



RENDERING TO HOPEFUL: ROOT RESECTION OF A PERIODONTALLY INVOLVED MOLAR USING AN ENDO-PERIO APPROACH- A CASE REPORT

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ABSTRACT

Clinical challenges posed by compromised teeth often complicate treatment plans and compromise long-term outcomes. Caries in the area of the furcation or periodontal attachment loss in upper molar teeth are examples of these issues. In such cases, treatment options include root resection to maintain a tooth or extraction and prosthetic replacement to remove the tooth. The resection of a problematic root involves removing the affected roots and keeping the relatively intact portions. An upper molar root resection treatment done using a combined periodontal approach and endodontic management resulted in a successful outcome described in this case report.

KEYWORDS: Root canal treatment, Root resection, Root amputation, Hemisection, Bicuspidization, restoration.

INTRODUCTION

In the modern era, modern advances in all facets of dentistry have enabled patients to maintain a functional dentition for the rest of their lives. Various treatment methods are employed to ensure that teeth are retained. Therefore, some combination of restorative dentistry, endodontics, periodontics, and prosthodontics are likely to be required to maintain the teeth. When teeth are resected, the tooth structure is largely preserved instead of being destroyed.<sup>[1]</sup> In dentistry, the term 'tooth resection' refers to the removal of a tooth or a portion of a tooth's root with or without the tooth's crown. A number of procedures are described as resections such as root resections, hemisections, and Root resections/amputations that remove roots from a multi-rooted tooth while leaving others on the tooth. Resection of the distobuccal root of the maxillary first molar is the most common root resection.<sup>[2]</sup> Root resection is the surgical removal of a multi-rooted tooth, especially a mandibular molar, through the furcation in a way that leaves a healthy root and part of the crown.<sup>[3]</sup> Bicuspidization is the separation of mesial and distal roots of mandibular molars along with its crown portion, where both segments are then retained individually.<sup>[3]</sup>

ACCORDING TO WEINE<sup>[4]</sup>

Periodontal Indications

1. Teeth with only one root show severe bone loss vertically.
2. Through and through furcation destruction.
3. The unfavorable proximity preventing adequate hygiene maintenance in proximal areas.
4. Severe root exposure due to dehiscence.

Endodontic and Restorative Indications

1. Vertical fracture of one root: The prognosis of vertical fracture is hopeless. If vertical fracture traverses one root while the other roots are unaffected, the offending root may be amputated.
2. Prosthetic failure of abutments within a splint: single or multi-rooted within a fixed bridge, instead of removing the entire bridge, if the remaining abutment support is sufficient; the root of the involved tooth is extracted.
3. Endodontic failure: Hemisection is useful in cases in which there is perforation through the floor of pulp chamber or pulp canal of one of the roots or an endodontically involved tooth which cannot be instrumented.

Severe destructive process

This may occur as a result of furcation or subgingival caries, traumatic injury and large root perforation during endodontic therapy.

### Contraindications

1. Strong adjacent teeth available for bridge abutments as alternatives to hemisection.
2. Inoperable canals in root to be retained.
3. Root fusion making separation impossible.

### CLINICAL PRESENTATION

35-year-old male patient presented to the Department of Periodontology & Oral Implantology of KD Dental College, Mathura, India, complaining of pain in the upper left posterior region since a few months ago. Symptoms were dull, intermittent, and non-radiating in nature. A thorough medical history was not provided and no deleterious habits were reported by the patient. No abnormalities were found during the extraoral examination.

At intraoral examination, a 7mm deep periodontal pocket was observed on the distal surface of the maxillary left first molar. Radiographs showed severe angular bone loss circumscribing the distal roots. The periodontal support of the palatal root of 26 appeared to be good, as well as the interradicular bone. A post-periodontal prognosis test on patient 26 indicated that his vitality was excellent. In our case, it was confirmed that it was chronic generalized marginal gingivitis associated with localised periodontitis in the left maxillary tooth. Considering the patient wanted to avoid extraction of the tooth, a conservative treatment option was chosen. This consisted of removing the disto-buccal root of the 26 tooth, followed by restoration.



**Figure 1: (a) pre-operative deep periodontal pocket measuring 7mm with respect to the distal root of 26 (b) pre-operative IOPA of 26 revealing bone loss circumscribing the disto-buccal root.**

### CLINICAL MANAGEMENT

#### PHASE I THERAPY

The whole procedure was explained to the patient and a thorough scaling and root planing was done. Gingival and periodontal status was re-evaluated after 2 weeks. Intentional root canal treatment was done in 26.

#### PHASE II THERAPY

The patient was kept on maintenance therapy for a period of two weeks following the endodontic therapy, at the end of which a deep periodontal pocket persisted for the distobuccal root of 26. As a result, root resection of the disto-buccal root of 26 was planned. Following an incision on the gingival crevice, a muco-periosteal flap was retracted under local anesthesia to allow visualisation and instrumentation. The bone defect along the distal root was revealed under reflection of the flap, following which the defect was debrided and cured. By giving a vertical cut toward the furcation area, a tapered fissure diamond bur was used to split the disto-buccal root of the tooth. We extracted the distobuccal root from the tree. It is essential to thoroughly debride and irrigate the socket in order to facilitate access to palatal root, which is then scaled and root planed. An antimicrobial periodontal dressing was placed over the surgical site and 3/0 black silk sutures were used to close the flap. By

minimizing the occlusal table, the forces are being directed along the palatal root axis. A dose of 200mg of Doxycycline was administered stat followed by 100 mg two times daily for 3 days, and Ibuprofen thrice daily for 3 days was prescribed. The suture was removed after one week. Regular postoperative monitoring ensured that the patient's wound healed completely and dental hygiene was maintained.



**Figure 2: Infrabony defect seen with respect to disto-buccal root of 26 following flap reflection.**



**Figure 3: (a) Root resection of distobuccal root of 26 completed (b) Extracted piece of root.**



**Figure 4: Post-operative IOPA**

### PHASE III THERAPY



**Figure 5: composite restoration.**

### CLINICAL OUTCOME

Followup visits and oral prophylaxis were conducted on the patient. Despite the prosthesis, he was pleased with the treatment outcome and had good masticatory efficiency.

### DISCUSSION

As an alternative to extraction and replacement, root resection therapy aims at preserving a diseased tooth. Implants, extensive bridge work, and tooth replacement are cost-prohibitive and can take a long time. Generally, root resections and crowns or a composite buildup are less costly and can be completed within 1-3 visits. Proper case selection is key to successful root resection. Before deciding to undergo any of the resection procedures, it is important to consider a number of factors.

1. Advanced bone loss around one root with an level of bone around the remaining roots.
2. Angulation and position of the tooth in the arch. A molar that is buccally, lingually, mesially or distally tilted, cannot be resected.
3. The divergence of the roots-teeth with divergent roots are easier to resect. Closely approximated or fused roots are poor candidates.
4. Length and curvature of roots-long and straight roots are more favorable for resection than short, conical roots.

Root resections have been reported to be effective by a number of authors. It would be more reliable to investigate and compare all cases after the same period of time. Evaluation of different therapy modalities based on long-term follow-up information. According to Hamp and colleagues<sup>[5]</sup>, the periodontal conditions five years after root resection were very good in 87 cases. In contrast, Langer<sup>[6]</sup> found that 38% of root resections failed 10 years after surgery. Newell et al.<sup>[7]</sup> looked at 70 root resected molars in 62 patients to evaluate quality of the resections. A total of 20 resections were found to be faulty when residual roots or ledges were present. The number of failures in maxillary molars was higher (33.3%) than in mandibular molars (22.7%). According to Buhler et al<sup>[8]</sup> 34 resected molars failed at an average rate of 32% after 10 years. Again, the main causes of failure were endodontic pathology and root fracture, while only one tooth was extracted due to periodontal breakdown. After a follow-up of 3 to 10 years, Blomlof

et al<sup>[9]</sup> reported the same failure rate. Root resection was performed on 691 molars in 579 patients by Shin-Young Park<sup>[10]</sup> he concluded that root resection, when performed to treat periodontal problems, had a better outcome than for nonperiodontitis patients. In order to get a good result, >50% of the roots needed to be supported by bone. These guidelines may help predict the success of rootresection therapy. By histological examination, Hoffman et al<sup>[11]</sup> determined that osteogenic regeneration of the volume of sockets was evident after the application of d-PTFE membranes to post-extraction sites, indicating the newly formed tissue in extraction sites primarily contained bone. Horowitz et al<sup>[12]</sup> and Agarwal et al<sup>[13]</sup> reported that guided bone-regeneration techniques and the use of bone-replacement materials were shown to be beneficial for socket healing and possibly modify the resorption process. Therefore, socket preservation is the primary objective in order to prevent collapse of alveolar bone and soft tissues, which would lead to unacceptable prosthesis aesthetics. When a molar has a furcation involved, root-resection therapy remains the best treatment option. The prognosis for root resection carried out for periodontal treatment was better than that for non-periodontal procedures.<sup>[14]</sup>

#### REFERENCES

1. Basaraba N. Root Amputation and tooth hemisection. *Dent Clin North Am*, 1969; 13: 121-132.
2. Larato DC: Some anatomical factors related to furcation involvement, *J Periodontol*, 1975; 46: 608-609.
3. Dr. Robert E. Cohen. *Glossary of Periodontal Terms*, 4<sup>th</sup> ed. Chicago: The American Academy of Periodontology, 2001; 39-40.
4. Franklin S. Weine, *Endodontic therapy*, 6th edition; Mosby Inc, 2004; 423-451.
5. Hamp, S. E., Nyman, S., and Lindhe, J.: Periodontal treatment of multirooted teeth. Results after 5 years. *J Clin Periodontol*, 1975; 46: 126-135.
6. Langer, Stein, and Wagenberg. An evaluation of root resections. A 10-year study. *J Periodontol*, 1981; 52: 719-722.
7. Newell DH. The role of the Prosthodontics in restoring root resected molars: a study of 70 molar root resections. *J Prosthetic Dent*, 1991; 65(1): 7-15.
8. Blomlof L, Jansson L, Applegren R. Prognosis and mortality of root resected molars. *Int. J Period Rest. Dent*, 1997; 17: 191-201.
9. Buhler H. Evaluation of root resected teeth. Results after ten years. *J Periodontol*, 1988; 59: 805-810.
10. Shin-Young Park, Seung-Yun Shin, Seung-Min Yang, and Seung-Beom Kye. Factors Influencing the Outcome of Root-Resection Therapy in Molars: A 10-Year Retrospective Study: *J Periodontol*, 2009; 80(1): 32-40.
11. Holfmann et al Alveolar bone preservation in extraction sockets using non-resorbable dPTFE membranes: a retrospective non randomized study. *J Periodontol*, 2008; 79: 1355-1369.
12. Horowitz R, Holtzclaw D, Rosen PS. A review on alveolar ridge preservation following tooth extraction. *J Evid Based Dent Pract*, 2012; 12: 149-60.
13. Agarwal G, Thomas R, Mehta D. Post extraction maintenance of the alveolar ridge: rationale and review. *Compend Contin Educ Dent*, 2012; 33: 320-326.
14. Park S, Shin S, Yang S, Kye S, Factors Influencing the Outcome of Root-resection Therapy in Molars: A 10-year Retrospective Study, *J Periodontology*, 2009; 80: 32-40.