Case Report

Hopeless to Hopeful: Management of an Intrabony Defect Using a Novel Alloplastic Material

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Abstract

Background: One of the most challenging problems sustained by the clinician is the endo-perio lesion. It is an impeding problem faced in diagnosing the lesion and a dilemma as to which part of the lesion to be addressed first. The simultaneous involvement of pulpal problems and inflammatory periodontal disease can obscure diagnosis and treatment planning. The present case report shows the importance of periodontal therapy that includes open debridement of the defect followed by placement of alloplast in the defect area. The involved tooth was first treated endodontically that was followed by splinting of the involved tooth preceded by periodontal treatment. There was a significant gain in clinical attachment level 6 months postoperatively in the involved tooth. Radiographically, there was a significant amount of bone fill observed using RVG.

Keywords: Alloplast, Intrabony defects, Regeneration, Open flap debridement.

Introduction

The pulpo-periodontal interrelationship is a unique one and can consider them as a single continuous system or as one biologic unit in which there are so many paths of communication. The interrelationship of these structures influences each other during function, health, and disease. They can get affected combined or individually; when both systems are included, they are called true endoperio lesions. Periodontal endodontic problems are responsible for more than 50% of tooth mortality today. They present confrontations to the clinician as far as diagnosis and prognosis of the involved teeth is concerned. It is very imperative to make a correct diagnosis so that the appropriate treatment can be provided. The relationship between the pulp and the periodontium was first discovered by Simring and Goldberg in 1964.[1] Since then, the term "perio-endo lesion" has been used to specify lesions due to inflammatory products found in varying degrees in both pulpal and periodontal tissues.[2] Bacterial infection is the main cause for pulpal and periodontal disease. Cross-infection between the root canal and the periodontal ligament can occur through the following pathways:

1. Anatomical (apical foramen, lateral and accessory canals, dentinal tubules, and palatogingival grooves)
2. Non physiological pathways (iatrogenic root canal perforations and vertical root fractures) (Zehnder *et al*., 2002).

Access this article online

Website: www.jrad.co.in

DOI: https://doi.org/10.53064/jrad.2021.12.3.12

Periodontal destruction is the loss of bone from the coronal to apical direction whereas the endodontic infection is from the apical to coronal direction.[3]

Decision-making, treatment, and prognosis depend primarily on the diagnosis of the specific disease. To have the best prognosis, clinician must assign the case to various areas of specialization, to perform endodontic, restorative, and periodontal therapy either singly or in combination.[2]

Classification

The most commonly used classification was given by Simon, Glick and Frank in 1972, which includes: [4]

1. Primary endodontic lesion
2. Primary periodontal lesion
3. Primary endodontic lesion with secondary periodontal involvement

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Received: Feb. 13, 2021; **Accepted:** Apr. 02, 2021; **Published:** Apr. 30, 2021

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How to cite this article: Reddy PVN, Reddy MSR, Yasaswini KP, Reddy CLC, Apoorva K, Sahithi J. Hopeless to Hopeful: Management of an Intrabony Defect Using a Novel Alloplastic Material. J Res Adv Dent 2021;12:3:59-63.

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

Prognosis of Teeth with Endo-Perio Lesions

Primary endodontic lesions

Primary endodontic lesions usually heal after root canal therapy. 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.[2,5]

Primary periodontal lesions

Such lesions can solely be treated by periodontal therapy. Prognosis of primary periodontal lesions depends on: [2]

- The severity of the periodontal disease
- Efficacy of periodontal therapy
- Response of the patient.

However, prognosis of primary periodontal lesions is not as affirmative as primary endodontic lesions. Effective removal of cementum and exposure of dentinal tubules during periodontal surgery may regress 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.[2]

Primary endodontic with secondary periodontal lesions

The prognosis of such lesions depends principally on the severity of periodontal involvement.

If the endodontic treatment is adequate, the prognosis depends on the severity of the marginal periodontal damage and the efficacy of periodontal treatment.[5]

The outcome of these lesions caused due to iatrogenic damage such as root perforations depends on the location, size, time of diagnosis and treatment, degree of periodontal destruction as well as the sealing ability, and biocompatibility of the sealer.[2]

Primary periodontal with secondary endodontic lesion and true combined lesions

Efficacy of periodontal therapy usually regulates the prognosis of combined lesions. A poor or even hopeless prognosis is expected in such cases, especially in patients with chronic and extensive periodontal diseases. A part of the root or tooth structure can be saved through hemi section or bicuspidization, and root amputation. However, various factors such as tooth anatomy, function, restorability, root filling, bone support, and patient's compliance should be considered before root resection by the operator.[2]

An improved prognosis can also be achieved by increasing the bone support of the affected tooth by the means of bone grafting and GTR. These regenerative procedures have reported to have a success rate 77.5% in the treatment of combined lesions (Parolia *et al*., 2013).[2]

On the contrary, the success rate ranges from 27% to 37% without regenerative procedures. Besides, patient-specific, defect-specific, and healing factors should also be considered at each level while determining the prognosis.[6]

The main factors to take into account for decision-making regarding the treatment are the pulp vitality, type, and extent of the periodontal defect.[3]

The aim of the present study is to diagnose and to manage the endo-perio lesion presented.

Primary periodontal with secondary endodontic lesion

A 32-year-old female patient came to the dental clinic with a chief complaint of mobility in her lower front tooth region of jaw since 2 months. Patient was systemically healthy. She gave the history of dull aching pain in relation to 41, 42.

Intra-oral clinical examination

- Visual: Supragingival calculus and inflammation of marginal gingiva w.r.t 31, 32, 41, 42.
- Periodontal finding: Deep periodontal pocket in relation to 31,32,41,42 (Figure 1)
- Mobility: Grade II mobility in relation to 41, 42 and Grade I mobility in relation to 31, 32, and 43.

Investigations

- OPG: Radiolucency involving 31, 32, 41 region (Figure 2) and RVG shows bone loss irt 41, 42
- Diagnosis: Primary periodontal with secondary endodontic lesion w.r.t. 31, 32, 41. (According to the proposed classification by Simon *et al*., 1972)

Decision-making and treatment plan

Decision-making

Involvement should first be treated with endodontic therapy (Rotstein and Simon, 2002)[7] along with first phase one (hygiene phase) of periodontal therapy. After the evaluation of treatment results in 2–3 months, further periodontal therapy should be considered (Parolia *et al*., 2013).[2]

Figure 1: Pre-operative clinical pic

Treatment Plan

- Phase I
  - Scaling and root planning
  - Oral hygiene instructions
  - Splinting in relation to 31, 32, 41, 42, 43 (Figure 3).

Figure 2: Pre-operative OPG

Figure 3: Splinting done irt 33, 32, 31, 41, 42, 43

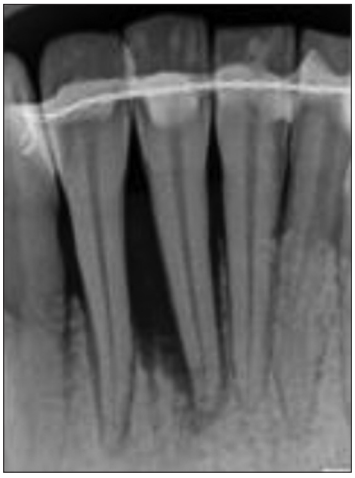

Figure 4: Pre-operative RVG

- Evaluation after Phase 1: Patient recalled after 1 week for root canal treatment irt 41, 42
- Phase II: Root canal treatment w.r.t 41, 42 (Figures 4-7).

Open flap debridement w.r.t 31, 32, 41, 42 (Figure 8) and regeneration was attempted with the help of alloplast in the bone loss area (Figure 9).

Figure 5: Working length irt 41, 42

Figure 6: Master cone irt 41, 42

Figure 7: Obturation done irt 41, 42

- Evaluation after phase II: Recall the patient after 3 months
- Phase III
- Phase IV: Recall appointments to be scheduled based on Merin's classification.

In present case report, mobility was seen irt 31, 32, 41, 42 and splinting done irt 31, 32, 41, 42 root canal treatment was performed irt 41, 42. After 3 months, periodontal pocket was reassessed. Deep periodontal pocket of more than 5mm was present in relation to 31, 32, 41, 42. Periodontal flap surgery was planned in relation to 31, 32, 41, 42 under local anesthesia. A full thickness mucoperiosteal flap was raised w.r.t 31, 32, 41, 42. The area was thoroughly debrided using hand curettes and ultrasonic scalers. Alloplast was placed in relation to 31, 32, 41, 42 in bone loss area. Simple interrupted braided 3–0 black silk sutures were placed (Figure 10) and periodontal dressing was applied over the area. Post-operative instructions and medications were given and patient was recalled after 10 days for suture removal (Figure 11).

Evaluation

The patient was recalled after 1 month and 3 months of flap surgery for re-evaluation. Bone fill was observed after 3 months of follow-up. During the 1st month of follow-up, a good oral hygiene of the patient was observed. There was absence of bleeding on probing w.r.t 31, 32, 41, 42. Resolution of the inflammation was observed (Figure 12). RVG taken 6 month postoperatively showed complete bone fill in the defect area along with significant gain in clinical attachment level was observed (Figure 13).

Figure 10: Suturing done

Figure 8: Open flap debridement

Figure 11: Post-operative after 1 week

Figure 9: Alloplast placed irt 41, 42

Figure 12: Post-operative after 6 months

Figure 13: Post-operative RVG after 6 months

Discussion

The endo-perio lesions are a challenging factor to clinicians as far as diagnosis and prognosis of the involved teeth are concerned.[3] Correct diagnosis is important to determine the treatment and long-term prognosis. However, treating a complex periodontal endodontic lesion is still one of the most common challenges in today's clinical practice. The simultaneous existence of periodontium and endodontium tissue destruction can complicate the diagnosis and subsequently affect the prognosis of the involved teeth.[8] This highlights the importance of following a critical diagnostic strategy to establish a correct treatment plan. It also requires thorough understanding of wound healing process involving both complex tissues.[9]

Treatment of perio–endo lesion requires both endodontic treatment and periodontal regenerative therapy. The treatment strategy is to first target on debridement and disinfection of the root canal system followed by an observation period. The objective of periodontal surgery is to remove all necrotic tissues from the surgical site and facilitate the regeneration of hard and soft tissue along with the formation of new attachment apparatus.[10]

In the reported case, the established diagnosis was of primary periodontal with secondary endodontic involvement. Splinting was done irt 31, 32, 41, 42 and root canal treatment was performed irt 41, 42. Since bone loss was observed, an attempted regeneration was done with the help of bone graft (alloplast). It is a synthetic bone graft material made out of 100% pure B-tricalcium phosphate that is very osteoconductive.

The optimized trabecular pattern of the graft with its macropore and micropore accelerates bone remodeling process.

Bone fill was observed after 3 months of follow-up. Significant gain in clinical attachment level 6 months postoperatively and also a significant amount of bone fill observed using RVG.

Conclusion

Endo-perio lesion has a complex pathogenesis and requires great dexterity to identify and treat it. Hence; cooperation between different disciplines that includes periodontology, prosthodontics, and endodontics is required to adequately treat the lesion. A preferred treatment plan leads to a better result as seen in this case report.

Conflicts of Interest

The authors declare they have no potential conflict of interests regarding this article.

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