

Hemisection a Preservative Approach to Endodontic-Periodontic Lesion: Case Report

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Abstract

Endodontic-periodontal lesions present the challenges to the clinician as far as diagnosis, prognosis and treatment planning is concerned. One treatment modality in such cases involves separation of two roots in the furcation area with selected removal of one root. This decision is based on the extent and pattern of bone loss, root trunk and root length, ability to eliminate the osseous defect, and endodontic and restorative considerations. This procedure represents a form of conservative treatment, aiming to retain as much of the original tooth structure as possible. The results are predictable and success rates are high in such cases. This case report presents two clinical cases of advanced endodontic-periodontal lesions treated with hemisection followed by restoration.

Key words: Hemisection, Periodontal pocket, Root canal treatment

Introduction

There is a close ontogenetic relationship between apical foramen and accessory and lateral canals with surrounding periodontal tissue [1]. Clinically, this relationship promotes the spread of infection, potentially resulting in typical manifestations of endo-perio osseous lesions [2]. Successful treatment of endo-perio lesions depends on, understanding the pathogenesis, clinical and radiographic manifestations of endodontic and periodontic lesions. True-combined lesions are treated initially as primary endodontic lesions with secondary periodontal involvement, where the treatment and prognosis depends on the degree of involvement of tissue [3]. In such types of lesion, root amputation, hemisection or separation can be considered as a treatment alternative if not all roots are severely involved. The main advantage of such treatment is the conversion of furcation involved multirrooted tooth to non-furcated single-root teeth and provide favourable environment for oral hygiene [4].

In current paper the cases of endo-periodontically involved mandibular molars were saved by a planned treatment approach involving endodontic therapy, hemisection procedure and fixed partial prosthesis.

Case 1

A 35 year old female reported to the Department of Conservative Dentistry and Endodontics with the chief complaint of pain in right mandibular first molar. Pain occurred spontaneously since six months. Pain was non-radiating and was relieved on taking medications. No history of any systemic diseases was reported. On clinical examination, class- I silver amalgam restoration and pain on percussion was present with 46. Periodontal probing with distal root of 46 revealed isolated 8 mm pocket (Figure 1a). Pulp vitality test, electronic pulp tester showed late response suggestive of necrosed pulp. The intraoral periapical radiograph showed radiolucency with the distal root of 46 suggestive of extensive bone loss in that area (Figure 1b). It was inferred that there was an advanced endo-perio lesion with 46.

Treatment

Treatment plan was decided, that root canal treatment, hemisection and removal of distal half of 46, followed by restoring the teeth 46 and 47 with fixed partial denture.

Endodontic Phase

The tooth was anesthetized and access to the pulp chamber was achieved. Working length of each canal was estimated by means of an apex locator (Root ZX: Morita, Tokyo, Japan). The root canals were cleaned and shaped using Niti rotary protaper files (Dentsply Maillefer,). Calcium hydroxide (RC Cal; Prime Dental Products) paste was then placed as an intracanal medicament for one week. The canals were obturated with AH-Plus sealer (Dentsply, Detrey Konstanz, Germany) and protaper gutta-percha (Dentsply, Detrey Konstanz, Germany) followed by amalgam restoration (Figure 1c).

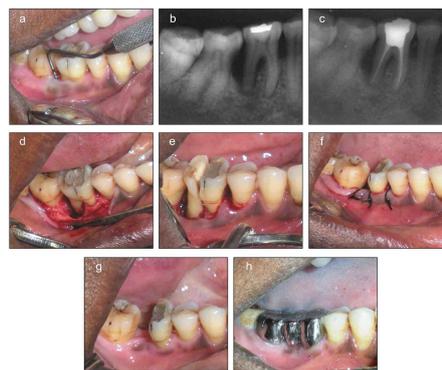


Figure 1. (a): 8 mm periodontal pocket with distal root. (b): Extensive bone loss with distal root. (c): Radiograph after obturation. (d): Reflection of mucoperiosteal flap. (e): Vertical cut was made faciolingually. (f): Distal half of the hemisected tooth was removed and flap was sutured. (g): Healing of socket after three month. (h): Complete prosthesis of hemisected tooth with fixed partial denture.

Periodontal Phase

After one week hemisection was carried out. Under the local anaesthesia a full thickness mucoperiosteal flap was reflected from 1st premolar to 2nd molar region. Facio-lingual vertical cut was given with a long shank; tapered fissure carbide bur (# 701, SS White Inc. Lakewood, New Jersey) till the furcation was reached for hemisecting the distal root and crown. Once the separation was complete distal half was extracted. The empty socket was thoroughly debrided, irrigated along with root planning of mesial root. Buccal and lingual flaps were approximated and sutured back into its position and the retained half of the tooth was ground out of occlusion which allowed the surgical site to heal with no occlusal stresses (Figure 1d-f). After the complete healing of socket (Figure 1g), remaining tooth was restored with the help of fixed partial denture.

Prosthodontic Phase

Metal crown with 47, premolar pontic in hemisected distal of 46 and premolar crown with mesial of 46 was decided, so as to distribute the occlusal stresses.

Tooth preparation, for metal crown in relation to 47 and 46 was done and the final impression was made using putty relin technique and master cast was obtained and sent to ceramic laboratory for fabrication of fixed partial denture. Final prosthesis was cemented using glass ionomer cement (Figure 1h).

Case 2

Another same case was reported in Department of Conservative Dentistry and Endodontics with complaint of pain in mandibular right first molar region.

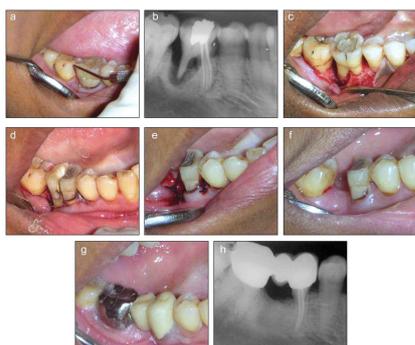


Figure 2. (a): 9 mm periodontal pocket with distal root (b): Radiograph after obturation. (c): Reflection of mucoperiosteal flap. (d): Vertical cut was made faciolingually. (e): Distal half of the hemisected tooth was removed and flap was sutured. (f): Complete healing of socket after three month. (g): Complete prosthesis of hemisected tooth with fixed partial denture. (h): six month radiograph.

Clinical examination showed, 9 mm periodontal pocket with distal root of mandibular first molar, radiograph confirmed the severe bone loss with distal root and well supported mesial root. Pulp vitality test revealed nonvital pulp with 46. The diagnosis of true combine endo-perio lesion was made with 46. Treatment plan inclusive of root canal

treatment, hemisection followed by prosthesis was performed as described in first case (Figure 2a-g). After six months, radiograph showed complete healing of bony lesion (Figure 2h).

Discussion

Successful treatment of endo-perio lesions depends upon their timely and accurate diagnosis. In the present cases, dental history, clinical findings and radiographic features indicates true combine endo-perio lesion. Hemisection is one of the treatment options for multirouted tooth with large periapical lesion and extensive bone loss of one root and the other root is healthy.

There are many reports and studies of successful hemisection and root resection cases aimed at preserving multirouted teeth in the literature [5,6]. Some investigators [7,8] reported that root-resected molars had >90% survival rate, whereas other investigators [6, 9] reported that ; 30% of resected molars failed over a 10-year period. Some investigators compared the prognosis of root-resection therapy to that of implant therapy. Langer et al reviewed records of 100 patients who had undergone root resection over a 10 years period. They reported a failure rate of 38%, of which 15.8% occurred within the first 5 years after surgery [10].

Kinsel et al. [11] reviewed the result of root-resection therapy and single implants in molar regions. They reported a 15.9% failure rate for root-resection therapy, whereas single implants showed a 3.6% failure rate. In contrast, Fugazzotto [12] reported 15-year cumulative success rates of 96.8% for root-resected molars and 97.0% for molar implants. He concluded that molar root- resection therapy and implant therapy had a high degree of functional success.

Buhler stated that hemisection should be considered as a treatment option before subjecting the molars for extraction, because it provides a good, absolute, and biologic cost saving alternative with good long term success [13]. Long term success of resected tooth depends on successful endodontic procedure, surgical resection, and restorative phase. Periodontal anatomical factors which considered during root resection are fusion of root, length of root trunk, position of root separation, divergence of roots, amount of residual attachment around remaining roots and the oral hygiene procedures [14].

During endodontic treatment, it is suggested that the access opening should be kept as small as possible, any operative procedure that removes intact coronal tooth structure or places excessive pressure within the canal is to be avoided. Excessive preparation of the radicular canals and lateral condensation during the endodontic treatment should also be avoided [15]. The morphology of remaining tooth after root separation and resection has been of prime importance for subsequent maintenance of the tooth. Schmitt & Brown, suggested that the preparation of the crown must be “barreled in” to follow the profile of the root complex [16]. With this preparation it is difficult for the patient to maintain good oral hygiene in this area. To overcome this problem Di Febo et al. suggest a “combined preparation” to modify the emergence profile creating convex surfaces which help in maintaining good oral hygiene [17].

Root fracture is one of the complications after hemisection, so occlusal modifications are required to be done for balancing the occlusal forces on the remaining root [18]. 6-10 degree taper are given to hemisected abutment to have compatible path of insertion, buccal and lingual grooves are placed to compensate this, occlusal table is reduced in size to decrease the forces on hemisected tooth, cuspal inclination make less steep to reduce laterally directed forces, and the sanitary pontic is the best design for posterior region [19].

As the hemisection procedure for a tooth requires careful planning and execution of treatment, a highly motivated patient with good oral hygiene is a prerequisite. If all these criteria are met, hemisection surgery is an alternative for tooth extraction and its replacement with either a dental implant or a conventional fixed/removable prosthesis [20].

Conclusion

For the endodontic-periodontal lesions to be treated successfully, an accurate diagnosis is mandatory that must cover the endodontic, the periodontal and the prosthetic rehabilitation so that the hemisected tooth should function independently or to serve as an abutment for a splint or bridge.

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