

A 18-year-old male with radix entomolaris

Khandoker Rumon, Sageer Ahmed, Govind Kumar Chaudhary, Mozammal Hossain, Md. Mujibur Rahman Howlader, Md. Joynal Abdin, Md. Ali Asgor Moral and Md. Shamsul Alam

Article Info

Department of Conservative Dentistry and Endodontics, Faculty of Dentistry, Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka, Bangladesh

For Correspondence:

Mozammal Hossain
mozammalresearch@gmail.com

Received: 6 August 2019
Accepted: 8 September 2019
Available Online: 3 October 2019

ISSN: 2224-7750 (Online)
2074-2908 (Print)

DOI: 10.3329/bsmmuj.v12i3.42459

Keywords: Alveolar abscess; Periodontitis; Pulp necrosis; Radix entomolaris

Cite this article:

Rumon K, Ahmed S, Chaudhary GK, Hossain M, Howlader MMR, Abdin MJ, Moral MAA, Alam MS. A 18-year-old male with radix entomolaris. Bangabandhu Sheikh Mujib Med Univ J. 2019; 12: 150-153.

Copyright:

The copyright of this article is retained by the author(s) [Attribution CC-BY 4.0]

Available at:

www.banglajol.info

A Journal of Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh

Presentation of Case

Dr. Khandoker Rumon (MS Resident): A 18-year-old boy came with the complaints of mild pain during mastication on the lower right posterior tooth for two weeks. He gave the history of severe pain on offending tooth one month before, which subsided within a few days after taking medication from a local pharmacy. On clinical examination, a deep occlusal caries was present on the lower right first molar tooth. The tooth was tender to the vertical percussion but not associated with any swelling or discharge. The vitality test revealed that the tooth was non-vital.

Radiological Findings

Dr. Mozammal Hossain (Associate Professor): Radiovisography revealed deep caries that involved pulp space and slight periodontal ligament space widening (Figure 1A). Furthermore, the presence of an additional periodontal space crossing over the distal root indicated a double periodontal ligament space on the distal aspect. This lead to suspicion of additional or extra root entity, which was confirmed as distolingual root by same lingual opposite buccal X-ray technique.

Provisional Diagnosis

Irreversible pulpitis

Differential Diagnosis

Pulp necrosis

Dr. Sageer Ahmed (MS Resident): Pulp necrosis means the death of the pulp usually not having any painful symptoms.¹ The discoloration of the tooth is the first indication that the pulp is dead.^{2,3} A few patients have a history of severe pain lasting for a few minutes to hours, followed by complete and sudden cessation of pain.⁴ In other cases, the patient is unaware that the pulp has died slowly and silently, without causing symptoms. There are usually no

radiographic changes in periapical tissue at initial stage.⁵⁻⁶

Chronic periodontitis

Dr. Ahmed: Chronic periodontitis is bacterial-induced inflammation of the periodontium of which 54% of adults have some 4 mm pockets present and 5% have a pocket of 6 mm or greater.⁷⁻⁸ Furthermore, bleeding, gingival recession, alveolar bone resorption and tooth mobility are the common clinical features.⁹⁻¹⁰ As these features were not found in the present case and it was excluded from the diagnosis.

Chronic alveolar abscess

Dr. Ahmed: A chronic alveolar abscess indicates a long-standing and low-grade infection of the periradicular alveolar bone. It is characterized by the presence of an abscess which drains through a sinus tract.¹¹⁻¹² The root canal is the main source of the infection and the death of the pulp results in the extension of the infective process periapical, or it may be from a pre-existing acute abscess.¹³⁻¹⁴ The radiograph frequently shows a diffuse area of bone rarefaction, but the radiographic appearance of the lesion is non-diagnostic and therefore, a radiographic examination is often performed by the insertion of a gutta-percha cone into the sinus tract to identify the involved tooth and the origin of the sinus tract.

Treatment Procedure

Dr. Rumon: After administration of local anesthesia, the access cavity was prepared with #4 round bur and refined by Endo-z bur (Dentsply maillefer). The access cavity was flushed with 2.5% sodium hypochlorite and two mesial and one distal canal orifices were located with the endodontic explorer. A dark line was observed in between the distal and distolingual orifice of the pulp chamber floor. Following the removal of dentin with diamond-coated ultrasonic tips mounted in an ultrasonic device, the distal orifice of a second canal was detected. The access cavity was filled with EDTA containing gel (Glyde, Dentsply Sirona) and all four canals were negotiated to the 2/3rd



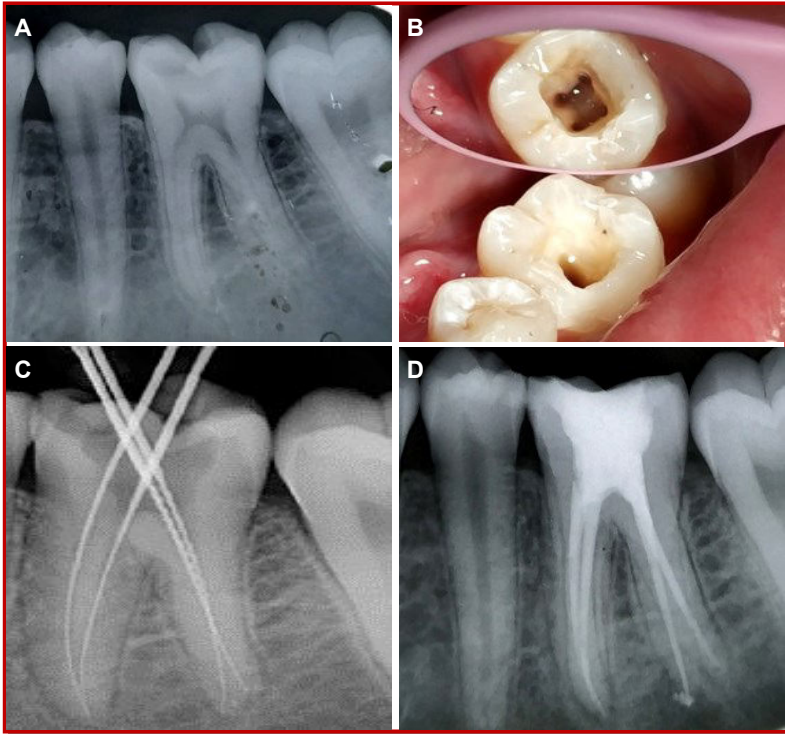


Figure 1: Radiovisiography shows deep caries that involving pulp space and slight widening of the periodontal ligament space (A); Photograph shows the four root canal orifices (B); Confirmation of the length of four canals by inserting one file in each canal (C); Obturation of the canal with radio-opaque gutta-percha and sealer that sealed the canal adequately (D)

length by 10K SS file (length was measured from the pre-operative radiograph) (Figure 1-A). Coronal flaring of canals was done with Sx and photograph was taken to demonstrate canal orifices (Figure 1-B). Working length was measured by using apex locator and confirmed by radiovisiography (Figure 1-C) followed by using Proglider (Dentsply, Sirona) for each canal after 10 K files to create smooth reproducible glide path up to the working length. All the four canals were prepared up to F2 (Protaper Gold, Dentsply) in the presence of a lubricant. The canals were finally irrigated with 17% liquid EDTA for 1 min and 2.5% sodium hypochlorite for 15 min and dried with paper points. Obturation was done by using F2 G.P master gutta-percha and Sealapex sealer (Kerr Dental) and followed by closing the cavity with definitive restoration (Figure 1-D).

Dr. Rumon's Diagnosis

Chronic apical periodontitis

Discussion

Morphology of root canal

Dr. Mujibur Rahman Howlader (Associate Professor): Previous studies have indicated that the mandibular first molar tooth may exhibit several anatomical variations among the races such as the first molars of the Caucasian population usually present with two roots: one mesial and one distal.¹⁵⁻¹⁶ Furthermore, in the case of the mesial root, the two canals finish into two different apical foramens or sometimes they may unite at the root ending and develops a single foramen. On the other hand, although the distal root normally shows a large kidney-shaped root canal if the orifice is narrow and round, a second distal canal could be identified.¹⁷⁻¹⁸ The presence of three mesial and three distal canals was reported by some of the previous studies.¹⁹⁻²¹

Variation of radix entomolaris

Dr. Govind Kumar Chaudhary (MS Resident): Previous studies have indicated that a third additional root known as radix entomolaris could be found in the mandibular first molar tooth in the distolingual position.²²⁻²³ Furthermore, when this supernumerary root is located in the mesiobuccal surface, it is termed as radix paramolaris. Moreover, when a supernumerary lingual or buccal root is identified, it is classified as type A, B, C, or AC.²²⁻²⁴ In type A and B, the root is located distally to the cervical part whereas type C is mesially located at mesial to the cervical part and type AC usually present in between the mesial and distal apparatus. De Moor et al. (2004)²⁵ described another classification according to curvature variations of radix entomolaris in the buccolingual direction as type I, II and III where type I considered as straight root/canals, type II as a curvature at the entrance of the orifice and type III contains two curvatures where one is located at the coronal and the other is found at the middle third.

Relation between radix entomolaris and races

Dr. Md. Joynal Abdin (Assistant Professor): The presence of a single radix entomolaris in the mandibular first molar is differing among the ethnic groups. Among the black, Caucasians and Indian population, the maximum frequency of radix entomolaris was ranged between 3 to 5%.²⁶ However, in Chinese, Eskimos, and American Indian population, the occurrences 5% to 30%.²⁷⁻³¹ Although, the actual etiology of the formation of radix entomolaris is still doubtful but several studies have confirmed that they were associated with gene, races and developmental factors.³²

Comparison between present and previous studies

Dr. Rumon: Previous studies have confirmed that radix entomolaris are found in the first, second and third mandibular molar teeth but the second molar is less affected than the others.²²⁻²³ Another study has reported that a bilateral radix entomolaris was found in 50-67% of the cases.³² Furthermore, the

presence of an additional root was found at the buccal surface and termed as the radix paramolaris.³³

Follow-up

Dr. Rumon: Radix entomolaris may be a challenge if there is lack of proper diagnostic aids and knowledge of root canal anatomy.

Dr. Sharmin Mahmud (MS Resident): How did you select the master finishing files in your case during instrumentation of the canals?

Dr. Rumon: There are three ways to select the master finishing files during biomechanical preparation of the canals while using ProTaper Gold rotary files.³⁴ The three techniques are apical gauging technique, visual technique and technique that uses file verifier. The apical gauging technique involves gauging of the apical foramen with ISO file number 20 once F1 finishing file reaches the working length. The visual technique involves the evaluation of apical 3-5 mm of apical flutes of the finishing instrument for dentin loading. If the apical flutes of F1 are not fully loaded with dentin, then proceed to the next sequential finishing file, or F2 (25/08). In a bath of fresh sodium hypochlorite, F2 is progressively carried to length in one or more passes. Upon reaching length, F2 is removed and the apical flutes are inspected. If its apical flutes are fully loaded, then visual evidence confirms the shaping. If the apical flutes of F2 are partially loaded or not loaded at all, then continue to the F3 finishing file, or F4 or F5 as indicated. Another technique is the use of file verifier that involves the use of specific file verifier for gauging the apical foramen after the use of each finishing files. If F1 reaches the working length, the file verifier corresponding to F1 is used to gauge the apical foramen. If this instrument is snug at length, the canal is shaped and ready to obturate. If it is loose at length, proceed to the F2 and, when necessary, the F3, F4 and F5 gauging after each finishing file with corresponding file verifier. In this case, the visual technique was used for selecting the master finishing files during canal instrumentation.

Final Diagnosis

Chronic apical periodontitis

Conflict of Interest

Authors declare no conflict of interest.

References

1. Rolland. Presumed case of pulp necrosis: Diagnostic difficulties. Rev Odontol Parana. 1950; 72: 566-70.
2. Moccelini BS, de Alencar NA, Bolan M, Magno MB, Maia LC, Cardoso M. Pulp necrosis and crown discoloration: A systematic review and meta-analysis. Int J Paediatr Dent. 2018; 28: 432-42.
3. Yu C, Abbott PV. An overview of the dental pulp: Its functions and responses to injury. Aust Dent J. 2007; 52: S4-16.
4. Edionwe JI, Shaba OP, Umesi DC. Single visit root canal treatment: A prospective study. Niger J Clin Pract. 2014; 17: 276-81.
5. Mohammadi Z, Abbott PV, Shalavi S, Yazdizadeh M. Postoperative pain following treatment of teeth with irreversible pulpitis: A review. N Y State Dent J. 2017; 83: 44-53.
6. Kandreli MG, Vadachkoriia NR, Gumberidze NSH, Mandzhavidze NA. Pain management in dentistry. Georgian Med News. 2013; 225: 44-49.
7. Trowbridge HO. Immunological aspects of chronic inflammation and repair. J Endod. 1990; 16: 54-61.
8. Heitz-Mayfield LJA, Schätzle M, Løe H, Bürgin W, Ånerud A, Boysen H, Lang NP. Clinical course of chronic periodontitis. II. Incidence, characteristics and time of occurrence of the initial periodontal lesion. J Clin Periodontol. 2003; 30: 902-08.
9. Moore WE, Holdeman LV, Cato EP, Smibert RM, Burmeister JA, Ranney RR. Bacteriology of moderate (chronic) periodontitis in mature adult humans. Infect Immun. 1983; 42: 510-15.
10. Persson GR. Periodontal complications with age. Periodontol 2018; 78: 185-94.
11. Hegde R, Awan KH. Effects of periodontal disease on systemic health. Dis Mon. 2019; 65: 185-92.
12. Torabinejad M. Mediators of acute and chronic periradicular lesions. Oral Surg Oral Med Oral Pathol. 1994; 78: 511-21.
13. Shimizu E, Ricucci D, Albert J, Alobaid AS, Gibbs JL, Huang GT, Lin LM. Clinical, radiographic, and histological observation of a human immature permanent tooth with chronic apical abscess after revitalization treatment. J Endod. 2013; 39: 1078-83.
14. Abella F, Patel S, Durán-Sindreu F, Mercadé M, Bueno R, Roig M. An evaluation of the periapical status of teeth with necrotic pulps using periapical radiography and cone-beam computed tomography. Int Endod J. 2014; 47: 387-96.

15. Zubery Y, Machtei EE. Periodontic-endodontic treatment of severe alveolar lesions. *Gen Dent.* 1993; 41: 56-59.
 16. Kröncke A. Possibilities and limitations of treating the root canal in pulp necrosis and chronic apical periodontitis. *SSO Schweiz Monatsschr Zahnheilkd.* 1965; 75: 1125-35.
 17. Byers MR, Taylor PE, Khayat BG, Kimberly CL. Effects of injury and inflammation on pulpal and periapical nerves. *J Endod.* 1990; 16: 78-84.
 18. Abuabara A, Schreiber J, Baratto-Filho F, Cruz GV, Guerino L. Análise da anatomia externa no primeiro molar superior por meio da tomografia computadorizada cone beam. *RSBO.* 2008; 5: 38-40.
 19. Abarca J, Zaror C, Monardes H, Hermosilla V, Muñoz C, Cantin M. Morphology of the physiological apical foramen in maxillary and mandibular first molars. *Int J Morphol.* 2014; 32: 671-77.
 20. Jabali AH. Middle mesial and middle distal canals in mandibular first molar. *J Contemp Dent Pract.* 2018; 19: 233-36.
 21. Filpo-Perez C, Bramante CM, Villas-Boas MH, Húngaro Duarte MA, Versiani MA, Ordinola-Zapata R. Micro-computed tomographic analysis of the root canal morphology of the distal root of mandibular first molar. *J Endod.* 2015; 41: 231-36.
 22. Fabra-Campos H. Three canals in the mesial root of mandibular first permanent molars: A clinical study. *Int Endod J.* 1989; 22: 39-43.
 23. Fabra-Campos H, Rodríguez-Vallejo J. Digitization, analysis and processing of dental images during root canal preparation with Quantec series 2000 instruments. *Int Endod J.* 2001; 34: 29-39.
 24. Carlsen O, Alexandersen V. Radix entomolaris: identification and morphology. *Scand J Dent Res.* 1990; 98: 363-73.
 25. De Moor RJ, Deroose CA, Calberson FL. The Radix entomolaris in mandibular first molars: An endodontic challenge. *Int Endod J.* 2004; 37: 789-99.
 26. Chandra SS, Chandra S, Shankar P, Indira R. Prevalence of radix entomolaris in mandibular permanent first molars: A study in a South Indian population. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2011; 112: e77-82.
 27. Sperber GH, Moreau JL. Study of the number of roots and canals in Senegalese first permanent mandibular molars. *Int Endod J.* 1998; 31: 117-22.
 28. Ribeiro FC, Consolaro A. Importancia clinica y antropologica de la raiz distolingual en los molares inferiores permanentes. *Endodoncia* 1997; 15: 72-78.
 29. Steelman R. Incidence of an accessory distal root on mandibular first permanent molars in Hispanic children. *ASDC J Dent Child.* 1986; 53: 122-23.
 30. Tu MG, Huang HL, Hsue SS, Hsu JT, Chen SY, Jou MJ, Tsai CC. Detection of permanent three-rooted mandibular first molar by cone-beam computed tomography imaging in Taiwanese individuals. *J Endod.* 2009; 35: 503-07.
 31. Curzon ME, Curzon JA. Three-rooted mandibular molars in the Keewatin Eskimo. *J Can Dent Assoc.* 1971; 37: 71-72.
 32. Stroner WF, Remeikis NA, Carr GB. Mandibular first molar with three distal canals. *Oral Surg Oral Med Oral Pathol.* 1984; 57: 554-57.
 33. Bolk L. The importance of endodontics in maxillary and mandibular molar root canals. *J Can Dent Assoc.* 1994; 60: 527-32.
 34. Ruddle CJ. The ProTaper technique: Shaping the future of endodontics. *Endod Topics.* 2005; 10: 213-16.
-