Mandibular incisors with two canals in a patient: A rare case

Deepak D Kakde 1, Omkar D Balsaraf 2, Aradhana B Kamble 3, Prashant B Munde 4

Abstract:
The root canal system of mandibular incisors often have three pulp horns and a single root canal, but it has also been demonstrated that there is presence of bifurcated and lateral canals also. The bifurcation of a root canal is the position at which a single canal separates into two smaller canals that follow divergent pathways but in some cases, the canals may rejoin to form a single canal again.

Key words: endodontic treatment, bifurcation, Canal configuration, angulated radiograph.

Introduction:
For a successful endodontic therapy, thorough knowledge of root canal morphology along with its variation is mandatory. The root canal system of mandibular incisors often have three pulp horns and a single root canal, but it is also been demonstrated that there is presence of bifurcated and lateral canals also. The bifurcation of a root canal is the position at which a single canal separates into two smaller canals that follow divergent pathways; but in some cases, the canals may rejoin to form a single canal again.

Lateral canals are canals which emanate from the main canal and take a perpendicular course which exit into the periodontal ligament space. As reported, more than 40% of mandibular incisors show the presence of two canals and teeth more than 1% has two separate apical foramina. Despite the low prevalence, clinicians should take into consideration the possible variations in the number of roots and root canals of mandibular incisors.

However, variations such as presence of extra canal in mandibular incisors are documented by various researchers previously. Canal configuration of mandibular incisors was classified by Vertucci into four types in 1974. Type I: Single canal continues from the pulp chamber to the apex. Type II: Two separate canals leave the pulp chamber, but join and form one canal short of the apex. Type III: Single canal leaves the pulp chamber, but it divides into two within the body of the root and merges again to exist as one canal. Type IV: Two separate and distinct canals are present from the pulp chamber to apex.

Failure by the operator to recognize the anatomy of a root canal system and the possible developmental anomalies may lead to inadequate cleaning and shaping of the root canal system, which in turn may contribute to failure of endodontic treatment and lead to need for endodontic retreatment. This case report describes the occurrence of 2 separate canals which end in single apical foramina in all mandibular incisors of the patient.

Case Report:
A female patient, 35-year old came to the Department of Conservative Dentistry and Endodontics with the chief complaints of pain with lower front region since a month. The medical history was non-contributory. Patient had experienced trauma to the mandibular anterior region 2 years back. The clinical examination revealed pain on percussion and no
response was seen to thermal and electrical pulp sensitivity tests on both lower lateral incisors. Widening of periodontal ligament space was seen in the pre-operative radiograph. A pre-operative radiograph showed presence of two canals in each root (Figure I). At the first appointment, access opening was prepared on both the mandibular lateral incisors. The pulp chamber was noted as to have a large size and a second root canal orifice was found in the lingual portion of the pulp chamber after widening the access cavity buccolingually in both the teeth. The patency was confirmed using a no. 10 k file. Working length determination was done by using a 15. no. H file in the buccal canal & 15 no. k file in the lingual canal. The presence of separate canals was confirmed using different radiographic angulations (Figure II & VI). Biomechanical preparation was done using step back technique. Three percent of sodium hypochlorite and 17% EDTA were used for simultaneous irrigation. The canals were thoroughly rinsed with normal saline after each instrument and calcium hydroxide dressing was given for 8 days. In the next visit, master cone radiograph (Figure III & VII) and obturation was done by lateral condensation technique. Radiographs with multiple angulations were taken (20 degree right and 30 degree left horizontal cone angulations) for better differentiation of two canals (Figure IV, V, VIII & IX).5

Discussion:

The main objective of root canal treatment is thorough debridement of the entire pulp space and complete obturation with an inert material.6 If there is sudden change in the canal radio density, narrowing of the canal space, abrupt disappearance of canal space during interpretation of diagnostic radiographs gives a clue for the need of one extra angulated radiograph to diagnose an extra root or canal.7
A well-designed access preparation is essential for a good post treatment result. Without adequate access to the canals and the apex, instruments and materials are difficult to handle in the highly complex and variable root canal system. Appropriate access cavity preparation provides straight line access to the apical foramina which will aid in locating all root canal orifices and it also conserves sound tooth structure.\(^8\)

Because of the small size and internal anatomy, mandibular incisors may be one of the most difficult access cavities to prepare. These teeth usually have two canals that are bucco-lingually oriented amongst which the lingual canal is most often missed. To avoid missing the canal, the clinician should extend the access cavity preparation well into cingulum gingivally, which, if present, is located directly beneath it.\(^8\)

When there are two canals, the buccal canal is the easiest to locate and is usually straighter than the canal linguually, which is usually shielded by lingual shelf\(^9\)

**Conclusion:**

The morphology of the pulp chamber in lower incisors can often have deviations in the number and the configuration of root canals. For successful endodontic treatment, it is important for a clinician to have thorough knowledge of the anatomy of the teeth, should perform additional radiographs in different angulations and modify the cavity for endodontic access, which would facilitate the procedure of locating additional root canals.

**References:**


Conflict of interests: Nil Date of submission: 20-12-2016
Source of funding: Nil Date of acceptance: 30-12-2016

Authors details:

1. **Corresponding author:** Senior lecturer, Department of Conservative Dentistry & Endodontics, Aditya Dental College & Hospital, Beed- 431122, Maharashtra, India; E-mail id : dr.deepakkakde@gmail.com

2. Senior lecturer, Department of Conservative Dentistry & Endodontics, Sinhgad Dental College & Hospital, Pune, Maharashtra, India.

3. 3rd Year Post Graduate student, Department of Conservative Dentistry & Endodontics, S.M.B.T. Dental College & Hospital, Sangamner, Maharashtra, India.

4. Senior lecturer, Department of Oral and Maxillofacial Pathology, Guardian College of Dental Sciences & Research Centre, Ambernath (W) Dist- Thane Maharashtra - 421505, India.