

CASE REPORT**HEMISCTION OF A MANDIBULAR MOLAR***S M Abdul Quader¹, M Shamsul Alam², M Osman Ghani Khan³, A Asgor Moral⁴

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ABSTRACT

Teeth once designated obsolete for rehabilitation and deemed for extraction should be re-evaluated for salvaging two thirds or even one third component of the individual teeth. Advances in dentistry, as well as the increased desire of patients to maintain their dentition, have lead to treatment of teeth that once would have been removed. In order to carry out this present day mandate, periodontally diseased teeth with severe bone loss and/or mandibular molar teeth exhibiting furcation invasions may well be retained by removal of one or more of their roots. This article describes a simple procedure for root amputation in mandibular molar and its subsequent restorations.

Introduction

Early in 1960's, the therapy involving root amputation was right on the cutting edge in both periodontics and endodontics. Hiat and Ameen contributed in the quest for salvaging teeth by comprehensively describing the indications and techniques for root amputation. In reality, GV Black described almost the same methods in the nineteenth century and by sharp in 1920.¹

With improvement in the dental procedures and materials in both periodontics and endodontics leading to more sophisticated therapy, teeth at marginal prognosis has provided the opportunity for patients to maintain a functional dentition for life time. Therapeutic measures performed to ensure

retention of teeth vary in complexity. The treatment may involve combining dentistry, endodontics and periodontics so that the teeth are retained in whole or in part. Such teeth can be useful as independent units of mastication or as abutments in simple fixed bridges or individual crown with sufficient rest support. Continued periodontal breakdown or grossly decayed tooth may lead to total loss of tooth unless these defects can be repaired or eliminated and health of the tissues restored. Thus tooth resection procedures are used to preserve as much tooth structure as possible rather than sacrificing the whole tooth.²

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The term tooth resection denotes the excision and removal of any segment of the tooth or a root with or without its accompanying crown portion. Various resection procedures described are root amputation, hemisection, radisection and bisection. Root amputation refers to removal of one or more roots of multi rooted tooth while other roots are retained. Hemisection denotes removal of separation of root with its accompanying crown portion of mandibular molars. Radisection is a newer terminology for the removal of roots molars. Bisection or bicuspidization is the separation of mesial and distal roots of mandibular molars along with its crown portion where both segments are then retained individually.¹ Weine¹ has listed the following indications for tooth resection

Periodontal Indications

1. Severe vertical bone loss involving only one root of multi-rooted teeth.
2. Through and through furcation destruction.
3. Unfavorable proximity of roots of adjacent teeth, preventing adequate hygiene maintenance in proximal areas.
4. Severe root exposure due to dehiscence.

Endodontic & Restorative Indications

1. Prosthetic failure of abutments within splints: If a single or multi rooted tooth is periodontally involved within a fixed bridge, instead of removing of entire bridge, if the remaining abutment support is sufficient, the root of the involved tooth is extracted.
2. Endodontic failure: Hemisection is useful in cases in which there is perforation through the floor of the pulp chamber, or pulp canal of one of the roots of an endodontically involved tooth which cannot be instrumented.
3. 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.
4. Severe destructive process: This may occur as a result of furcation or sub gingival caries, traumatic injury, and large root perforation during endodontic therapy.

Contraindications

- a. Strong adjacent teeth available for bridge abutments as alternatives to hemisection.
- b. Inoperable canals in root to be retained.
- c. Root fusion-making separation impossible.

It is important to consider the following factors before deciding to undertake any of the resection procedures.

- Advanced bone loss around one root with acceptable level of bone around the remaining roots.
- Angulation and position of the tooth in the arch. A molar that is buccally, lingually, mesially or distally tilted, can not be resected.
- Divergence of the roots- teeth with divergent roots is easier to resect. Closely approximated or fused roots are poor candidates.
- Length and curvature of roots- long and straight roots are more favorable for resection than short, conical roots.
- Feasibility of endodontics and restorative dentistry in the root/roots to be retained.

Case Report

A 22 years old lady Barna reported with the complaint of continuous dull pain and grossly decayed of one tooth on the right side of the mandible for the last six months, which was aggravated during food lodging and /or chewing solid food and relieved transiently by antibiotics and analgesics. She was also suffering from mild sensitivity and food stagnation on the right side of the mandible, for the last 3 months, which was initiated by cold objects and lasted for a few minutes.



Fig: 01: Initial Photograph



Fig: 02: Initial Radiograph □

□ On clinical examination, right mandibular 1st molar tooth was grossly carious and the crown portion above the distal root area was almost broken at the subgingival level and the remaining crown portion above the mesial root surrounded by gingiva which was normal appearance both in color and texture. The tooth was tender to percussion. The right mandibular second molar exhibited caries, which was easily discernible by direct vision. It was sensitive to air from triple syringe, which was not lingering so far. (Fig:01) On radiographic evaluation, severe periapical bone loss was evident on distal root involving the furcation area. The tooth was grossly decayed and the bony support of mesial root was completely intact. (Fig:02) It was decided that the distal root should be hemisected after completion of endodontic therapy of the tooth.

The root canal access cavity was prepared for mesial root and the canal was negotiated with no. 10 K file without local anesthesia. The working length was determined with no. 15 file and the canals were biomechanically prepared using protaper instruments for hand use. (Fig:03)

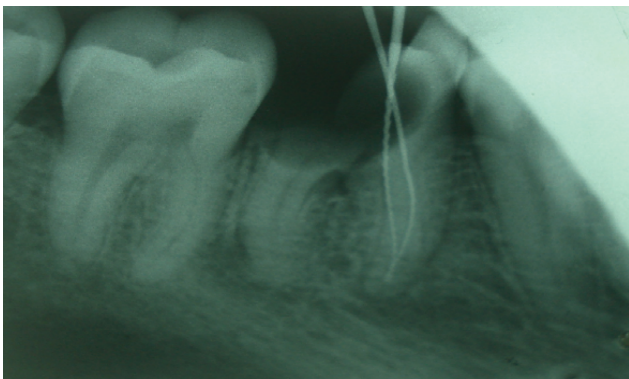


Fig: 03: WI Measuring Radiograph □

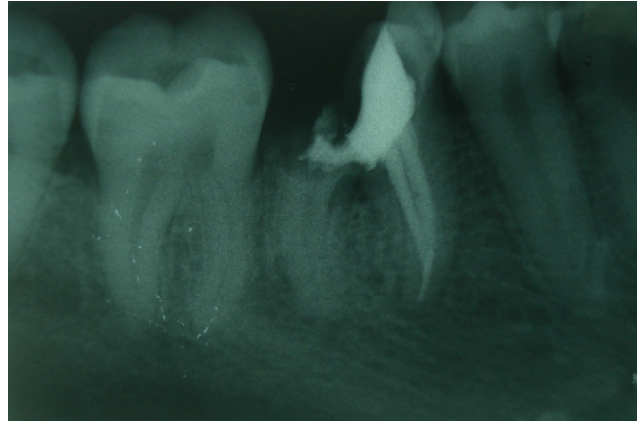


Fig: 04: After Obturation Final X-Ray.

The canals were obturated with .06 taper GP eq. to F2 protaper file (Fig: 04) and the chamber was filled with glass ionomer filling to maintain a good seal and allow inter proximal area to be properly contoured during surgical separation.



Fig: 05: Extraction of Distal Root.

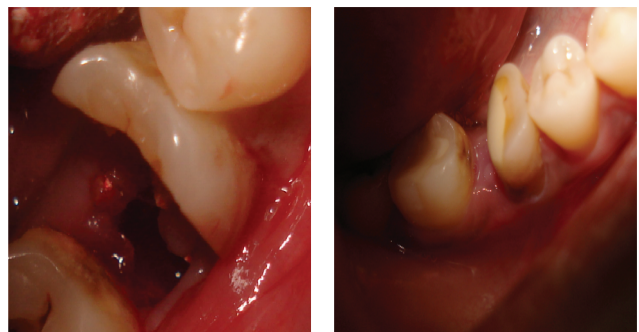


Fig: 06: Extraction followed by healing.

After a week under local anesthesia, two roots were separated at bifurcation area using a vertical cut method. A long shank tapered fissure bur was used to make vertical cut toward the bifurcation area. A fine probe was passed through the cut to ensure separation.

The distal root was extracted and the socket was irrigated adequately with sterile saline to remove bony chips and debris's. (Fig: 05)

The furcation area was trimmed to ensure that no spicules were present to cause further periodontal irritation. The socket was irrigated with normal saline and packed with cotton pellet for haemostasis. (Fig: 06)

The occlusal table of the targeted tooth was reduced to decrease the impact of untoward occlusal stresses on the coronal segment. A class I glass ionomer restoration with calcium hydroxide lining was planned for the right mandibular second molar, which alleviated the problem of hypersensitivity.



Fig: 07: Metal Trial of the Restoration.

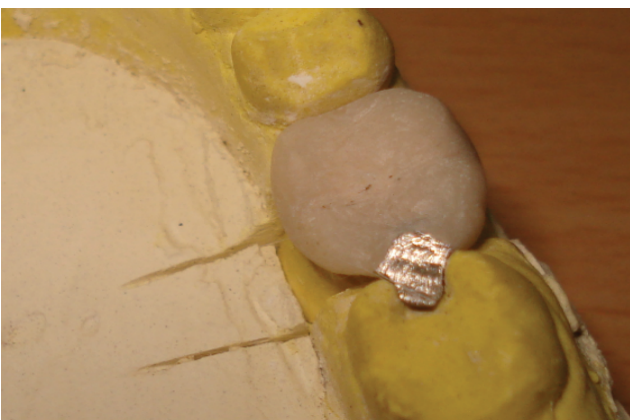


Fig: 08: Porcelain Trial with Occlusal Rest.

The second phase of treatment was carried out after 2 months when sufficient healing at the site of amputation had occurred. The retained coronal segment of mesial root was prepared for



Fig: 09: After Cementation of The Crown with occlusal rest support.



Fig: 10: After occlusion in correct cuspal position

crown and an occlusal rest support was prepared on the right mandibular second molar. A fixed prosthesis of metal fused porcelain crown with a sanitary pontic area on the distal root and an occlusal rest was prepared and cemented with glass ionomer luting cements. (Fig: 07, 08, 09, 10)

Discussion

Root amputations of any type are more complicated than extractions of whole tooth. Grossmann referred to root amputations as a dental proof of half a loaf being better than none.³ Weine quoted cases where great time, effort and expense were invested but wasted because aspects of treatment were not evaluated thoroughly or carried out improperly due to insufficient expertise

Root amputation at times was performed incorrectly or in cases not indicated for the procedure. Patients were assured in order to accept the treatment that may be fruitful for a long time. Despite time consuming and expensive modality, certain types of failure cropped up. Many authors started writing articles describing disaster cases and some even eliminated such treatment from their choices of therapy.¹ Root amputation is successful only with intelligible utilization of the complex of periodontics, endodontics and restorative dentistry. Such teeth can work as independent units of mastication or abutments in simple fixed bridge. Thus, tooth resection procedures are used to preserve as much tooth structure as possible rather than sacrificing the whole tooth.²

As with any surgical procedure, it can cause pain and anxiety. Root surfaces that are reshaped by grinding in the furcation or at the site of hemisection are more susceptible to caries. Failure of endodontic therapy due to any reason will cause failure of the procedure.⁴

According to Gher, Anderson and Vernoni, mesial root in mandibular molars is an ideal root for retention due to increased surface area circumferentially, if both the root canals of the mesial root are easily negotiable.⁵⁻⁶

According to Weine, mesial root retention in mandibular molars has presented with poor prognosis despite greater surface area and greater retention as compared to distal root retention with least retentiveness due to difficulty in endodontic therapy and placement of post and core system in mesial roots as compared to distal roots.¹ Evaluation of the involved tooth requires thorough periodontal evaluation of the root or roots to be retained. Remaining structure needs continuing care and thus should be pointed out to the patient. Bony support, the crown root ratio, occlusal relations and restorability of the remaining segment all determine the case outcome.⁷ Several studies have evaluated the long term success of root resected and hemisected. The results range from a success rate of 62 to 100% occurring over times ranging from 01 to 23 years. Combining the data from these studies indicate an overall success rate of 88% for the time periods followed.⁸⁻⁹

Radisection is not successful if proper support for the retained segment is not available and proper restoration of the retained segment is not

possible by coronal root stabilization with proper and planned decision of splintage with adjacent teeth. Lateral forces can lead to augmented stresses if the inclined planes of the cusps are not reduced in the final prosthesis for eliminating hazardous effects on the supporting structure of the amputated root and thus preventing the mobility of the retained segment.⁴

Conclusion

The prognosis for hemisection is the same as for routine endodontic procedures provided that case selection has been correct, the endodontics has been performed adequately, and the restoration is of an acceptable design relative to the occlusal and periodontal needs of the patients.

Root amputation and hemisection should be considered as another weapon in the arsenal of the dental surgeon, determined to retain and not remove the natural teeth. With recent refinements in endodontics, periodontics and restorative dentistry, hemisection has received acceptance as a conservative and dependable dental treatment and teeth so treated have endured the demands of function.

References

1. Weine FS. Endodontic therapy. 6th ed. St. Louis, MO, USA: Mosby; 2004.
2. Basaraba N. Root Amputation and tooth hemisection. *Dent Clin of N Amer* 1969;13:121
3. Grossman LI, Oliet S, Delirio CE. Endodontic practice. 11th ed. Philadelphia: Lea & Febiger; 1988.
4. Parmar G, Vashi P. Hemisection: A case report and review. *Endodontology* 2003; 15: 26-9.
5. Anderson RW, McGarrah HE, Lumb RD, Eick JD. Root surface measurements of mandibular molars using stereo-photogrammetry. *J Am Dent Assoc* 1983;107:613-5.
6. Gher ME, Vernoni AR. Root morphology- clinical significance in pathogenesis and treatment of periodontal disease. *J Am Dent Assoc* 1980;101:627-9.
7. Ingle JI, Bakland LK, Banumgartner JP. Endodontics. 6th ed. Ontario: B.C. Decker Inc.; 2008.
8. Blomlof L, jansson L, Appelgren R, Ethnevid H, Lindskog S. Prognosis and mortality of root resected molars. *Int J Periodontics Restorative Dent* 1997; 17:190-201.
9. Carnevale G, Pontoriero R, diFebo G. Long term effects of root resective therapy in furcation-involved molars: a 10-year longitudinal study. *J Clin Periodontol* 1998; 25:209-14.