Endodontic management of radix entomolaris in a mandibular third molar

TUSHAR KOHLI, ALPA GUPTA, ARUNDEEP SINGH KAWATRA, DAX ABRAHAM
Department of Conservative Dentistry and Endodontics, Manav Rachna Dental College, Faridabad, Haryana, India

ABSTRACT
A wide array of anatomical variations present to dentists from time to time. The mandibular third molars are not far away in this context. Many a time, extraction remains the choice of treatment because of their most posterior location and unpredictable anatomy. In terms of anatomy, an extra distolingual root (radix entomolaris) poses a serious challenge, and it is very rare as well. Hence, the identification and management of radix entomolaris is an essential goal for the successful root canal treatment. The aim of this article is to present article the successful endodontic management of a mandibular third molar with three roots and four root canals.

Keywords: Magnifying loupes, mandibular third molar, radix entomolaris

INTRODUCTION

It is important to save the third molar if it is serving as a support for future replacements of missing teeth in the adjacent vicinity rather than extraction. In such cases, third molar teeth should be provided with proper and thorough endodontic treatment.

Such a variant is a characteristic feature in mandibular first molar, rare in mandibular third molar with least occurrence in the mandibular second molar. The highest occurrence of radix entomolaris (RE) was found among the Mongolian race, including Chinese, Taiwanese, and Koreans. However since it is uncommon among the Caucasians (3.4% - 4.2%) it is considered as an unusual or dysmorphic root morphology. Mandibular third molar exhibits major anatomical and morphological variations as compared to other teeth such as may have one or four roots. Till date, the extra roots in mandibular third molar have been identified in vitro by clearing technique; only, very limited case reports have been documented.

The diagnosis and management of RE are of paramount importance from the point of endodontic success. This case report further emphasizes the rare occurrence and successful management of radix in mandibular third molars and that one should attempt to see the unseen.

CASE REPORT

A 22-year-old male patient reported with spontaneous pain in his right lower back region of the jaw the past 1 week. Clinical and radiographical examination revealed that the pulp was exposed by deep caries, and the tooth was symptomatic to vertical pressure. Pulp vitality tests (cold and electric pulp tests) confirmed the diagnosis of pulp necrosis and symptomatic apical periodontitis [Figure 1a]. Radiograph revealed an additional root. Another radiograph has been taken with same lingual opposite buccal. Patient’s consent was taken following which access preparation

Address for correspondence: Dr. Alpa Gupta, Manav Rachna Dental College, Faridabad, Haryana, India. E-mail: alpagupta2008@gmail.com

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 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.

For reprints contact: reprints@medknow.com

How to cite this article: Kohli T, Gupta A, Kawatra AS, Abraham D. Endodontic management of radix entomolaris in a mandibular third molar. Endodontology 2019;31:179-82.
was started using local anesthesia (2% lignocaine with 1:100,000 epinephrine) under rubber dam. To locate an extra canal, the conventional opening was redefined. After careful inspection and examination under operating loupes × 3.5 (Zumax), it revealed the presence of four root canals orifices. All together four root canal orifices were identified, i.e. mesiobuccal, mesiolingual, distobuccal, and distolingual [Figure 1b]. The caries were removed from the coronal walls, and the working length was established using an apex locator (Root ZX, J. Morita Inc.) and further by radiographs [Figure 1c]. Chemomechanical preparation was completed in all the canals till X2 Protaper Next (Dentsply Maillefer, Switzerland) along with copious use of 3% sodium hypochlorite followed by 17% ethylenediaminetetraacetic

| Authors               | Journal                                | Year | Type of study          | 1 root | 2 roots | 3 roots | 4 roots |
|-----------------------|----------------------------------------|------|------------------------|--------|---------|---------|---------|
| Pineda and Kuttler[3] | Oral Surgery Oral Medicine Oral Pathology | 1972 | In vitro (radiographic) (n = 259) | 1C (M) = 65.8% | 1C (D) = 92.2% | 2C (M) = 34.2% |
| Green[4]              | Oral Surgery Oral Medicine Oral Pathology | 1973 | In vitro (sectioning) (n = 100) | 1C = 74% | 2C = 26% |
| Guerisoli et al.[5]   | Braz Dental Journal                    | 1998 | In vitro (cleaning) (n = 114) | 1C = 14/114 | 2C = 42/114 | 3C = 3/114 |
| Sidow et al.[6]       | Journal of Endodontics                 | 2000 | In vitro (cleaning) (n = 150) | 1C = 5/150 | 2C = 10/150 | 3C = 7/150 |
| Gulabivala et al.[7]  | International Endodontic Journal      | 2002 | In vitro (clearing) (n = 58) | 2C = 1/173 | 3C = 3/150 | 6C = 1/50 |
| Gulabivala et al.[8]  | International Endodontic Journal      | 2001 | In vitro (clearing) (n = 173) | 2C = 1/173 | 2C (M) = 2/173 | 3C = 1/173 |
| Čosić et al.[9]       | International Association of Dental Research | 2008 | In vitro (sectioning) (n = 50) | 56% | 44% |
| Sert et al.[10]       | Australian Endodontic Journal         | 2011 | In vitro (cleaning) (n = 257) | n = 257 | 2C = 151/370 | 2C (D) = 7/173 |
| Kuzuanani et al.[11]  | J Dent Res Dent Clin Dent Prospects    | 2012 | In vitro (clearing) (n = 150) | 21% | 73% | 5.5% |
| Park et al.[12]       | European Journal of Dentistry         | 2013 | In vivo (CBCT) | 37.9% | 56.5% |
| Čosić et al.[13]      | Coll Antropol                          | 2013 | In vitro (sectioning) | 56.0% | 44.0% |
| Ahmad et al.[14]      | Saudi Endodontic Journal              | 2016 | In vitro (clearing) (n = 70) | 12.9% | 74.3% | 8.7% | 4.3% |

**Case reports**

| Authors       | Journal                        | Year | Type of study | No. of cases |
|---------------|-------------------------------|------|--------------|--------------|
| Plotino[15]   | Journal of Endodontics        | 2008 | Case report  | 4C           |
| Garg et al.[16]| J Contemp Dent Pract.        | 2014 | Case report  | 4C           |
| Sinha and Sinha[17]| Saudi Endodontic Journal  | 2014 | Case report  | 5C           |
| Arora et al.[18]| Case reports in Dentistry    | 2018 | Case report  | 2C           |

CBCT: Cone-beam computed tomography
acid. Suitable intracanal medicament was placed followed by temporization with Orafil G. The patient was recalled after 2 weeks.

The patient reported after 2 weeks and was totally asymptomatic. The temporary filling was removed; canals were irrigated and thereafter dried with paper points. The corresponding gutta-percha points were placed, and a radiograph was obtained [Figure 1d]. Root canal filling was thereafter completed, and the postendodontic permanent restoration was performed with nanohybrid composite (Tetric N-Ceram) [Figure 2a]. The patient came after a 3-month follow-up and was found to be asymptomatic [Figure 2b].

**DISCUSSION**

Endodontic treatment of third molars are considered an ordeal owing to their most posterior location, unpredictable internal anatomy, bizarre occlusal anatomy and aberrant eruption patterns. Although the extraction of third molars is often the treatment of choice, few clinical situations might demand the retention of these teeth. Third molars might serve as an abutment for removable partial denture of fixed prosthesis, where second molars are lost. Moreover, the principle of endodontics is directed at the preservation of each and every functional component of the dental arch. The anatomical variations confronted in third molars range from extra root (RE), curved roots, bayonet roots, fused canals, C-shaped canals, dilacerations, etc. The exact cause of RE is still not known. Some authors say that it may be due to disturbance during odontogenesis or may be due to an atavistic gene. Incidence varies from 5% to 30% and also among different populations. To achieve a correct diagnosis, minimum of two diagnostic radiographs are necessary using buccal object rule. Even the presence of an extra cusp may sometimes indicate the presence of RE.

Access cavity preparation should be modified usually from a triangular to trapezoidal shape. The modification should be done following the dentinal map. Advanced diagnostic aids help in the better identification and visualization of all the canals.

Some of the common problems encountered during the treatment of RE in mandibular third molar are as follows:
1. Difficulty in radiographic interpretation
2. Inability to locate the fourth canal because of limited space
3. Proximity to inferior alveolar nerve
4. Confusion in working length determination
5. Difficulty in rubber dam placement.

Apart from these difficulties, clinicians are prone to commit some iatrogenic errors such as straightening of a root canal, resulting in loss of working length, ledge formation, zipping, transportation or even perforation, and instrument separation due to limited mouth opening. Hence, these factors should be kept in mind before embarking the treatment of mandibular third molar.

**CONCLUSION**

RE in mandibular third molar is very rare, and it was possible to detect same through radiographic techniques and enhanced magnification aids. There is limited literature available regarding the successful endodontic management of RE in mandibular third molar with a 3-month follow-up.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and
other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

REFERENCES

1. Aly Ahmed HM. Management of third molar teeth from an endodontic perspective. Eur J Gen Dent 2012;1:148-60.
2. Calberson FL, De Moor RJ, Deroose CA. The radix entomolaris and paramolaris: Clinical approach in endodontics. J Endod 2007;33:58-63.
3. Pineda F, Kuttler Y. Mesiodistal and buccolingual roentgenographic investigation of 7,275 root canals. Oral Surg Oral Med Oral Pathol 1972;33:101-10.
4. Green D. Double canals in single roots. Oral Surg Oral Med Oral Pathol 1973;35:689-96.
5. Guerisoli DM, de Souza RA, de Sousa Neto MD, Silva RG, Pécora JD. External and internal anatomy of third molars. Braz Dent J 1998;9:91-4.
6. Sidow SJ, West LA, Liewehr FR, Loushine RJ. Root canal morphology of human maxillary and mandibular third molars. J Endod 2000;26:675-8.
7. Gulabivala K, Opasanon A, Ng YL, Alavi A. Root and canal morphology of Thai mandibular molars. Int Endod J 2002;35:56-62.
8. Gulabivala K, Aung TH, Alavi A, Ng YL. Root and canal morphology of Burmese mandibular molars. Int Endod J 2001;34:359-70.
9. Čosić J, Galić N, Njemirovskij V, Vodanović M. Root Canal Anatomy of Third Molars. London: PEF/IADR International Dental Research Meeting; 2008.
10. Sert S, Sahinkesen G, Topçu FT, Eröğlu SE, Oktay EA. Root canal configurations of third molar teeth. A comparison with first and second molars in the Turkish population. Aust Endod J 2011;37:109-17.
11. Kuzekanani M, Haghani J, NosratI H. Root and canal morphology of mandibular third molars in an Iranian population. J Dent Res Dent Clin Dent Prospects 2012;6:85-8.
12. Park JB, Kim N, Park S, Ko Y. Evaluation of number of roots and root anatomy of permanent mandibular third molars in a Korean population, using cone-beam computed tomography. Eur J Dent 2013;7:296-301.
13. Čosić J, Galić N, Vodanović M, Njemirovskij V, Segović S, Pavelić B, et al. An in vitro morphological investigation of the endodontic spaces of third molars. Coll Antropol 2013;37:437-42.
14. Ahmad IA, Azzeh MM, Zwiri AM, Haija MA, Diab MM. Root and root canal morphology of third molars in a Jordanian subpopulation. Saudi Endod J 2016;6:113-21.
15. Plotino G. A mandibular third molar with three mesial roots: A case report. J Endod 2008;34:224-6.
16. Garg AK, Bhardwaj A, Mantri VR, Agrawal N. Endodontic management of mesiobuccal-2 canal in four-rooted and five-canalled mandibular third molar. J Contemp Dent Pract 2014;15:363-6.
17. Sinha DJ, Sinha AA. An endodontic management of mandibular third molar with five root canals. Saudi Endod J 2014;4:36-9.
18. Arora S, Gill GS, Setia P, Abdulla AM, Sivadas G, Vedam V. Endodontic management of a severely dilacerated mandibular third molar: Case report and clinical considerations. Case Rep Dent 2018;1:1-4.