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PARTIAL PRESERVATION OF A COMPROMISED TOOTH – A CASE REPORT

Dentistry

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ABSTRACT

The health of the periodontium is important for proper function of the tooth. It is a fact that periodontium is anatomically interrelated with dental pulp by apical foramen and the lateral canals which create pathways for exchange of noxious agents between these two tissues. Periodontally diseased tooth with severe bone loss may be well retained by removal of one or more of their roots. When the disease is restricted to one root and the other root is healthy in case of mandibular molars, hemisection may be the treatment of choice. The present case report discusses hemisection in mandibular molar and its prosthetic management.

KEYWORDS

Hemisection, Resective surgery, Periodontitis

INTRODUCTION:

An endo-perio lesion is the one where both pulp and periodontal tissues are affected and the term 'endo-perio' has become integral part of the dental vocabulary [1]. Pulp and periodontium are derived from common mesodermal source of the developing tooth bud. Dental papillae and follicle are the precursors of the periodontium and pulp, and this embryonic development gives rise to anatomical connection, some of which remain patent throughout life [2].

Close relationship between pulpal and periodontal tissues is the main reason for the disease transmission between these two structures. Microbiological similarities between infected root canal and advanced periodontitis strongly support the above said transmission. So, the existence of communication between the pulp and periodontal tissues are mainly due to microbiological structures and components of cellular infiltrate [3].

Anatomical and physiological pathways are the possible pathways for the ingress of bacteria and its products into these tissues. The periodontium is anatomically interrelated with the dental pulp by virtue of apical foramina and lateral canals, which create pathways for exchange of noxious agents between the tissues. Apart from that, pulpal diseases can progress through lateral canals present in the apical third and furcation areas [4].

Recent advances in dentistry provide the opportunity for patients to maintain the functional dentition for lifetime with different therapeutic measures. Periodontally diseased teeth with severe bone loss may be well retained by removal of one or more of the roots and such teeth can be useful as independent units of mastication or as abutment in single fixed bridge. The term tooth resection denotes the excision or removal of a root with or without crown portion. Root amputation, hemisection, radisection and bisection are different types of resection. Hemisection denotes removal of one root with its accompanying crown portion of the mandibular molars [5]. Hemisection is indicated in vertical fractures confined to a single root of mandibular molar or any severe destructive process that is confined to a single root, including caries, external root resorption and trauma. Hemisection of mandibular molar may be a suitable option when decay is restricted to one root and the other one is healthy [6]. This case report discusses the hemisection in mandibular molar and its subsequent management by restoration.

Case Report:

A 43 years old systemically healthy male patient reported to the department of Periodontics TNGDC&H with the chief complaint of bleeding gums with dull aching pain and mobility of right mandibular first molar since last 2-3 months. On clinical and radiographic examination, it was found that the patient had generalized Stage III Grade B periodontitis. Right mandibular first molar was sensitive to vertical percussion and exhibited grade I mobility and grade III furcation involvement. On probing the area with periodontal probe there was a 14 mm deep periodontal pocket around the distal root and 6 mm around mesial root of the same tooth. Radiographic examination of the right mandibular first molar revealed severe bone loss (>50%) surrounding the distal root and involving the furcation area. The haematological investigations were performed and the results were non-contributory.

The alveolar bone support of mesial root appeared to be quite adequate. The treatment options for such furcation involvement include scaling and root planing (SRP), flap surgery, guided tissue regeneration (GTR) and resective surgery. SRP and flap surgery were not favoured, as in both the treatment plans even after the elimination of unhealthy subgingival tissue, residual pocket could have encouraged food impaction and recurrent infection. GTR was not considered because deeper extension might result in inadequate bone growth upto the desired level. So it was decided to perform hemisection of the desired tooth following endodontic treatment. The tooth so treated would act as abutment for effective prosthetic rehabilitation.

Patient was explained about the prognosis and his consent was obtained. Initially full mouth SRP was done and antimicrobial therapy (amoxicillin 500 mg TDS and metronidazole 400 mg TDS) was started from the same day for next 5 days. Access opening was done for 46 and working length of the tooth was determined. Biomechanical preparation was done, and master cone radiograph was taken. The canals were obturated with crown-down method, post-endodontic restoration was performed with composite material. Patient was evaluated after twelve weeks and there was still presence of moderate to severe periodontal pocket (Figure 1). Under antibiotic coverage open flap debridement was done for first, second and third quadrants.

For hemisection, under local anesthesia, full thickness mucoperiosteal flap was reflected after giving a crevicular incision for the whole quadrant. All granulation tissue were debrided with Gracey curettes to expose 1mm of alveolar bone. The furcation area was trimmed to ensure that no spicules were present which can cause further periodontal irritation.

The vertical cut method was used to cut the crown. The crown portion was sectioned into mesial and distal half up to the level of furcation using contra-angled handpiece and a long shank tapered fissure diamond bur. A straight probe was passed through the cut to assure separation. The distal half was elevated and extracted atraumatically, socket was curetted and later irrigated with sterile saline solution (Figure 2). Flap margins were trimmed and approximated with 3-0 braided silk sutures (Figure 3). Subsequently periodontal pack was applied.The occlusal table was reformed to redirect the forces along the long axis of the mesial root (Figure 4). Postoperative instructions were given and antibiotics and analgesics were prescribed for 5 days. The patient was recalled after 7 days for suture removal and post-surgical follow up. Sutures were removed on the 7th day post-operatively. The wound healing was satisfactory. After a waiting period of 4 weeks prosthetic rehabilitation of the hemisected tooth was performed. A three unit FPD (PFM) was given with the support of 45 and 47 (Figure 5). The patient was followed up at regular intervals and the outcomes were satisfactory.

Figure 1 – IOPA of right mandibular first molar – after endodontic treatment

Figure 2– Intraoperative photograph of hemisectioned right mandibular first molar

Figure 3 – Immediate postoperative

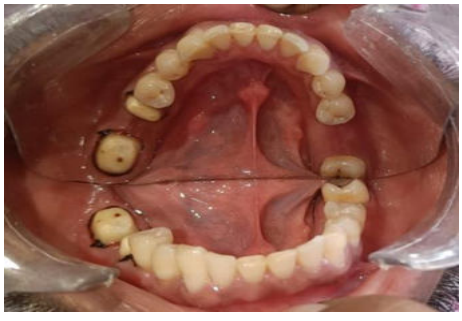

Figure 4 – Occlusal table reformed and tooth prepared for prosthetic rehabilitation

Figure 5 – Prosthetic rehabilitation

DISCUSSION:

Generally multirooted, periodontally involved molars show good prognosis and can be maintained for long period of time with hemisection [7]. To avoid variation in success and failure in this technique-sensitive procedure, case selection, management and maintenance must be careful throughout the procedure. Treatment option includes removable partial dentures (RPD), fixed partial dentures (FPD) and dental implants [8]. The use of hemisection to retain a compromised tooth offers a progressive susceptibility to any other tooth with endodontic management.

In this case, the case selection was carefully done to perform hemisection. The roots were not closely approximated or fused. Usually, hemisection has been used successfully to retain teeth with furcation involvement and at the same time failure of endodontic therapy due to caries at the site of hemisection or root surface that are reshaped by grinding in the furcation area due to the chances of increased susceptibility for caries [9].

After the hemisection the tooth loses its root support and it needs restoration to function [10]. Failure of hemisection occurs due to improper restoration [11]. If margins are defective or if non-occlusal surfaces do not have physiologic form, acceptable force can be converted to destructive force leading to failure. So, one should be careful in preparing the restoration. To decrease the forces on the retained hemisectioned root, occlusal table should be reduced in size with the deep cuspal incline which will eliminate non-working condition. Generally, to reduce the load on the retained root, the tooth is restored as premolar [12]. In this case, hemisectioned mandibular molar was restored as a three unit FPD involving 45 and 47.

CONCLUSION:

Long term success depends on proper diagnosis, selection of patients with good plaque control and careful management of phase I and phase II periodontal therapy with maintenance. Hemisection should be considered as another weapon in the arsenal of the dental surgeon, determined to retain the tooth. With recent refinements in periodontics, hemisection has received acceptance as a dependable dental treatment and teeth so treated have endured the demands of function. Hence hemisection should be considered as an important weapon in the squad of dental surgeon.

REFERENCES:

1) Narang S, Narang A, Gupta R. A sequential approach in treatment of perio-endo lesion. J Indian Soc Periodontol. 2011 Apr;15(2):177-80. doi: 10.4103/0972-124X.84390. PMID: 21976845; PMCID: PMC3183672.
2) Sunitha V R, Emmadi P, Namasivayam A, Thyegarajan R, Rajaraman V. The periodontal- endodontic continuum: A review. J Conserv Dent. 2008 Apr;11(2):54-62. doi: 10.4103/0972-0707.44046. PMID: 20142886; PMCID: PMC2813095.
3) Kipioti A, Nakou M, Legakis N, Mitsis F. Microbiological findings of infected root canals and adjacent periodontal pockets in teeth with advanced periodontitis. Oral Surg Oral Med Oral Pathol. 1984 Aug;58(2):213-20. doi: 10.1016/0030-4220(84)90139-7. PMID: 6384871.
4) Singh P. Endo-perio dilemma: a brief review. Dent Res J (Isfahan). 2011 Winter;8(1):39-47. PMID: 22132014; PMCID: PMC3177380.
5) Taori P, Nikhade PP, Mahapatra J. Hemisection: A Different Approach From Extraction. Cureus. 2022 Sep 21;14(9):e29410. doi: 10.7759/cureus.29410. PMID: 36304357; PMCID: PMC9586421.
6) Sharma S, Sharma R, Ahad A, Gupta ND, Mishra SK. Hemisection as a Conservative Management of Grossly Carious Permanent Mandibular First Molar. J Nat Sci Biol Med. 2018 Jan-Jun;9(1):97-99. doi: 10.4103/jnsbm.JNSBM_53_17. PMID: 29456402; PMCID: PMC5812084.
7) Saluja I, Kamath AK, Pradeep S, Gupta R, Duggal K. Hemisection: Partial preservation of compromised tooth. J Conserv Dent. 2023 May-Jun;26(3):355-358. doi: 10.4103/jcd.jcd_31_23. Epub 2023 May 16. PMID: 37398860; PMCID: PMC10309137.
8) Jensen C, Speksnijder CM, Raghoebar GM, Kerdijk W, Meijer HJA, Cune MS. Implant-supported mandibular removable partial dentures: Functional, clinical and radiographical parameters in relation to implant position. Clin Implant Dent Relat Res. 2017 Jun;19(3):432-439. doi: 10.1111/cid.12484. Epub 2017 Mar 20. PMID: 28317243.
9) Haueisen H, Heidemann D. Hemisection for treatment of an advanced endodontic-periodontal lesion: a case report. Int Endod J. 2002 Jun;35(6):557-72. doi: 10.1046/j.1365-2591.2002.00538.x. PMID: 12190914.
10) Radke U, Kubde R, Paldiwal A. Hemisection: a window of hope for freezing tooth. Case Rep Dent. 2012;2012:390874. doi: 10.1155/2012/390874. Epub 2012 Aug 14. PMID: 22928121; PMCID: PMC3426179.
11) Varma K M, Chittem J, Satish R K, Kumar M SR, Sajjan GS. A novel approach for restoration of hemisectioned mandibular second molar with modified tunnel restoration: a case report. J Clin Diagn Res. 2014 Oct;8(10):ZD07-9. doi: 10.7860/JCDR/2014/9519.4955. Epub 2014 Oct 20. PMID: 25478460; PMCID: PMC4253278.
12) De Franco DJ. Premolarization of a fractured maxillary first molar: a multidisciplinary treatment. J Am Dent Assoc. 1990 Oct;121(4):511-3. doi: 10.14219/jada.archive. 1990. 0187. PMID: 2212343.