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Hemisection: An alternative approach for preservation of hopeless mandibular molars - A case series

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Abstract

Hemisection is the surgical separation of a multi-rooted tooth, especially a mandibular molar through the furcation in such a way that a root and the associated portion of the crown may be removed. Hemisection is an appropriate treatment option when caries, resorption, iatrogenic complication or periodontal damage is limited to one root and the other root is relatively healthy. Hemisection of the affected tooth helps to preserve alveolar bone which surrounds the tooth structure and supports fixed dentures. The retained root is endodontically treated and its furcation area is made self-cleansable by proper cleaning and debridement. This case series describes a simple procedure for hemisection in mandibular molar and its subsequent restoration.

Keywords: Hemisection, Root Canal, Endodontically

Introduction

Better education and awareness about oral health along with modern advances in all phases of dentistry has given options for patients to maintain a functional dentition for lifetime. The terms 'hemisection' and 'root amputation' are together known as 'root resection'. Hemisection is a surgical procedure of separating a mandibular molar into two halves followed by extraction of the diseased root along with its associated crown portion. Thus, the furcation area is turned into self-cleansable area by this surgical procedure along with retaining the endodontically treated half tooth. This helps to preserve alveolar bone surrounding the remaining half tooth structure and supports fixed dentures.[1, 2, 3]

Proper case selection along with restoring them adequately by an extra-coronal restoration by interdisciplinary approach remains important for long term success of root resection procedures. [2, 4] Weine has listed

the following indications and contraindications for tooth resection.[5]

Periodontal indications:

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

Endodontic and restorative indications:

1. Prosthetic failure of abutments within a splint: If a single or multirooted tooth is periodontally involved 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.
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 subgingival caries, traumatic injury, and large root perforation during endodontic therapy.

Contraindications

1. Poorly shaped roots or fused roots
2. Poor endodontic candidates or inoperable endodontic roots
3. Patient unwilling to undergo surgical and endodontic treatments.

Bühler stated that hemisection should be considered before every molar extraction because this procedure can provide a good absolute biological cost saving with good long-term success. Hemisection should be always be prioritized before the extraction of each molar as there are studies supporting the long-term successful results of this procedure. Studies done by Yuh et al. and Carnevale et al. have reported survival rate upto 93 % with 10 years follow up.[6, 7, 8]

This article is about 2 case reports which describes hemisection procedure done in mandibular molar which otherwise would have undergone extraction.

Case Report 1

A 28 year old male patient, reported to Department of conservative dentistry and endodontics, KVG dental college and hospital, Sullia, Karnataka, India with the chief complaint of decayed tooth and pain in right, lower, posterior region, since 3 months. The patient did not give any significant medical history, but he was a tobacco chewer since 8 years. On intraoral examination, grossly decayed 45 and 46 teeth was noticed. Tender on percussion was found to be positive with respect to 45 and 46. The probing depth of 10 mm was found in the furcation area, along with Glickman's grade II furcation involvement in tooth 46. IOPAR revealed sub gingival caries along with furcation involvement with respect to mesial root as compared with distal root in 46. Periodontal prognosis with 46 was good with respect to distal root of 46 and 45. The multiple treatment options were extraction, followed by placement of implant, a fixed partial denture or a removable partial denture. As the patient desired not to have the teeth removed, so conservative treatment was selected, which included hemisection of mesial root of 46 after root canal treatment and fiber post placement of 46 and 45, followed by fixed prosthetic replacement. 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. Root

canal treatment was done in 45 and distal half of 46 followed by fiber post placement and composite core build up.

After local anesthesia, a full thickness mucoperiosteal flap was reflected to expose the area of hemisection via sulcular incision given with respect to 45 to 47. Using long shank-tapered fissure diamond bur, the vertical cut was made from occlusal surface towards the furcation area, and the mesial root along with crown portion was extracted. The separation was confirmed by passing a fine probe. The exposed root surface were scaled and root planned. The socket was debrided and irrigated with plenty of normal saline. The flap was repositioned and sutured with silk non-resorbable interrupted sutures. The occlusal table of the retained portion was minimized to reduce the masticatory forces along the long axis. The sutures were removed 7 days later. The patient was monitored on a weekly schedule, postoperatively, to ensure good oral hygiene in the surgerized area.

A temporary bridge was seated during healing and consolidation phase to prevent drifting of the remaining root. Definitive restoration therapy was accomplished 8 weeks after hemisection. The final prosthesis includes hemisected tooth contoured to a shape of a molar with minimal cuspal inclines and smaller occlusal table to reduce stress. Lateral forces were reduced by making cuspal inclines less steep and eliminating balancing incline contacts Patient was followed up by regular recall visits upto 1 year with radiographs showing progressive healing.

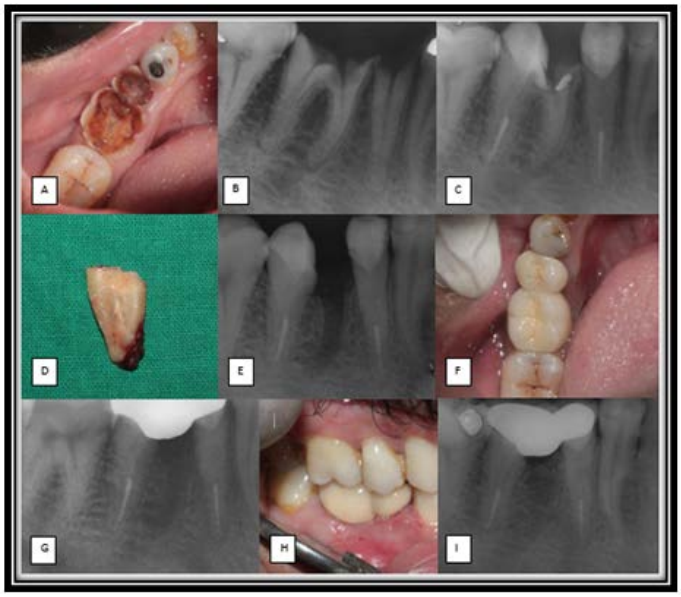

Figure 1: (A) Preoperative Photograph, (B) Preoperative radiograph, (C) Radiograph following RCT and Fiber post placement, (D) Hemisected mesial root, (E) Immediate post Hemisection radiograph, (F) Occlusal view of fixed partial denture, (G) and (H) 2 month follow up radiograph and photograph, (I) 1 year follow up radiograph.

Case Report 2

A 32 year old female patient, reported to Department of conservative dentistry and endodontics, KVG dental college and hospital, Sullia, Karnataka, India with the chief complaint of pain in right, lower, posterior region, since 2 week. She also gives a history of root canal treatment done in the same tooth 3 years ago. The patient did not give any significant medical history. On intraoral examination, an incomplete, intra osseous fracture running buccolingual was seen (Leubke's classification). Tender on percussion was found to be positive with respect to 46. The probing depth of 7 mm was found in the furcation area. IOPAR revealed thin radiolucent fracture line in furcation area of 46 with widening of periodontal space with respect to mesial root. The obturation of distal root was found to adequate without any periapical lesions. After removal of old restoration and secondary caries, the remaining tooth structure was weak and undermined. Just

like previous case, the different treatment options was explained to patient after which it was decided to go ahead with hemisection of mesial root of 46 followed by fixed prosthesis. The procedure was carried out similar to previous case.

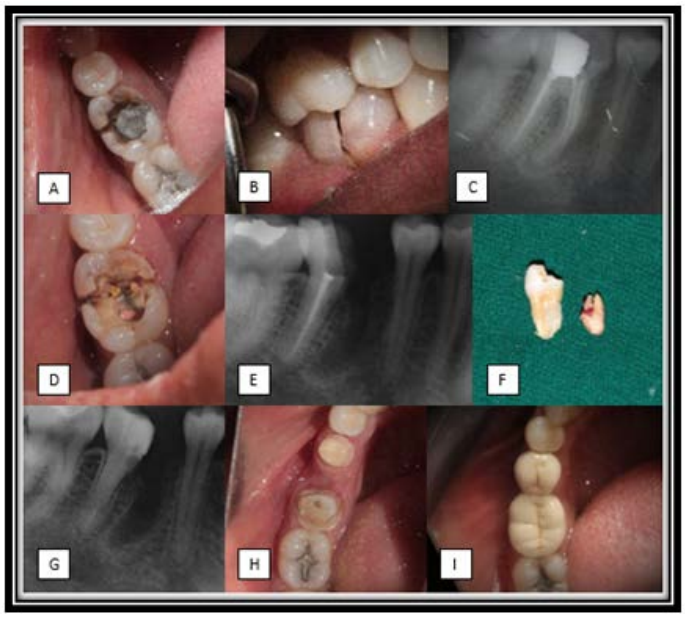

Figure 2: (A) Preoperative Photograph, (B) Fracture line running into furcation, (C)Preoperative radiograph, (D) Preoperative photograph after removal of restoration, (E) Immediate post Hemisection radiograph, (F) Hemisected mesial root, (G) Radiograph following fiber post placement, (H) Crowing cutting for fixed partial denture, (I) Occlusal view of fixed partial denture.

Discussion

Mandibular and maxillary molars plays a very paramount role in mastication and its loss can lead to a number of several unwanted consequences including drifting of adjacent premolars and molars, a loss of the vertical dimension of occlusion, loss of supporting alveolar bone along with supra-eruption of opposing dentition and reduction in chewing ability. Hemisection is a surgical procedure of separating a mandibular molar into two halves followed by extraction of the diseased root along with its associated crown portion. Thus, the furcation area is turned into self-cleansable are by this surgical procedure along with retaining the endodontically treated half tooth. This helps to preserve alveolar bone surrounding the remaining half tooth structure and supports fixed dentures along with reduction in cost and time. [2, 8, 9]

Hemisection is also preferred over otherwise costly and complicated implant treatment option as it allows for natural physiologic tooth mobility of the remaining root, which over time is a more acceptable abutment for fixed partial dentures than an osseointegrated implant. At the same time, most endodontic procedures result in minimal patient discomfort compared to implants and are performed with fewer complications. It is also well documented fact that stereognostic ability is lower in implant treated patients than in patients with natural dentition. [10, 11]

The clinician should decide on a treatment option based on the patient's age, medical history and ability to provide adequate oral hygiene. The clinician's decision to choose one treatment plan over another is influenced by various factors. These may be enumerated in three areas:

a) Local factors-tooth anatomy, tooth mobility, crown: root ratio, the severity of attachment loss, interact and intra-arch occlusal relationship, strategic dental value for retention or removal;

b) Patient factors-systemic health/host resistance, the emotional value of the tooth to the patient, involvement, and commitment in time and money;

c) Clinician factors-diagnostic and treatment planning skills, awareness of therapeutic options and clinical acumen or skill in providing service. [2, 12]

The other important local factors that should be taken into consideration are:

- Angle and position of the tooth in the arch; Hemisection cannot be performed on the buccal, lingual, mesial or distal angled molar teeth.

- Intertadicular distance; Hemisection of teeth with separated roots are easier. Hemisection is not preferred for teeth with very close or fused roots.
- Length and curvature of roots; Long and straight roots are more suitable for hemisection than short conical roots. [8,13]

After hemisection, an extra-coronal restoration by interdisciplinary approach remains important for long term success of root resection procedures. Unfortunately, a restoration can also contribute to periodontal destruction, if there are defective margins or if non-occlusal surfaces do not have physiologic form. Also, an improperly shaped occlusal contact area may convert acceptable forces into destructive forces and predispose the tooth to trauma from occlusion and ultimate failure of hemisection.[1] For good prognosis and high success and survival rates in hemisection therapy, it is advocated that the occlusal tables should be kept smaller in size along with under-contouring of the embrasure spaces to reduce the masticatory forces along the long axis and to increase the strength of connectors in fixed partial dentures. Lateral forces were reduced by making cuspal inclines less steep and eliminating balancing incline contacts.[8, 14]

A few disadvantages associated with Hemisection are pain and anxiety as in any surgical procedures. Root surfaces are also more susceptible to caries. Hence, regular follow up and oral prophylaxis along with good oral hygiene play crucial role in long term success of hemisection cases. [1]

In a similar case, Mohammad Khalid Shafiq hemisected the fractured dislodged mesial root. A three unit bridge was given combining the hemisected root and adjacent second premolar which he followed for more than a year. He concluded that the retention of a part of a tooth seems to extend the life of prosthesis and the patient certainly deserves the option of hemisection or root amputation rather than extraction. [15]

Similarly, Santosh Kumar, Atul Jain, have reported hemisection case reports which have been highly successful. [16, 17] Park J et al, in his study concluded that proper maintaining of oral hygiene along with follow up of hemisected molars with questionable prognosis can be maintained for a long time without further bone loss.[18] Hence, hemisection as a treatment alternative to retain a compromised tooth offers a prognosis comparable to any other tooth with endodontic treatment. As stated by Giannobile and Lang, “We have been trained to preserve teeth, let us face the challenge”. [19]

Conclusion

Hemisection has received as an acceptable treatment option for a hopeless tooth which otherwise would have been extracted. The prognosis for hemisection is good provided that there will careful clinical and radiographic examination before case selection, adequate endodontic treatment and final coronal restoration with an acceptable design relative to the occlusal and periodontal needs of the patient. We should also note that regular periodontal maintenance follow up and sufficient coronal restoration of the root resected teeth are important precondition for long term survival. Hemisection should be considered as another weapon in the arsenal of the dental surgeon, determined to retain and not remove the natural teeth.

References

1. Shah S, Modi B, Desai K, Duseja S. Hemisection—A Conservative Approach for a Periodontally Compromised Tooth: A Case Report. Journal of Advanced Oral Research. 2012 May; 3(2):21-5.
2. Baranwal HC, Sami A, Yadav DS. Alternative approach for preservation of hopeless mandibular molar through hemisection with its different restorative modalities: a case series. Journal of Dental and Medical Sciences. 2018; 17(1):82-6.

3. Parmar G, Vashi P. Hemisection: a case-report and review. Endodontology. 2003; 15(1):26-9.
4. Newell DH. The role of the prosthodontist in restoring root-resected molars: A study of 70 molar root resections. The Journal of prosthetic dentistry. 1991 Jan 1; 65(1):7-15.
5. Weine FS. Endodontic-periodontal problems. Weine FS. Endodontic Therapy. 5th ed. St Louis: Mosby. 1996:640-73.
6. Yuh DY, Cheng GL, Chien WC, Chung CH, Lin FG, Shieh YS, Fang WH, Mau LP, Fu E, Huang RY. Factors Affecting Treatment Decisions and Outcomes of Root-Resected Molars: A Nationwide Study. Journal of periodontology. 2013 Nov; 84(11):1528-35.
7. Carnevale G. Retrospective analysis of the periodontal-prosthetic treatment of molars with inter radicular regions. Int. J. Periodont. Rest. Dent. 1991; 11:189-205.
8. Tavsan O, Ozturk H, Simsek N. Hemisection: A modern endodontic approach as an alternative treatment for the extraction of molar teeth-case series. Annals of Medical Research. 2020; 27(1):407-10.
9. Sharma S, Tewari RK, Mishra SK, Kharade PP. Conservative management of grossly carious mandibular first molar with a hemisection approach: a case report. General dentistry. 2015 Jul 1; 63(4):19-21.
10. Kost WJ, Stakiw JE. Root amputation and hemisection. Journal (Canadian Dental Association). 1991 Jan; 57(1):42-5.
11. Jacobs R, Serhal CB, van Steenberghe D. The stereognostic ability of natural dentitions versus implant-supported fixed prostheses or overdentures. Clinical oral investigations. 1997 Jun; 1(2):89-94.
12. Bhutada G. Hemisection as a treatment option: A case report and review. Indian journal of dental research. 2011 Mar; 2012.
13. Behl AB. Hemisection of a multirooted tooth-A case report. Open Access Sci Rep. 2012 Sep; 1:1-3.
14. Rapoport RH, Deep P. Traumatic hemisection and restoration of a maxillary first premolar: a case report. General dentistry. 2003 Jul 1; 51(4):340-2.
15. Shafiq MK, Javaid A, Asaad S. Hemisection: An option to treat apically fractured & dislodged part of a mesial root of a molar. Jpda. 2011 Jul; 20(3):183-6.
16. Balaram SK, Galagali S, Hanumanthappa N. Hemisection with Socket Preservation Surgery as an Alternative Treatment for vertically fractured mandibular molars: A Case Report. International Journal of Contemporary Dentistry. 2011 Mar 1; 2(2).
17. Jain A, Bahuguna R, Agarwal V. Hemisection as an alternative treatment for resorbed multirooted tooth-A case report. Asian J Oral Health Allied Sci 2011; 1: 44-6.
18. Park JB. Hemisection of teeth with questionable prognosis. Report of a case with seven-year results. J Int Acad Periodontol 2009; 11:214-9.
19. Giannobile WV, Lang NP. Are dental implants a panacea or should we better strive to save teeth. J Dent Res. 2016 Jan 1; 95(1):5-6.