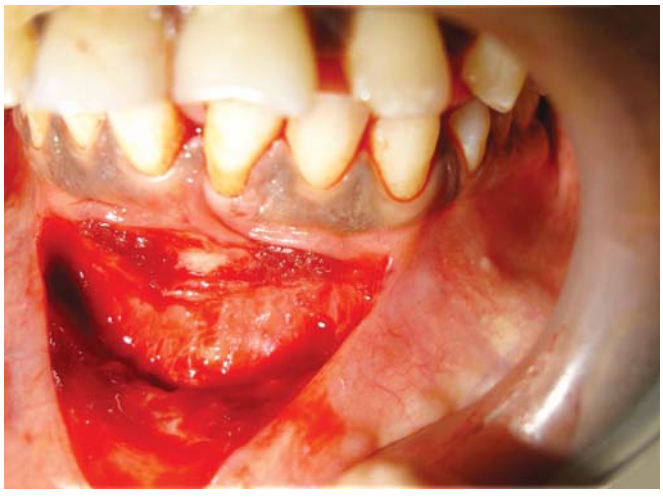

Fig. 3: Vestibular incision at donor site

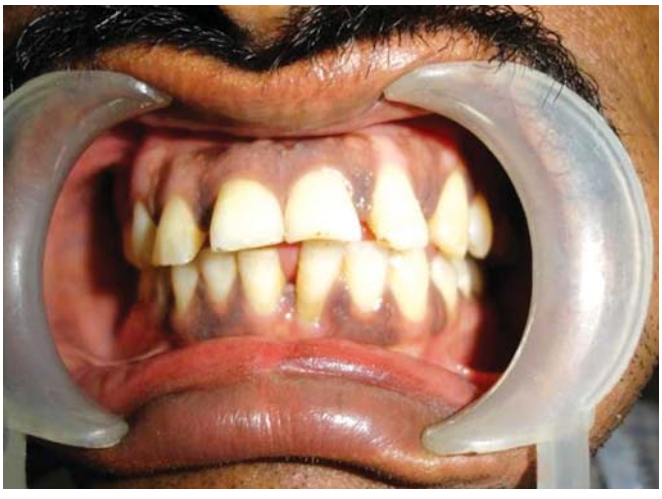

Fig. 1: Preoperative photo of donor site

Fig. 4: Harvesting of bone graft from the donor site by using trephine bur and micromotor handpiece

Fig. 2: Preoperative photo of recipient site

Fig. 5: Donor site after harvesting

Fig. 6: Harvested graft

Fig. 8: Reflection of the flap at recipient site

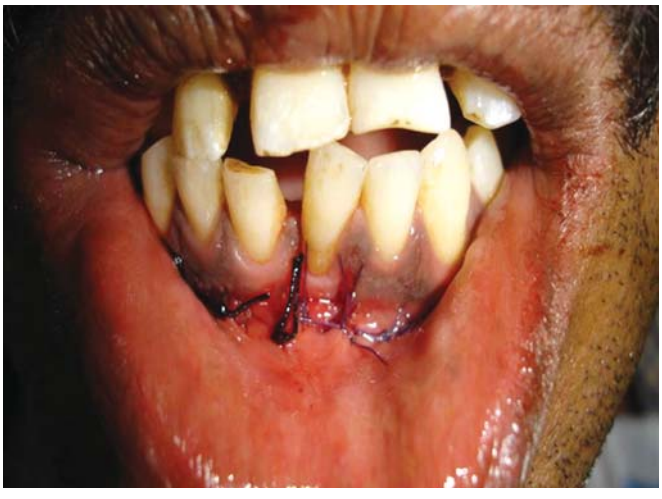

Fig. 7: Suturing at donor site

Fig. 9: Bone graft placed in the osseous defect

from the region of 45 to 47 (Fig. 8). No vertical relieving incisions were given, this was done to achieve maximum coverage of the graft. Meticulous defect debridement and root planning were carried out using ultrasonic instruments and area-specific curettes. No osseous recontouring was carried out. The harvested bone graft was packed into the osseous defect (Fig. 9). The recipient site was the sutured using interrupted sutures (Fig. 10).

Postsurgical Treatment and Follow-up

The patient was given an injection of dexamethasone phosphate 4 mg IV. He was prescribed an antibiotic coverage with ofloxacin-ornidazole combination (500 mg BD) and was given ibuprofen 400 mg BD along with serratiopeptidase 10 mg TDS, per day for 5 days. The patient was advised to apply cold pack in the harvested site area to control postoperative bruising and swelling. The patient was instructed to avoid brushing in the regions of surgery and was prescribed a 0.12% chlorhexidine mouthwash for rinsing twice daily for a week. The sutures were removed after a week and the patient was then advised to start mechanical plaque control using a soft brush.

Fig. 10: Suturing at recipient site

The patient was put on a recall of 1, 3, 6 and 9 months. The 3 months recall showed uneventful healing along with

no complaints of paresthesia or drooping in the chin area (Fig. 11). A 9 months follow-up revealed that the donor site region had also healed uneventfully (Fig. 12) and a decrease in the probing depth to 4 mm and the postoperative IOPA X-rays showed a good bony fill in the region of the osseous defect (Figs 13 and 14).

Fig. 11: Postoperative photo of donor site

Fig. 12: Postoperative photo of recipient site

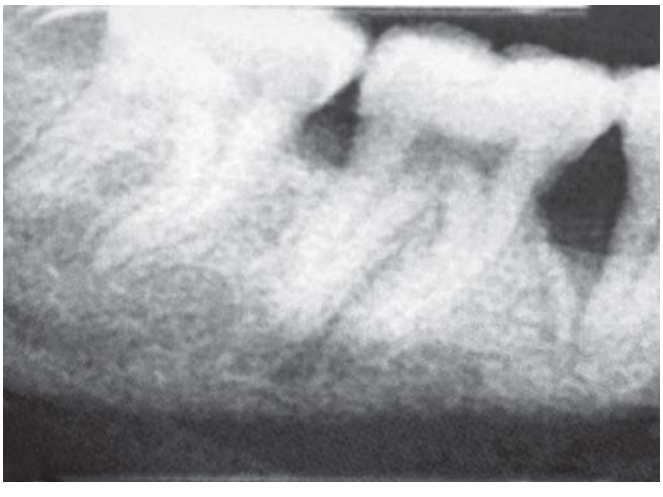

Fig. 13: Preoperative periapical radiograph

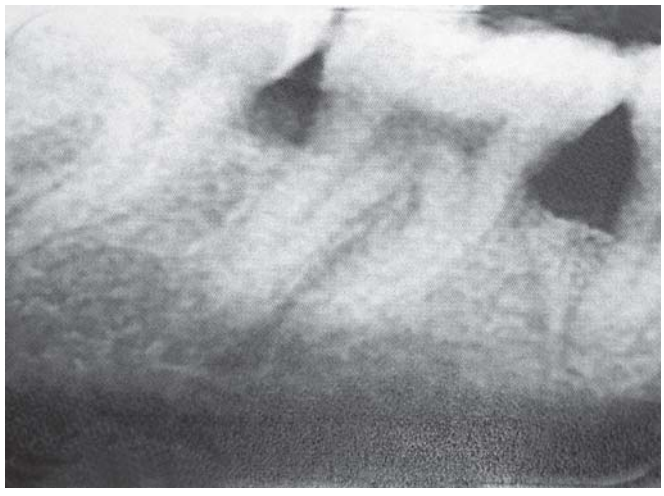

Fig. 14: Postoperative periapical radiograph (9 months)

DISCUSSION

Bone is composed of the outer cortical layer and the inner cancellous layer. The dense haversian systems of cortical bone provide skeletal strength. Interposed between the cortices is a three-dimensional lattice network of trabeculae that acts as a reservoir for active bone metabolism.[4] This bony architecture is dynamic with a continuous remodeling to repair and shape the bone to ensure renewal of form and function. The principles of osteogenesis, osteoconduction and osteoinduction can be used to optimize therapeutic approaches to bone regeneration.[5] Osteogenesis has been described as the direct transfer of vital cells to the area that will regenerate new bone. Osteoconduction embraces the principle of providing the space and a substratum for the cellular and biochemical events progressing to bone formation. The space maintenance requirement for many of the intraoral bone augmentation procedures allows the correct cells to populate the regenerating zone.[6] Osteoinduction embodies the principle of converting pluripotential, mesenchymal-derived cells along an osteoblast pathway with the subsequent formation of bone.

A bone graft is a tissue or material used to repair a defect or deficiency in contour and/or volume.[4] The considerations that govern the selection of the material have been defined by Schallhorn (1977):[7]

- Biologic acceptability
- Predictability
- Clinical feasibility
- Minimal operative hazards
- Minimal postoperative sequeal
- Patient acceptance.

Bone replacement grafts are the most widely used treatment options for the correction of periodontal osseous defects.[8] Bone grafts fall into four general categories: Autografts, allografts, xenografts and alloplasts. The use

of these materials in regenerative procedures is based on the hypothesis that they possess osteogenic potential (contain bone-forming cells), are osteoinductive (contain bone inducing substances), or simply are osteoconductive (serve as a scaffold for bone formation).[4]

Autogenous bone harvested from intraoral or extraoral sites is the most predictable osteogenic organic graft for osseous tissue regeneration.[9,10] Extraoral sites, such as the iliac crest, provide adequate quantity of graft material with excellent osteogenic, osteoinductive, and osteoconductive properties, but have a high morbidity related to the second surgical site.[4]

In 1923, Hegedus attempted to use bone grafts for the reconstruction of periodontal osseous defects.[11] In 1965, Nabers and O'Leary revived the method and numerous efforts have been made since, that time to define its indications and technique.[12]

The particulate autograft is the gold standard for most craniofacial bone grafting, including the treatment of dental implant-related defects.[4] Several studies demonstrated the effectiveness of particulate autograft.[4]

Out of various sites from where autogenous bone graft can be harvested, symphysis menti is the safest area to obtain it, as follows:[13]

- It has no major surgically important anatomical landmarks around it
- Graft obtained is corticocancellous in nature
- There is minimal resorption of the harvested bone graft; proximity to the recipient site and therefore reduced morbidity
- No hospitalization
- Convenient surgical access
- No cutaneous scar formation.

However, there have been rare reports of postoperative morbidity[13]

- Loss of sensation of local chin area
- Extensive reflection of the mentalis muscle may lead to loss of facial contour, since one of the main functions of this muscle consists of elevating the lower lip.

CONCLUSION

Autogenous bones harvested from intraoral or extraoral sites are nonimmunogenic and contain osteoblasts and osteoprogenitor stem cells, which are capable of proliferating.[1] It is thus the most predictable osteogenic organic graft for osseous tissue regeneration and is thus considered as 'Gold Standard' amongst bone grafts. Within the limits of the study, it is suggested that autogenous bone grafts are most predictable for periodontal regeneration and the symphysis menti is an excellent source for obtaining this corticocancellous graft.

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