

MANDIBULAR LATERAL INCISOR PRESENTING BIFURCATED ROOT CANALS: A CASE REPORT

Dentistry

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ABSTRACT

The anatomy of mandibular single-rooted teeth often presents bifurcated root canals, missing one of these leading to failure of endodontic treatment. As the mandibular incisors are smaller in dimensions, proper access cavity preparation is technical, the lingual canal is more difficult to find because of the angulation. Thorough knowledge and skills are required to negotiate all of the canals for successful treatment and prognosis.

A case report is presented to illustrate non-surgical endodontic management of mandibular lateral incisors with two canals having a common exit.

Summary: The mandibular incisors or single rooted teeth of mandible are often thought of having only one canal relating to the anatomy of root. But on the other hand, the morphology of root canal system of mandibular teeth presents multiple variations and multiple canals in single rooted teeth. This case is presented here with mandibular lateral incisor having two canals with common entrance and exit.

KEYWORDS

Mandibular Incisors, Two Canals, Bifurcated Root Canals, Vertucci, Dual Canals, two orifices.

INTRODUCTION:

Root canal anatomy of mandibular single-rooted teeth extends the wide range of variations as having two canals with separate apical foramina and with two canals having a single exit. The overall prognosis of endodontically treated teeth depends on the knowledge and skills about the existence of versatile root canal morphology. The outcome, completely depends on understanding and locating all of the canals, failure to do so leads to periapical pathologies, surgical treatments, and at last loss of the tooth.

Root Canal configuration of mandibular incisors was classified by Vertucci into four types in 1974^{1,2}.

Type I: Single canal from pulp chamber to the apex, no bifurcation at any place.

Type II: Two separate root canals, separate entrance, but join and form one canal reaching the apex.

Type III: Single root canal leaving the pulp chamber, divides into a midway of the body of the root and merges again with common exit.

Type IV: Two distinct root canals have separate entrances and exits.

The single-rooted teeth are often thought to be easiest to treat, but without contrasting experience and skills if a canal is missed or not negotiated leads to the failure of the treatment and subsequently may turn up into loss of the tooth. It has been reported that more than 40% of mandibular incisors show the presence of two canals and teeth more than 1% has two separate apical foramina^{3,4}. Newer techniques and use of advanced armamentarium, Magnifying loupes, Endodontic microscopes, CBCT are extremely helpful in reducing errors, and chances of missing a canal.

This case report is presented here to demonstrate variation among root canal anatomy of mandibular incisors as though its rare but can present itself with two separate canals.

Case-report:

A 30-year-old male was referred to the Department of Conservative Dentistry and Endodontics with the chief complaints of pain in the lower front region for a month.

The patient was having severe pain in his lower front region of the jaw and when examined intra-orally, all lower incisors were severely attrited. Central incisors had already been treated earlier. Lower left lateral incisor -32, was symptomatic and tender on percussion, no extra-oral swelling was observed. No deep pockets were present though the slight bone loss is evident radio-graphically.

On the radiograph left, the lateral incisor showed a slight peri-apical reaction but no signs of dual canals. Non-surgical endodontic

treatment was planned with exploration, cleaning, and filling the root canal system on subsequent appointments. The patient was anesthetized with 1.5 ml of lignocaine and access cavity prepared. The access openings of 32, widened buccolingually and extended into the cingulum, which revealed the presence of two canal orifices, one labial, and one lingual, Figure 1 (a,b). The patency was confirmed using a no. 10 k file. Working length determination was done by using a 15. no. K file



Figure 1 (a)

Figure 1 (b)

Biomechanical preparation was done using the step-back technique. Chemo-mechanical debridement of canals was completed using k-files while irrigation with 3% sodium hypochlorite and 17% EDTA gel. The root canals were then filled with gutta-percha using the lateral condensation technique, Figure 2. The access cavities were restored with nano-composite. The patient was recalled the next day (after 24 hrs), the pain and tenderness were reduced. During the next visit after 15 days; the tooth was asymptomatic. Radiographs were taken with multiple angulations (20 degrees right and 30 degrees left horizontal beam angulation) for better identification of two canals.

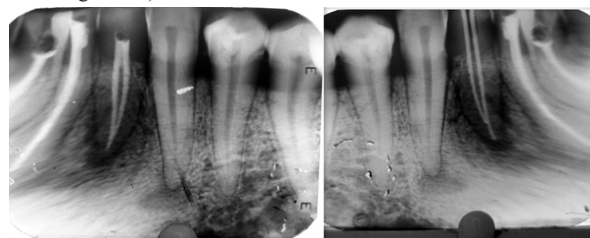


Figure 2

DISCUSSION:

To full fill, the main objective of root canal treatment, complete debridement of the entire pulp space, lateral canals, and proper sealing with an inert material is required. Conventional access cavity preparation provides direct line access to the apical foramina straight through the canal or at least to the initial curvature of the canal to negotiate all root canal orifices, conserving the sound tooth structure⁵.

A well-furnished access cavity preparation is essential for the acceptable endodontic result and prognosis of the tooth.

Successful Endodontic treatment depends on multiple factors. A study reveals that 42% of endodontic treatment failures leading to re-treatment is due to missed canals^{6,7}. If the radiograph presents overlapping of roots or presents unusual findings, then the radiograph is taken using Clark's rule⁶. For the detection of extra canals, the exploration of root canal orifices also plays an important role. For this magnifying loupes or Microscopes are quite helpful. Mandibular incisors teeth are one of the most difficult to prepare access cavities because of their small size. The other canal which is placed more lingually may often get missed by the practitioner. Whenever there are two canals, it's always easy to locate the buccal root canal. The buccal root canal is usually straight, while the lingual canal is often covered by the lingual shelf. The failure to find, debride, and obturate leads to incomplete bio-mechanical preparation of the missed lingual canal often and forms one of the main reasons for the failure of the endodontically treated tooth in mandibular incisors. Proper irrigation of the root canal system also plays an important role for disinfection and lubrication of the canal for proper instrumentation.

Some authors recommended that when entering mandibular incisors to perform endodontic treatment, clinicians should always initially assume that two root canals exist. Therefore, clinicians should always prepare an access cavity with the appropriate size and location and thoroughly search for the two canals. Only after such a search fails to reveal a second canal should clinicians be satisfied that the tooth has only one root canal.

CONCLUSION:

We have found in our clinical experience that mandibular incisors present more often two canals than reported in the literature. So, one should always keep in mind that there can always be two canals in mandibular incisors unless confirmed with different angles of radiographs and proper access cavity exploration. With advances in modern endodontic techniques, most teeth with complex root canal anatomies can be successfully treated without surgical intervention.

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