

Mandibular lateral incisor with unexplored second canal treated under Dental Operating Microscope: A case report

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Abstract:

The root canal anatomy of mandibular incisors can present a number of variations, including multiple canals. Successful endodontic therapy of a tooth demands that the dentist should have a thorough knowledge of the root canal morphology, making it mandatory towards thorough radiographic evaluation and diagnosis of the status of the pulp canals as well as the periapical areas. Here is a case report which describes the endodontic management of a mandibular lateral incisor with two root canals.

Keywords: *mandibular incisor, root canal anatomy, endodontics*

Introduction:

Successful endodontic therapy of a tooth demands that the dentist, should have a thorough knowledge of the root canal morphology, making it mandatory towards thorough radiographic evaluation and diagnosis of the status of the pulp canals as well as the periapical areas. Improper diagnostic protocol may lead to the failure of endodontic treatment (Tikoo, Damle 2005)¹. A wide morphological divergence of the root canal systems is known to exist. Varying number of the root canals in different teeth, their anatomy and interconnections have been studied and reported by several authors. Vertucci has classified morphological patterns of the root canal systems into eight types². Generally, the mandibular incisors have one root canal with one apical foramen (Vertucci type I) or two root canals with one apical foramen (Vertucci type II). However, the occurrence of two root canals with two separate foramina (Vertucci type IV) in the mandibular incisors is very rare viz 3% and 2% in the mandibular central incisors and lateral incisors respectively, and in canines it is 6%. It is generally accepted that many mandibular incisors have 2 canals, which may merge into 1 canal before reaching the apex³. In a study of mandibular incisors in which a surgical resection method was used to study canal anatomy, Mauger and others demonstrated that, at the apical 1, 2 and 3 mm levels in the mandibular incisor, the canal is only rarely separated by hard tooth structure and that only 2% of the teeth they studied had 2 canals at the 1 mm resection level. (Hegde et al)³

Table 1: Percentage of canal system types in mandibular incisors²

Investigators	Year	Type I	Type II	Type IV
Rankine Wilson & Henry	1965	60.0%	35.0%	5.0%
Madieriea & Hetem	1973	88.5%	11.0%	5.0%
Dowson	1974	59.0%	40.0%	1.0%
Vertucci	1985	92.5%	5-2.5%	

This case report describes the endodontic management of a mandibular lateral incisor with two root canals.

Case Report:

A 25 year-old male reported to the department of conservative dentistry and Endodontics, Guru Nanak Institute of Dental Science and Research, Kolkata-700114, with the chief complaint of mild pain and swelling in the right lower region of mouth. Clinical examination revealed a discharging sinus in relation to 41 and 42. 42 was tender on percussion and access cavity on 41 and 42 indicated previously attempted endodontic treatment. (fig 1(a)) Radiographic examination of 42 revealed a 2mm x 1.5mm large periapical lesion in relation to 41 and 42 and bone loss in relation to 42 (fig 1(b)). Medical and family history was noncontributory. In view of the clinical symptoms, and periapical pathology, an endodontic retreatment of 42 was planned.

The tooth was isolated with rubber dam and access cavities modified. Two separate root canal orifices were spotted at the floor of the pulp chamber. One

no. #15 K files and other no.#15 H file were inserted into the canals and radiographs were taken at different angles following SLOB technique.(fig 3)Both tactile sensation and radiographic examination under dental operating microscope (fig 2) revealed the presence of two canals which originated as separate entities from the pulp chamber but joined short of apex in the apical third to emerge as a single canal (Vertucci type II). A perforation was observed in the cervical third of root immediately below the CEJ. The perforation was repaired with Light cured Glass Ionomer Cement (i –seal, Prevest Dentpro) and endodontic treatment was initiated. Working length was established radiographically and biomechanical preparation was performed using crown-down technique with rotary Protaper Universal files and both the canals were enlarged upto #F1. A 2.5% of sodium hypochlorite and normal saline were alternatively used as irrigants at every change of instruments. The canals were dried with sterile paper points and root canal dressing was done with calcium hydroxide & iodoformpaste (Metapex) (fig 4). The access cavities were then temporarily sealed with IRM (Dentsply). At 2 weeks follow up the patient was asymptomatic with resolution of pain and swelling and no discharge from the canals. Calcium hydroxide dressing was removed and new dressing of calcium hydroxide paste was given, which was changed every 2 weeks for three more appointments. At the 8th week since the patient was asymptomatic with no pain, swelling, no discharge from canals and no tenderness on percussion in 42, obturation of the root canals was undertaken with laterally condensed gutta-percha using lateral condensation technique. Post obturation radiograph was taken (fig 5(b)) and the access cavities were sealed with glass ionomer cement.(fig 5(a)) The patient was periodically recalled at 1, 3, 6, 8 and 12 month intervals. At 12 month post-operative the patient was completely asymptomatic and radiograph revealed considerable healing of the periapical lesion.

Discussion

Since the success of the endodontic treatment is related to a thorough debridement of the root canals and hermetic seal of the obturated materials, a good preoperative radiographic evaluation is necessary². The anatomy of root canal systems dictates the condition under which root canal therapy is carried out and can directly affect its prognosis. Extra root or root canals if not detected are a major reason for failure of this treatment. (Slowey 1974)⁴Incomplete removal of all the irritants from the pulp space may increase

the possibility of treatment failure(Nair 1990; Sjogren 1990)^{5,6}. The main reasons for failure in endodontic treatment of mandibular incisors is the inability to detect the presence of a second root canal,which can then not be prepared and obturated during treatment. The frequency of two root canals in the mandibular incisors is 45% as reported by Kartal and Yanikoglu, whereas the other reports give these percentages between 11.5% and 41.4% respectively (Kartal 1992).⁷

Our case of a mandibular lateral incisor with two canals and one foramina is similar to the case presented by Hema BS et al 2011. Funatoet al., reported a case of a mandibular central incisor with two root canals and two separate apical foramina⁸Kabak et al., reported successful management of two canals in all the mandibular incisors⁹. Similar cases were reported by Tikoo et al(2005)¹ and Hegde et al.³

It is essential that clinicians know the clinical and radiographic signs that suggest the presence of extra canals. In cases with necrotic pulps or when the canals are pulpless, the presence of an apical rarefaction on the lateral side of the root may suggest the presence of an extra canal. Some of the other indications could be the eccentric location of an endodontic file on a radiograph during working length determination, inconsistent apex locator readings, a sinus tract that traces laterally away from the main canal, or the feeling of a 'catch' on the canal wall during instrumentation of a wide and unobstructed main canal. Complete disappearance of the lumen in the coronal third of the root on the periapical radiograph; suggest the possible presence of second canal. (Hema BS 2011)².

A common reason for not locating a second canal in mandibular incisors is an inadequate access opening into the tooth which leaves a lingual shelf of dentine over the second (usually the lingual canal).(Benjamin 1974)¹⁰.

Therefore it may be necessary to modify the conventional access preparation to permit better visualization and instrumentation of additional canal even at the emphasis of compromising the crown structure. (Ingle et al)¹¹

Numerous antimicrobial agents have been recommended as inter appointment dressings. Calcium hydroxide paste is a simple and remarkably effective antimicrobial medicament (Bystrom 1985).¹²It has been shown to dissolve necrotic tissue and enhance the tissue dissolving effect of sodium hypochlorite solution (Hasselgren 1988)¹³

Finally, it is also important that the endodontic treatment be reviewed periodically to ensure continuous healing without complications.

Conclusion:

The patient is presently asymptomatic. The patient will be reviewed periodically at 6 monthly intervals to monitor the success of endodontic treatment.

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References

1. An unusual presentation of all the mandibular anterior teeth with two root canals - A case report; AM Tiku¹, RR Kalaskar¹, SG Damle; Journal of Indian society of Pedodontics and Preventive Dentistry; Year: 2005 | Volume : 23 | Issue : 4 | Page : 204-206
2. Endodontic management of type II canal in mandibular incisors: A Case Report; Hema BS, Chandu GS; INDIAN JOURNAL OF STOMATOLOGY 2011;2(4) 270-72
3. An unusual presentation of all the 4 mandibular incisorshaving 2 root canals in a single patient - A case report; VIBHA HEGDE *SHARAD R. KOKATE **YOGESH R. SAHU; ENDODONTOLOGY ;Case Report
4. Slowey RR. Radiographic aids in detection of extra root canals. Oral Surgery Oral Medicine Oral Pathology 1974;37: 762-71
5. Nair R, Sjogren U, Kreg G, Khanberg KE, Sandquist G.;Intraradicular bacteria and fungi in root filled asymptomatic human teeth with therapy resistant periapical lesion- a long term light and electron microscope follow up study. Journal of Endodontics 1990;16: 580-8
6. Sjogren U, Hagglund B, Sundquist G, Wing K. Factors affecting the long term results of endodontic treatment. Journal of Endodontics 1990;16: 498-504
7. Kartal N, Yanikoglu F C. Root canal morphology of mandibular incisors. Journal of Endodontics 1992;11:562-564.
8. Funato A, Funato H, Matsumoto K. Mandibular central incisor with two root canals. EndodDent Traumatol 1998;14:285-86.
9. Kabak YS, Abbott PV. Endodontic treatment of mandibular incisors with two root canals: Report of two cases. AustEndod J 2007;33:27-31
10. Benjamin KA, Dowson J. ;Incidence of two canals in human mandibular incisor teeth. Oral Surg Oral Med Oral Pathol Oral RadiolEndod 1974;38(1):122-26.
11. Ingle JJ. Endodontics, 2edn. Philadelphia; Lea and Febiger, 1965;771-72
12. Bystrom A, Claesson R, Sundquist G. The antibacterial effect of camphorated paramonochlorophenol, camphorated phenol,and calcium hydroxide in the treatment of infected root canals. Endodontics and Dental Traumatology 1985;1:170-5.
13. Hasselgren G, Olsson B, Cvek M. Effects of calcium hydroxide and sodium hypochlorite on the dissolution of necrotic porcine muscle tissue. Journal of Endodontics 1988;14:125-7.

Figures:



Fig 1. Pre operative (a)clinical & (b)radiographic view

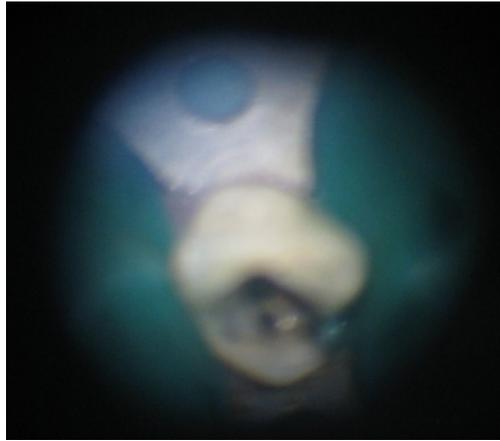


Fig 2. Dental Operating Microscopic View



Fig 3. WL determination Fig 4 After Metapex Dressing of two separate canals



Fig 5. Post operative (a)clinical & (b)radiographic view

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