

Hemisection of mandibular molar with iatrogenic mishap: A case report

¹Dr. Shubhneet Kaur, Post-graduate student, Dept. of Conservative Dentistry & Endodontics, Sri Guru Ram Das Institute of Dental Sciences & Research, Amritsar

²Dr. Rupam Kaur, Reader, Dept. of Conservative Dentistry & Endodontics, Sri Guru Ram Das Institute of Dental Sciences & Research, Amritsar.

³Dr. Kanwalpreet kaur bhullar, Professor and Head of Department, Dept. of Conservative Dentistry & Endodontics, Sri Guru Ram Das Institute of Dental Sciences & Research, Amritsar.

⁴Dr. Shantun Malhotra, Reader, Dept. of Conservative Dentistry & Endodontics, Sri Guru Ram Das Institute of Dental Sciences & Research, Amritsar.

Corresponding Author: Dr. Shubhneet Kaur, Post-graduate student, Dept. of Conservative Dentistry & Endodontics, Sri Guru Ram Das Institute of Dental Sciences & Research, Amritsar

Citation of this Article: Dr. Shubhneet Kaur, Dr. Rupam Kaur, Dr. Kanwalpreet Kaur Bhullar, Dr. Shantun Malhotra, “Hemisection of mandibular molar with iatrogenic mishap: A case report”, IJDSIR- April - 2021, Vol. – 4, Issue - 2, P. No. 56 – 61.

Copyright: © 2021, Dr. Shubhneet Kaur, et al. This is an open access journal and article distributed under the terms of the creative commons attribution noncommercial License. Which allows others to remix, tweak, and build upon the work non commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Endodontic surgeries are performed as a treatment modality where all the non-surgical options fail. Some such surgical options are apicoectomy, hemi-section, root resection and bicuspidisation. This treatment modality i.e. hemisection, refers to sectioning of a mandibular molar into two halves followed by removal of the diseased root and its coronal portion. It is indicated where one of the root of molar is unsalvageable due to caries, Periodontitis or iatrogenic mishaps. Some instances where a surgical modality could become a priority are separated instrument fragments, ledges which cannot be negotiated, large perforations etc. In such cases, the resective option is justified to remove the affected part and save the tooth as

a whole. The aim of the case report was to preserve the mandibular molar with iatrogenic mishap in mesial root by hemisection.

Keywords: Endodontic surgery, Hemisection, Iatrogenic mishaps.

Introduction

Endodontic surgeries are performed as a treatment modality where all the non-surgical options fail.¹ Some such surgical options are apicoectomy, hemi-section, root resection and bicuspidisation.² Hemisection refers to sectioning of a mandibular molar into two halves followed by removal of the diseased root and its coronal portion.³The retained root is endodontically treated and the furcation area is made self-cleansable by removing the

lip of root carefully. Since hemisected teeth fail by root fractures, it is important to restore them adequately by an extra-coronal restoration.⁴ The respective option is justified to remove the affected half and save the tooth as a whole, in some situations.

A complex root canal anatomy, overzealous biomechanical preparation which leads to ledge formation especially in curved canals and perforations and also the use of NiTi files are increasingly observed to cause an accidental instrument separation. The chances of failure of treatment are more when procedural accident occur during the treatment of an infected tooth, such situation cannot be left unattended.

Thorough clinical and radiographic assessment is required to evaluate the possibilities of a non surgical method first, if not possible, surgical alternative should be planned after educating the patient well about the prognosis and long term success of the planned treatment. Some instances where a surgical modality could become a priority are separated instrument fragments, ledges which cannot be negated, large perforations etc.²

The present case report is successful management of mandibular molar with instrument separation in mesial half of tooth by hemisection and restoration of remaining root with crown with 1.5 year follow up.

Case Report

A 42-year-old male with a non-contributing medical history reported to endodontic postgraduate clinics of Sri Guru Ram Das Institute of Dental Sciences and Research, Amritsar, Punjab, with a chief complaint of pain in left lower back tooth region of jaw since last 3 months. Clinical examination revealed cotton dressing irt #36. The tooth was sensitive to percussion. Patient gave history of intermittent, dull aching pain in left posterior region of jaw since 3 months. Patient gave history of previously initiated root canal treatment from a private practitioner 3

months ago in the same region of jaw. There was no mobility and the periodontal status was normal. Radiographic examination revealed separated instrument in mesial half of mandibular first molar and gutta percha remnants in the distal root (Figure 1).

Based on the clinical and radiographic findings, the diagnosis made was previously initiated endodontic therapy irt 36 and endodontic retreatment followed by hemisection and restoration with crown i.r.t 36 was planned treatment.

Local anesthesia (2% lidocaine and 1:100,000 epinephrine) was given to the patient and after isolation under rubber dam, the canal was negotiated in distal root and gutta percha remnants were removed using H files and canals were not negotiated in mesial roots as there was ledge formation and instrument separation. Working length was established using 10K file and apex locator in the distal canal which was then confirmed by radiograph (Figure 2).

Subsequent shaping and cleaning was performed with neo endo rotary files till 25/.04 and copious irrigation with 2.5% NaOCl, 17% EDTA and chlorhexidine. Saline was used to flush out debris from the canal and used in between the irrigants to avoid interaction between them.

A confirmatory master cone radiograph was done before obturating the distal canal (Figure 3). The canal was dried with sterile paper points and then obturated using gutta-percha cones and AH Plus sealer. Post-operative restoration was done (Figure 4). For extracting the mesial half of tooth, crevicular incision was given (Figure 5), gingiva was then retracted till furcation and tooth was sectioned into two halves using a diamond tapered bur (Figure 6). The mesial half was luxated, elevated and extracted (Figure 7) and immediate post-operative radiograph was taken (Figure 8). The tooth was restored with PFM crown with distal rest on 35 (Figure 9) and

patient was kept on follow-up. 1.5 year follow up of patient had no complains about the function or esthetics of tooth. It was in sound working condition with good periodontal status with bone formation at the extraction site. (Figure10).

Discussion

Sound, healthy tooth devoid of dental caries and any other problems should not be disturbed unless necessary. Whenever there is a possibility of saving the tooth either completely or at least partially one must attempt to do so.⁵ One should prefer doing hemi-section whenever indicated to prevent involvement of the adjacent tooth and for better patient care.⁶

An iatrogenic event is defined as a procedure “induced inadvertently by a physician or surgeon”. One of the most unfortunate occurrences that may impair the success of the root canal procedure is the separation of endodontic instrument in the root canal.

Causes of instrument separation are using a stressed instrument, forcing a file before canal has been opened sufficiently, inadequate access, anatomy of canal, manufacturing defects of files or placing exaggerated bends in files precurving. The reported incidence of separation of rotary NiTi is 1.3%–10% in the literature 44.3% of which are attributed to cyclic fatigue and 55.7% to torsional failure.^{7,8}

American Association of Endodontists defines ledge as “an artificial irregularity created on the surface of root canal wall that impedes the placement of an instrument to the apex of an otherwise patent canal.”

Failure to precurve the instruments, the inability to achieve a proper glide path to the apex and forcing large files into curved canals are perhaps the most common reasons for ledge formation.⁹

Clinically ledge formation is recognized when the canal is usually straightened at the point where the file stops

negotiating the curve and there is suddenly a looser feeling of the file within the canal, with no more tactile sensation of the tip of the instrument binding in the canal. Radiographically recognition of ledge formation is done if the radiograph reveals that the tip of the instrument deviates away from the canal curvature, then it is highly likely that a ledge formation has occurred on the canal wall.

Objectives of Hemisection are to facilitate maintenance, to prevent further attachment loss, to obliterate furcation defects as a periodontal maintenance problem.

Various indications are where one of the root of molar is unsalvageable due to caries, Periodontitis or iatrogenic mishaps, Deep caries approaching the furcation, Distal root vertical fracture resulting in a split root, Multiple root perforations so weaken the root as to make it nonrestorable. Whereas it is contraindicated where strong adjacent teeth are available for bridge abutments as alternatives to hemisection, Inoperable canals in root to be retained, Root fusion-making separation impossible.

In this case, there was ledge formation as well as instrument separation in the mesial half of tooth. So, Mesial split was done as it was the diseased half and the conserved half was endodontically treated and restored with PFM crown with rest on distal of 35.

Careful evaluation, planning and execution of the procedure with utmost care can yield successful long term results for the clinicians thereby ensuring patient comfort and safety.¹⁰

Conclusion

In the dilemma of implants Vs hemisection in dental disciplines, the later is an answer to the least risk – involved, most conservative and economically viable option to retain a compromised tooth.

The overall prognosis has been evaluated and depends on many factors, but the quality of RCT performed in

surviving root, contours of restoration and effectiveness in plaque control are most decisive. The key to long term success lies with an proper diagnosis and going for a proper selection of the candidate.

References

1. Madarati AA, Hunter MJ, Dummer PM. Management of intra canal separated instruments. *J Endod.* 2013;39(5):569-581.
2. Regan JD, Witherspoon DE, Gutmann JL. Prevention, identification and management of tooth perforation. *Endod Pract.* 1998;1:24-40.
3. Kost WJ, Stakiw JE. Root amputation and hemisection. *J Can Dent Assoc.* 1991 Jan;57(1):42-5
4. Rapoport RH, Deep P. Traumatic hemisection and restoration of a maxillary first premolar: a case report. *Gen Dent.* 2003 ;51:340-342.
5. Carnevale G. Management of furcation involvement. *Periodontology.* 2000;9:69-78. 5.
6. Newell DH. The diagnosis and treatment of molar furcation invasions. *Dent Clin North Am.*1998;42(2):301-37.
7. Iqbal MK, Kohli MR, Kim JS. A retrospective clinical study of incidence of root canal instrument separation in an endodontics graduate program: A PennEndo database study. *J Endod.* 2006;32:1048–52.
8. Spili P, Parashos P, Messer HH. The impact of instrument fracture on outcome of endodontic treatment. *J Endod.* 2005;31:845–50.
9. Kenneth M Hargreaves, Louis H Berman. Managing iatrogenic endodontic events. In: Kenneth M Hargreaves, Louis H Berman, editors. *Cohen's Pathways of the Pulp.* #First South Asia Edition. EIH Limited: Elsevier Inc; 2016. p. [722-755].
10. Vaibhavi Joshipura. Hemisection- A relevant, practical and successful treatment option. *J of Int Oral Health.* 2011;3(6):43-8.

Legend Figures

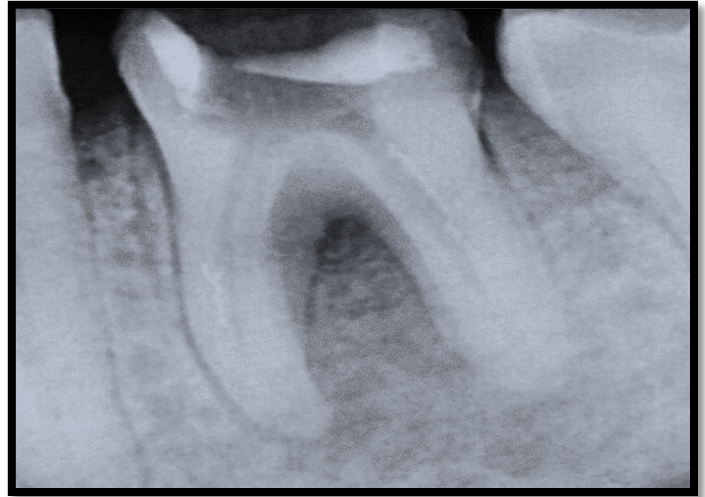


Figure 1: Pre-operative radiograph

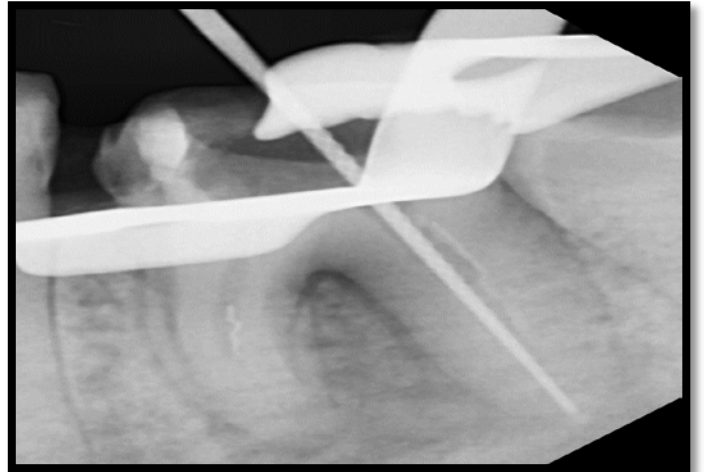


Figure 2: Working Length radiograph



Figure 3: Master Cone radiograph

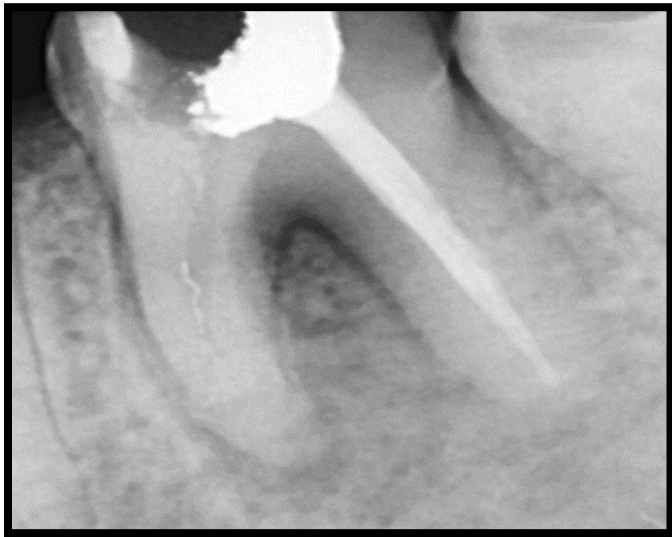


Figure 4: Post-Obturation radiograph



Figure 7: Extraction of mesial half of tooth



Figure 5: Crevicular Incision

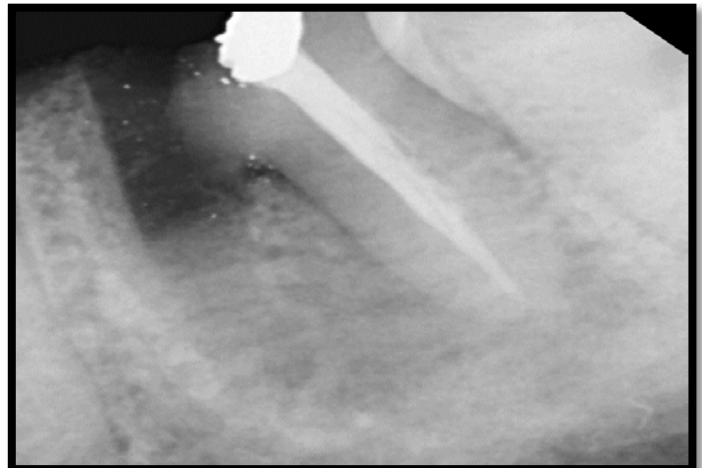


Figure 8: Immediate Post-Operative Radiograph



Figure 6: Sectioning the tooth with Bur



Figure 9: Restoration of distal root with pfm crown with distal rest on 35



Figure 10: Follow up after 1.5 year