

CASE REPORT



Injectable platelet-rich fibrin-“a quicker therapeutic aid” in the treatment of combined endo-perio lesion: A case report

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Abstract

An endo-perio lesion has been one of the prevalent issues affiliated with the tooth. The cutaneous involvement of pulpal and inflammatory periodontal pathology can perplex the diagnosis and treatment planning. The present case report shows the synergic effect of endodontic, periodontal, and esthetic therapy. The treatment includes root canal therapy and open debridement followed by the placement of “sticky bone” graft and guided tissue regeneration membrane over the osseous defect site. After 6 months, a coronally advanced tunneling procedure with connective tissue graft placement was performed to improve esthetics. The patient was followed up for 1 year. Clinically, there was a reduction in probing pocket depth, increase in attached gingiva, and improvement in gingival biotype. Radiographically, there was a resolution of periapical radiolucency and a significant amount of bone fill was observed. Hence, the coactive effect of various regenerative materials with root canal sealing had significantly improved both clinical and radiographic features of the endo-perio lesion.

Keywords: Endo-perio lesion, guided tissue regeneration, sticky bone

Introduction

Periodontic-endodontic lesions are convoluted in nature, but have diverse pathogenesis. Treatment decision-making and prognosis confide primarily on the diagnosis of definitive disease. To have the ace prognosis, the clinician needs an interdisciplinary approach, to perform either endodontic and periodontal therapy alone or in the combination of both.^[1]

Classification

The most commonly used classification was given by Simon *et al.*, in 1972, which includes:^[2]

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.

Prognosis of teeth with endo-perio lesions

Healing of primary endodontic lesions usually takes place after root canal therapy (RCT). The presence of microorganisms in the root canal influences the outcome of therapy. With a proper focus on control of infection, a good prognosis is expected with

the treatment.^[3] The primary periodontal lesions can solely be treated by periodontal therapy. Prognosis of primary periodontal lesions depends on the severity of the periodontal disease, efficacy of periodontal therapy, and compliance of the patient.^[4]

However, the prognosis of primary periodontal lesions is not as favorable as primary endodontic lesions. Vigorous removal of cementum and exposure of dentinal tubules during periodontal surgery may deteriorate the outcome, by causing pulpal inflammation and necrosis of the dental pulp. Avoiding the use of irritating chemicals, minimizing the use of ultrasonics, and rotary scaling instruments may aid in the good outcome of the disease.^[4,5]

The prognosis of primary endodontic with secondary periodontal lesions depends principally on the severity of endodontic mission and degree of periodontal involvement and adequacy of both endodontic and periodontal treatments. The endodontic involvement with marginal periodontal damage may respond well to endodontic treatment alone with scaling and root planing.^[4] The outcome of the lesions caused due to iatrogenic damage such as root perforations depends on the size, location, time of diagnosis and treatment, degree of periodontal damage, as well as the sealing ability and biocompatibility of the sealer. For primary periodontal and secondary endodontic lesion and true combined lesions, the efficacy of periodontal therapy usually determines the prognosis. A poor or even hopeless

prognosis is expected in patients with chronic and extensive periodontal diseases.^[5]

An improved prognosis can also be achieved by increasing the bone support of the affected tooth by the means of bone grafting and guided tissue regeneration (GTR). These regenerative procedures reported to have a success rate of 77.5% in the treatment of combined lesions (Parolia *et al.*, 2013).^[6] On the contrary, the success rate ranges from 27% to 37% without regenerative procedures. Besides, patient-specific and defect-specific healing factors should also be considered at each level while determining the prognosis of combined lesions.^[6]

Case Report

A 48-year-old male patient reported to the Department of Periodontics, Bapuji Dental College and Hospital, Davanagere, Karnataka, India, with a chief complaint of pain in his upper right front tooth region for 1 month. The patient was systemically healthy. He gave the history of trauma i.r.t. upper right front tooth region 6 months back.

On intraoral clinical examination, supraerupted 21 revealed soft, edematous marginal and attached gingiva, bleeding on probing, Miller's Class III recession, Grade II mobility, and periodontal pocket of 9 mm on the mesiolabial aspect [Figure 1] with tender on vertical percussion. Intraoral radiographic examination showed an interdental bone loss until apical one-third and existence of periapical radiolucency in relation to the same [Figure 2]. The electric pulp vitality test found to be negative. The case was diagnosed as primary endodontic with secondary periodontal lesion i.r.t. 21. (According Simon *et al.*, 1972)^[4] with a “poor” periodontal prognosis. Therefore the extraction of 21 was advised, as patient was not willing for the extraction of 21, an attempt was made to prolong the prognosis of the tooth. Here, an attempt was made to prolong the prognosis of the tooth.

Treatment plan

In this case report, the treatment for endo-perio lesion was planned with an interdisciplinary approach involving both endodontist and a periodontist. The treatment protocol was explained and a written consent was obtained from the patient. Routine blood investigations were advised and the reports acquired were within normal limits.

At the first visit, the treatment plan started with scaling (Woodpecker Scaler[®]) and root planing (2R-2L Columbia, universal curettes Hu-Friedy) by a periodontist followed by the RCT by an endodontist. After completion of RCT, the patient was kept on maintenance phase. Although the ceramic crown was advised to the patient but due to unaffordability, the tooth was treated with composite resins as esthetically admissible as possible along with odontoplasty to correct the supraeruption. On reevaluation at 3 months, the patient oral hygiene maintenance was good, gingival inflammation and tooth mobility (Grade II to Grade I) were reduced non-tender



Figure 1: Pre-operative pocket depth



Figure 2: Pre-operative IOPA

on percussion, but the presence of bone loss and periodontal pocket of 9 mm was confirmed with radiographic and clinical examinations. Periodontal surgical therapy was planned i.r.t. 21 by periodontist with an attempt to regenerate bone using sticky bone and GTR membrane. On the scheduled day, the patient was asked to rinse thoroughly for 30 s with 0.12% chlorhexidine mouthwash before surgery. After the administration of local anesthesia (2% lidocaine 1:80,000 adrenaline), a transgingival probing was performed to analyze the extent of bony defect and gingival biotype, which resulted in 10 mm from the gingival margin to the crest of the alveolar bone and soft-tissue biotype was found to be thin. A full-thickness mucoperiosteal flap was raised by giving sulcular incision and two vertical incisions extending from the distal aspect of 11 to mesial aspect of 23 using #15 Bard-Parker blade and periosteal elevator. Thorough debridement and degranulation with curettes (2R-2L Columbia, universal curettes Hu-Friedy) were done.

To prepare sticky bone, injectable platelet-rich fibrin (i-PRF) was prepared with 10 ml of venous blood from the patient's right antecubital vein. The collected blood was injected into the i-PRF tube [Figure 3a]. The blood was then centrifuged at 700 rpm for 3 min. After centrifugation, the blood was separated into two fractions. The bottom layer fraction consisted of red blood cells.

The top light yellow-colored liquid layer (i-PRF) consisted of plasma, platelets, and coagulation factors still in uncoagulated form which was aspirated by keeping the tip of the syringe just above the junction of the two layers and the injectable PRF was obtained, it was mixed with Bio-Oss® particulate bone graft [Figure 3b]. After approximately 4 min, the mixture becomes a cohesive mass with a putty-like consistency called “sticky bone.” This sticky bone was then grafted to fill the osseous bony defects surrounding the tooth followed by the placement of the collagen membrane (Bio-Gide®) to cover the surgical site [Figure 4]. The flap was then repositioned and approximated with digital pressure and gauze before suturing. The flap was approximated with passive closure with simple interrupted Trulon 4-0 suture material (Ethicon®, USA).

Postoperatively, amoxicillin 500 mg t.i.d for 5 days, ibuprofen 400 mg t.i.d for 3 days, and 0.2% chlorhexidine mouthwash were prescribed twice daily for 14 days.^[6] The patient was recalled after 10 days for suture removal during which the patient was comfortable, and the operated site revealed uneventful tissue

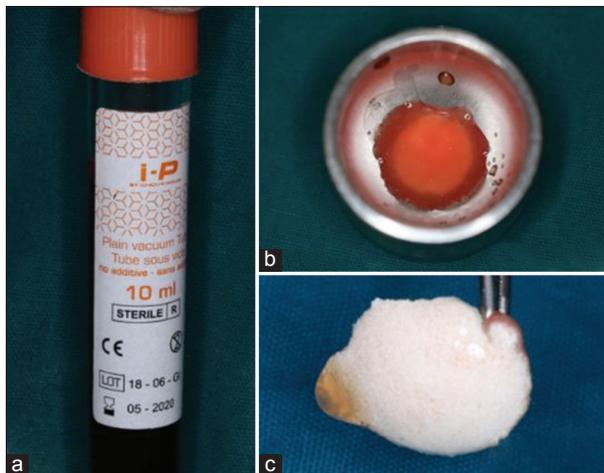


Figure 3: (a-c) Sticky bone preparation with bone graft



Figure 4: GTR membrane placement

healing. On 6-month follow-up, probing depth reduction was noted (4 mm) and intraoral periapical radiographs revealed increased radiopacity in periapical area and bone fill seen on the mesiolabial aspect of 21, suggestive of repair/regeneration [Figure 5].

The treated tooth showed Miller’s Class II recession. Hence, a periodontal plastic surgery was carried out using connective tissue from palate and tunneling with coronally advancing the flap simultaneously. After 1 month of periodontal plastic surgery, there was an improvement in the gingival biotype, clinical attachment level, and width of keratinized gingiva [Figure 6]. At present, the patient is kept under maintenance therapy.

Discussion

The diagnosis and prognosis of the tooth having endo-perio lesions presents a challenge to the clinicians. Correct diagnosis is important to determine the treatment and long-term prognosis. However, treating a complex endodontic periodontal lesion is still one of the most common challenges in today’s clinical practice. The simultaneous existence of endodontium and periodontium tissue destruction can complicate the diagnosis and subsequently affect the prognosis of the involved teeth.^[6] This highlights the importance of following a critical diagnostic strategy to ensure a correct treatment plan. It also requires a thorough understanding of wound healing process involving both complex tissues. Treatment of endo-perio lesion requires both endodontic treatment and periodontal regenerative treatment.



Figure 5: Tunelling procedure



Figure 6: Post-operative after 1 month

The treatment strategy is to first focus on debridement and disinfection of the root canal system followed by an observation period. The goal of periodontal surgery is to remove all necrotic tissues from the surgical site and to facilitate the regeneration of hard- and soft-tissue along with the formation of new attachment apparatus.^[7]

“Sticky bone” is a combination of i-PRF and particulate bone graft which has excellent properties for regeneration as it is a homogenous product that contains crucial elements for bone formation. It also contains growth factors which stimulate differentiation and migration of cells, which further helps in osteoconduction and osteoinduction to regenerate the lost bone.^[7] The bone graft with fibrin, platelets, and leukocytes provides high osteoblastic activity, i.e., osteoinduction and maturation than the use of PRF alone. Furthermore, sticky bone is more economical and easy procedure.^[8,9]

Bio-Oss[®] (Geistlich, Wolhusen, Switzerland) is a commercial unsintered, inorganic, bovine, mineral matrix of calcium-deficient carbonate apatite (Kasabah *et al.*, 2002). The biocompatibility and osteoconductivity of Bio-Oss[®] are well documented in the literature. The GTR membrane used here was Bio-Gide[®] which is a pure collagen membrane. They extracted from veterinary certified pigs and have a bilayer structure. The porous surface – facing the bone – allows the ingrowth of bone-forming cells. The dense surface – facing the soft tissue – prevents the ingrowth of fibrous tissue into the bone defect. The membrane is made of collagen type I and type III without further cross-linking or chemical treatment.^[10]

The main objective of GTR membrane placement was not to allow the gingival tissue to penetrate the site and provides a space required for regeneration. GTR membranes have been indicated as hemostatic agents and also encourage regeneration to occur, they allow the clot to form and adhere to the surface of the root, thereby facilitating complete wound maturation. They also act as a lattice for migrating periodontal ligament fibroblasts.^[11]

The periodontal plastic surgery was done with connective tissue from palate using pouch and tunneling procedure with coronal advancement. The main aim of the pouch and tunnel technique is to minimize the incisions and maximize the blood supply to the graft. In this technique, the subepithelial donor connective tissue is placed into the pouches beneath the papillary tunnel which allows intimate contact of the donor tissue to the recipient site, thus ensuring an abundant blood supply to the graft. Coronal advancement procedure has more advantages for treating gingival recession as they do not require a separate surgical site to obtain a graft, it has perfect color/contour match

with the surrounding tissue, the procedure is not technique sensitive, thus making it simple to perform. It does not require an extended surgical or recovery time. The results are stable overtime.^[12]

Conclusion

Endo-perio lesion having a nexus pathological process needs a multidisciplinary approach to spot and treat it. A correct designing and ulterior follow-up of such cases are vital. This case report additionally depicts an encouraging domain within which the coaction of various regenerative analogs with the endodontic therapeutic regime has led both clinical and radiographic improvements in combined endo-perio lesions with enhanced prognosis.

References

1. Simring M, Goldberg M. The pulpal pocket approach: Retrograde periodontitis. *J Periodontol* 1964;35:22-48.
2. Rotstein I, Simon J. The endo-perio lesion: A critical appraisal of the disease condition. *Endodontic Topics* 2006;13:34.
3. Bergenholtz G. Micro-organisms from necrotic pulp of traumatized teeth. *Odontol Revy* 1974;25:347-58.
4. Simon JH, Glick DH, Frank AL. The relationship of endodontic/periodontic lesions. *J Periodontol* 1972;43:202-8.
5. Patil VA, Deshpande P, Shivakumar TP. Endo-perio lesion: An interdisciplinary approach. *Int J Dent Clin* 2009;1:4.
6. Parolia A, Gait TC, Porto IC, Mala K. Endo-perio lesion: A dilemma from 19th until 21st century. *J Interdiscipl Dent* 2013;3:2.
7. Gupta V, Bains VK, Singh GP, Mathur A, Bains R. Regenerative potential of platelet rich fibrin in dentistry: Literature review. *Asian J Oral Health Allied Sci* 2011;1:23-8.
8. Mohamed EM. The use of growth factors fibrin network to enhance architecture mechanical and biological aspect of the graft particles. *Int J Prevent Clin Dent Res* 2014;1:41-4.
9. Ayoub AH, Agbor RO. Tissue engineering platelets concentrates and its role in dental implant treatment. *EC Dent Sci* 2016;5:969-80.
10. Kim YK. Bone graft material using teeth. *J Korean Assoc Oral Maxillofac Surg* 2012;38:134-8.
11. Bottino MC, Thomas V, Schmidt G, Vohra YK, Chu TM, Kowolik MJ, *et al.* Recent advances in the development of GTR/GBR membranes for periodontal regeneration—a materials perspective. *Dent Mater* 2012;28:703-21.
12. Cairo F, Pagliaro U, Nieri M. Treatment of gingival recession with coronally advanced flap procedures: A systematic review. *J Clin Periodontol* 2008;35:136-62.

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