

Case Report

Different Surgical Approaches for the Management of Periodontal Intrabony Defects in the Anterior Maxilla

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ABSTRACT

This article reports the outcomes of judicious management of periodontal intrabony defects in the anterior maxilla with a long-term follow-up. Two cases reported with a deep probing pocket depth along with an osseous defect due to chronic periodontitis. After completion of nonsurgical periodontal and endodontal therapy, guided tissue regeneration was undertaken for both the cases. Freeze-dried bone allograft along with a biphasic cross-linked collagen membrane was used in the osseous defect. The patients were then recalled for professional scaling on a regular basis. The long-term follow-up of both the cases showed a resolution of the probing pocket depth and radiographic evidence of bone fill in the osseous defect with stable results.

KEYWORDS: Endo-perio lesion, interdisciplinary approach, microsurgery, tissue regeneration

Received: October, 2018.

Accepted: November, 2018.

INTRODUCTION

Chronic periodontitis is an infectious disease resulting in inflammation within the supporting tissues of the teeth, progressive attachment, and bone loss and is characterized by pocket formation and/or recession of the gingiva.^[1] The relationship from the pulp to the periodontium was first described by Simring and Goldberg in 1964.^[2] Since then, the term “endo-perio lesion” has been used to describe lesions of varying degrees in both the periodontium and the pulp. Although numerous authors have classified these lesions, the most commonly used classification is by Simon *et al.*^[3] as follows:

1. Primary endodontic lesion
2. Primary periodontal lesion
3. Primary endodontic lesion with secondary periodontal involvement
4. Primary periodontal lesion with secondary endodontic involvement
5. True combined lesion.

Successful management of such lesions depends on careful clinical evaluation, accurate diagnosis, and structured approach to treatment planning for both

the periodontic and endodontic components. The predictability of periodontal regeneration is influenced by multiple factors related to the patient (e.g., smoking and compliance), defect site (e.g., bony morphology, root topography, and gingival biotype), surgical technique, and early supportive periodontal care.^[4] This case series presents periodontal management of a single-rooted anterior teeth with and without endodontic treatment depending on the diagnosis of the type of endo-perio lesion.

CASE SERIES

Case 1

A 32-year-old male reported with a complaint of pus drainage from maxillary anterior tooth for 1 month. He was diagnosed with localized chronic periodontitis with an angular osseous defect [Figure 1a], and deep pocket

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How to cite this article: Padhye NM, Joshi AA, Agrawal AM. Different surgical approaches for the management of periodontal intrabony defects in the anterior maxilla. J Int Clin Dent Res Organ 2018;10:93-6.

Access this article online	
Quick Response Code: 	Website: www.jicdro.org
	DOI: 10.4103/jicdro.jicdro_13_18

of 9 mm [Figure 1c] was found on the mesiobuccal aspect of 12. There was absence of tenderness on percussion and normal response to an electric pulp vitality tester and to a cold test.

Thorough debridement was done after raising a full-thickness mucoperiosteal flap using ultrasonic scaler (Suprasson P5 Booster, Satelec, France), and the granulation tissue was curetted out with Gracey curettes (Hu-Friedy, Chicago, IL, USA). Intrabony moat type defect was present with 12 [Figure 1d] which was grafted with freeze-dried bone allograft (Bone and Tissue Bank, Tata Memorial Hospital, Mumbai, Maharashtra, India) [Figure 1e] and covered with a cross-linked biphasic resorbable collagen membrane (Heal I Guide, Advanced Biotech Products Pvt. Ltd, Chennai, Tamil Nadu, India) [Figure 1f]. Flaps were repositioned to attain primary closure using 4-0 black silk sutures [Figure 1g]. The patient was reevaluated again at the end of 6 months where probing pocket depth was reduced to 3 mm [Figure 1h], and radiographic evidence of bone fill was present [Figure 1b].

Case 2

A 37-year-old male reported with a complaint of mild pain and pus drainage from upper left front tooth for 4 months. The patient had a history of trauma 2 years back, but the tooth was asymptomatic then. Pain started 4 months back and was dull and throbbing which aggravated on chewing or eating hot foodstuff. The patient also noticed pus discharge from the gums for 2 weeks.

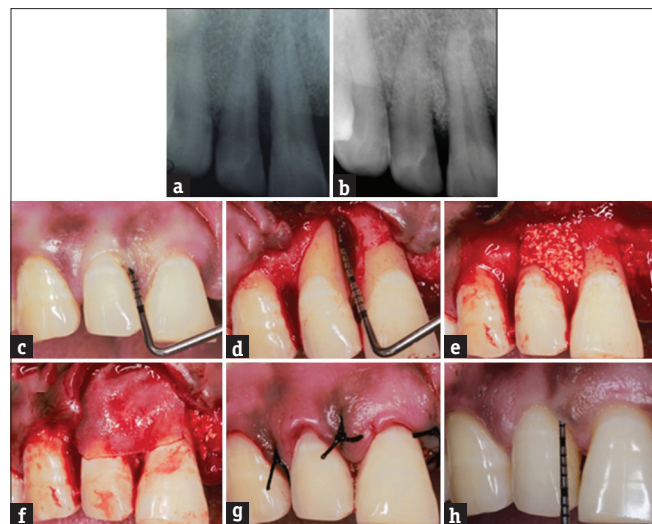


Figure 1: (a) preoperative radiograph showing interdental bone loss, (b) 6-month follow-up showing radiographic evidence of bone fill, (c) preoperative probing pocket depth of 9 mm, (d) moat type intrabony defect, (e) intrabony defect grafted with freeze-dried bone allograft, (f) biphasic cross-linked collagen membrane placed, (g) suturing, and (h) 6-month follow-up showing decrease in probing pocket depth to 3 mm

Intraoral clinical examination revealed a deep precipitous pocket measuring 13 mm at the mesiobuccal line angle of the tooth along with purulent discharge [Figure 2f]. A sinus tract was noted at the base of the pocket on the labial mucosa with respect to 22. The tooth gave no response to an electric pulp vitality tester and to a cold test and was tender on percussion. Radiographical examination showed a patent root canal with respect to 22. Radiolucency was noted from the apex of the tooth till the crest of the bone on the mesial surface of the tooth [Figure 2a]. A diagnosis of primary endodontic with the secondary periodontal lesion and pulpal necrosis was inferred. An interdisciplinary treatment plan was formulated for the patient.

Endodontic access and cleaning and shaping of the canal were carried out using the crown-down and step-back technique up to an apical file size #60 (Mani Inc, Utsunomiya, Japan) [Figure 2b and c]. Copious irrigation with 5% sodium hypochlorite (I-Dent, Delhi, India) was done during the root canal debridement, and calcium hydroxide powder (ProDent, Ratnagiri) mixed with 0.9% normal saline was placed as an intracanal medicament. Subsequently, the tooth was obturated using gutta-percha and AH Plus Sealer (Dentsply Maillefer, Ballaigues, Switzerland) using lateral compaction technique [Figure 2d].

Following this, sulcular incision and two vertical releasing incisions were given, a full-thickness trapezoidal mucoperiosteal flap was raised, and thorough debridement was performed using hand and ultrasonic instruments [Figure 2g].

The apex of the tooth was located using a dental operating microscope (OPMI Pico, Carl Zeiss Pvt Ltd, Germany) at $\times 1.6$ [Figure 2h]. Apicoectomy was performed for the tooth where the apical 3 mm of the tooth was resected [Figure 2i], and retropreparation of 3 mm was done using an ultrasonic tip AS3D (Endosuccess Apical Surgery Kit, Acteon, Merignac, France) [Figure 2j]. A mineral trioxide aggregate (MTA) cement (ProRoot MTA, Dentsply Maillefer, USA) was placed at the tip of the tooth to seal off the apex [Figure 2k and l].

Freeze-dried bone allograft was placed in and around the defect [Figure 3a] and supported using a bioabsorbable biphasic cross-linked collagen membrane [Figure 3b]. The flap was approximated and supported with sling sutures. The sinus tract opening was closed using sutures [Figure 3c]. The patient was instructed to maintain the area using an interproximal brush. No attempt at probing or deep scaling was made till 1 year following the surgery. At 6 months,

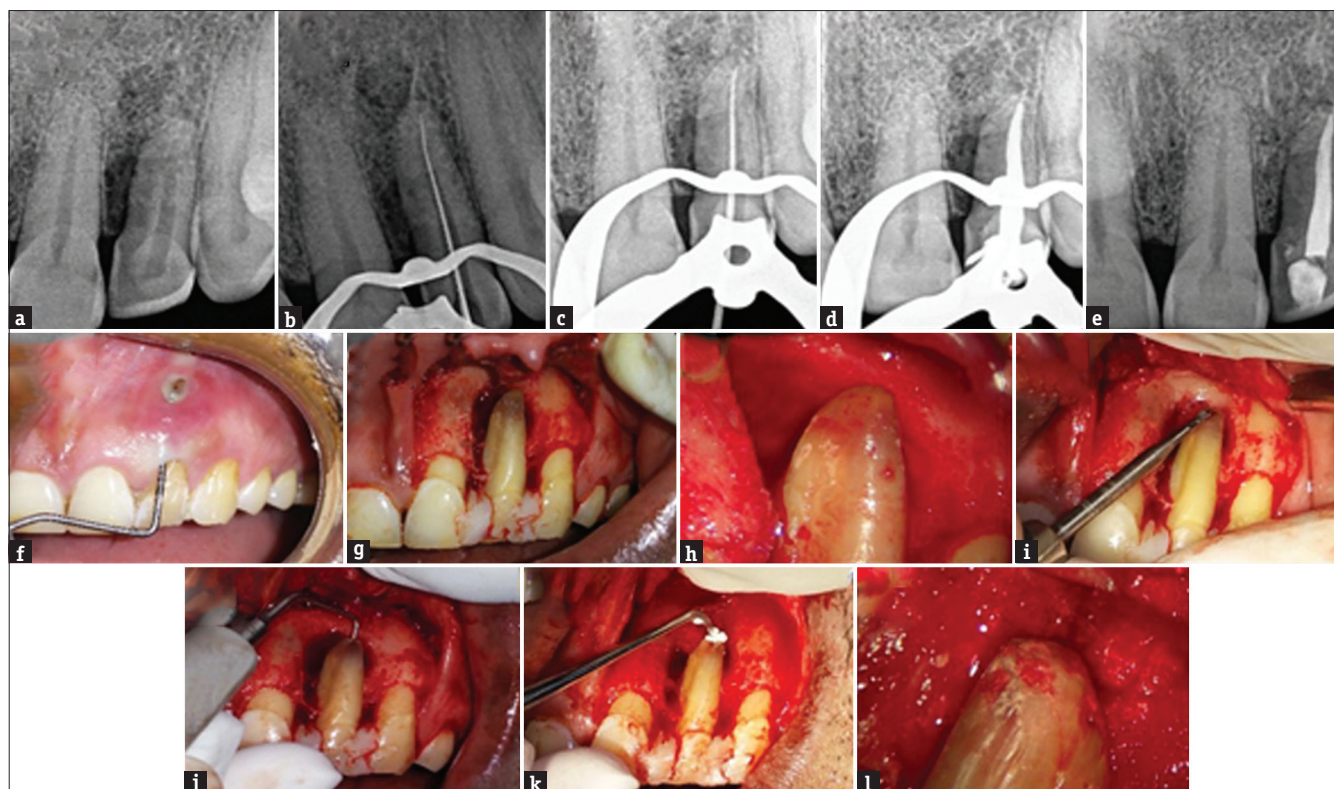


Figure 2: (a) preoperative radiograph, (b) working length radiograph, (c) master cone #60 radiograph, (d) postobturation radiograph, (e) 2-year follow-up showing radiographic evidence of bone fill, (f) probing pocket depth of 13 mm, (g) debridement completed, (h) apex of the tooth located using a dental operating microscope, (i) apicoectomy performed, (j) retro-preparation done, (k) tooth apex sealed off using mineral trioxide aggregate cement, and (l) sealed apex of the tooth visualized under dental operating microscope

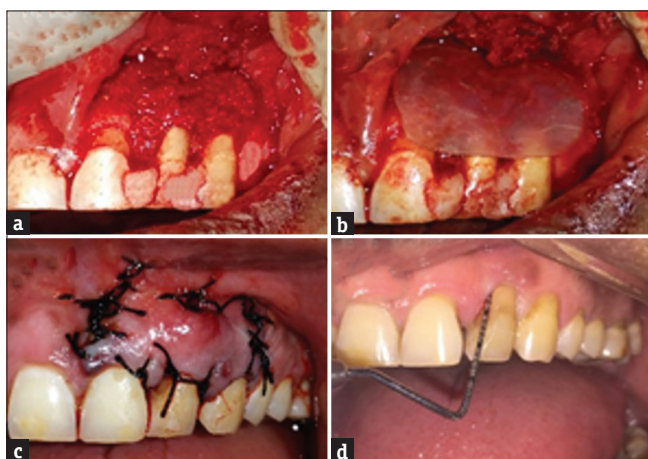


Figure 3: (a) osseous defect grafted using freeze-dried bone allograft, (b) biphasic cross-linked collagen membrane placed, (c) suturing, and (d) 2-year follow-up showing decrease in probing pocket depth to 5 mm

radiographic evidence showed a disappearance of the radiolucency. Figures 2e and 3d show the 2-year follow-up after the surgery, where the probing pocket depth reduced to 5 mm, and radiograph shows the presence of bone fill in the previously existing osseous defect. Thus, an 8-mm gain of clinical attachment along with bone fill in the osseous defect was achieved by this procedure.

DISCUSSION

The extent of the bone defect, the grade of mobility, and the involvement of pulpal tissue dictated the difference in treatment protocols in these cases. The first case due to its uncomplicated nature with no endodontic involvement could be managed successfully with surgical periodontal regenerative therapy protocol. With respect to the treatment of intrabony defects, the results of meta-analysis conclude that bone grafts increase bone level, reduce bone loss, increase clinical attachment level, and reduce probing pocket depths when compared to open flap debridement procedures.^[5]

Endo-perio lesions are common conditions and often pose a challenge for the diagnosis and treatment. The most important factor to be considered in treating such lesion is to establish the vitality of the involved tooth. Case 2 had a history of trauma along with pulp vitality test showing the nonvital nature of the tooth. Therefore, root canal treatment was initiated for 22. Since the initial apical file size was #45, endodontic cleaning and shaping was done till #60, that is, three times larger. Calcium hydroxide dressings were given every week as the hydroxyl ions released in the aqueous medium caused an antibacterial effect in the root canal system.^[6]

Apical root resection of 3 mm was performed to eliminate the apical ramifications.^[7] Furthermore, after retropreparation, MTA was chosen as a retrofilling material because of its ability to provide an excellent marginal seal. MTA has been shown to have the capacity to induce cell response stimulating the adherence of osteoblasts to it.^[8]

The success rate of the endo-perio combined lesion without concomitant regenerative procedure has been reported to a range from 27% to 37%.^[9] This highlights the need for periodontal interventional therapy for a combined lesion. The freeze-dried bone allograft served a dual purpose of space maintenance along with its osteoconductive ability. Bone fill is also enhanced by addition of a graft material to guided tissue regeneration procedures.^[10] Predictable outcomes can be achieved for sites treated with a bone graft along with guided tissue regenerative therapy. The combination of the same was used in this case series.

CONCLUSION

Treatment outcomes for intrabony defects requiring regenerative therapy will be more predictable if a clinician has a detailed knowledge about the diagnosis, treatment sequences, and intervals. An immediate and interdisciplinary management whenever necessary can impede the loss of the natural tooth and delay more complex treatments.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/

her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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