An Endodontic management of mandibular incisor with bifurcated root canal
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Abstract
The root canal anatomy of mandibular incisors can present a number of variations. This case report illustrates the abnormal configuration and successful non-surgical endodontic management of complex canal systems in mandibular lateral incisors.
Key words: Bifurcated canal; Canal configuration; endodontic treatment; mandibular incisor.
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Introduction
The root canal systems of mandibular incisors often have three pulp horns and a single root canal, but some studies have demonstrated the presence of bifurcated and lateral canals. The bifurcation of a root canal is the position at which a single canal bifurcates into two smaller canals that follow divergent pathways; in some cases, these canals may rejoin to form a single canal again. (1) More than 40% of mandibular incisors have two canals and more than 1% has two separate apical foramina. (1, 2) Despite the low prevalence, clinicians should consider the possible variations in the number of roots and root canals of mandibular incisors. (3) This case report illustrate the outcome of endodontic treatment of a patients who had bifurcated root canals of their mandibular lateral incisors with 1-2-1 root canal configuration.

Case Report
A 41-year-old male patient reported to the department of conservative dentistry with the chief complaint of moderate pain in lower front tooth since past 15 days. The medical history was noncontributory, but the patient had experienced traumatic injury to the anterior mandibular region about 2 years back. The clinical examination revealed tender on percussion and no response to thermal and electrical pulp sensitivity tests. Pre-operative radiographic examination revealed widening of periodontal ligament space at the apex of #31 (Fig. 1).

The lateral incisor showed a radiolucent canal that stopped abruptly in the middle third of the root, indicating the bifurcation of canals. The diagnosis of pulpal necrosis with chronic apical periodontitis of the mandibular central incisor was made. Root canal treatment was indicated. After placement of a rubber dam, access was gained from lingual approach using high speed endo access bur under surgical loupe. Entry was made into the pulp chamber and access cavity modified to oval shape wider cervico-incisally. First a 10 number K-file was inserted till the apex and a second 10 number K file was inserted in the same orifice which advanced labial to the previous file. The working length was estimated using electronic apex locator and then confirmed by radiograph (Fig. 2).

Figure 1: Pre-op radiograph of 32  Figure 2: Working length radiograph showing 1-2-1 configuration
The radiograph suggested that canal was single at the orifice, bifurcated at middle third and united as single just before reaching apical foramen suggesting 1-2-1 root canal configuration. The root canals were prepared with protaper rotary instruments and were copiously irrigated with 5.25% sodium hypochlorite. Root canal dried using paper points. Protaper master cone gutta-percha was seated and checked for apical fit individually for both the canals. While obturating the labial variant of the bifurcated canal was done first.

Master gutta percha cone was coated with AH-plus sealer and introduced in to the labial branch up to the working length. Then corresponding heated System B plugger was introduced into the canal from orifice at the temperature of 200 degrees for 2 seconds and advancing towards just below the level of bifurcation that was 10mm from the orifice. Then again the heat was activated for 1 sec and plugger was withdrawn searing gutta-percha along with. Subsequently the same procedure was carried out to obductare the lingual branch of bifurcated canal till the level of bifurcation. Then rest of the canal was back filled with OBTURA II. Tooth was temporized with CA VIT. Post obturation radiograph taken (Fig 3). Patient recalled after one week for permanent restoration. Follow up evaluation after six months revealed asymptomatic.
Discussion

The main objective of root canal treatment is thorough mechanical and chemical cleansing of the entire pulp space and complete obturation with an inert filling material. (4-6) Traditionally by examining the pulp chamber’s floor certain indications could lead to the location of the canal orifices. 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. (7) Careful interpretation of the radiographic features is essential to ensure that additional root canals are not overlooked. (8) This may necessitate imaging the tooth from a variety of angles so that the root canals may be distinguished in the resulting image. (5) In the present cases obturation would have been difficult in conventional cold lateral condensation technique. As the bifurcation was from the middle third, placing two greater taper master cones simultaneously was not possible practically because of existing anatomy. Hence, System B obturation technique was carried out to obturate one of the bifurcated canal completely first and then followed by another.

Conclusion

This case reports highlight the importance of having a thorough knowledge of all possible root canal irregularities. In some cases, it is very difficult to identify additional root canals by radiographic examination, therefore magnification and deep probing during initial endodontic treatment is essential for location of all the canals. With advances in modern endodontic techniques, most teeth with complex root canal anatomies can be successfully treated without surgical intervention.

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