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Endodontic Management of Mandibular Central Incisors with Vertucci's Type III Canal Configuration: a Case Report

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ABSTRACT

Understanding the anatomy of human teeth and its variations are essential prerequisite to all dental procedures especially for root canal treatment which deals with management of the tooth's internal anatomy. Even though majority of mandibular central incisors have one canal, additional canals are not uncommon. This case report enhances the importance of multiple angulated radiographs in detecting root canal variations.

Keywords: NIL

INTRODUCTION

Failure of root canal treatment is not uncommon despite thorough cleaning, shaping and obturation. Failure to detect and negotiate additional canal is one of the reason for such failures. Mandibular incisors usually considered with one root and one canal. However different studies reported an incidence of 11.5% to 41.4% second canal in mandibular incisors[1-3]. So an in depth knowledge of the root canal anatomy and its variations is an essential prerequisite to achieve the objectives of access, cleaning, disinfection, and three-dimensional obturation.

Different methods are used clinically to diagnose the variations in root canal morphology. Intra oral radiograph in different angulations gives valuable information about number of roots, root canals and canal configuration. This is a case of successful management of bilateral mandibular central incisors with vertucci's type III configuration.

CASE REPORT

A 23 year old male patient presented with complains of pain and swelling in lower front teeth region since last 3 days. The medical history was non contributory. Clinical examination revealed both the mandibular central incisors were discolored and there was no response to cold or electric pulp test. There as a diffuse swelling with obliteration of mucobuccal fold. Preoperative radiographic examination showed periapical radiolucency of both central incisors. A diagnosis of pulpal necrosis with periapical abscess was made and non surgical endodontic treatment was planned. There was a sudden disappearance of radiolucency in the root canal space indicating bifurcation.(figure-1)

The tooth was anaesthetized by infiltration using a 2% solution of lignocaine hydrochloride containing 1:80000 adrenaline (Lignox 2% A, Warren, Indoco). The tooth was isolated with a rubber dam and access cavity preparation was made. The pulp chamber was inspected with the help of a dental operating microscope. On exploring the canals of both central incisors were found to have single canal bifurcating in to two. There was a purulent discharge from the both tooth through the canals which were then irrigated with 5% sodium hypochlorite solution. Working length were determined with electronic apex locator (J. Morita, Kyoto, Japan) and then confirmed with radiograph (figure-2). The radiograph revealed a single canal bifurcating in to two and

rejoining just short of apex, classified as Vertucci's type III (4). The teeth were prepared using Hyflex files and the final preparation was performed with a size 25/.04% Hyflex file(Coltene). The canals then irrigated with 5% sodium hypochlorite and 17% EDTA dried with paper point. Pure calcium hydroxide was mixed with chlorhexidine gel and placed as intracanal medicament into the root canals. Teeth were then temporarily sealed with IRM and recalled after 2 weeks.

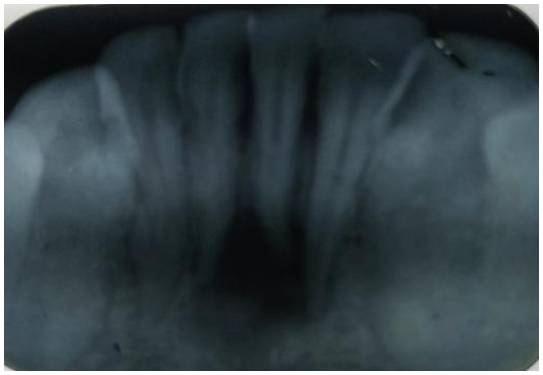

Figure.1- Preoperative radiograph showing Periapical radiolucency of both central incisors

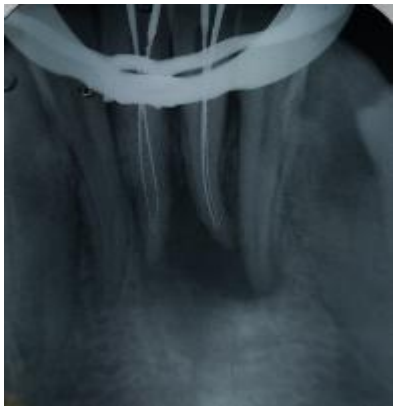

Figure.2 – Radiographic working length confirmation

In the next appointment, patient was asymptomatic. The root canal was re-entered and irrigated again with 5.25% sodium hypochlorite and 17% EDTA. Final rinse was done with 2% chlorhexidine. A mastercone radiograph was taken to confirm the working length (figure-3). The canals were then dried with paper point. The root canals were then obturated with gutta percha with lateral condensation and AH plus as sealer. The access cavity was then sealed with composite. Patient was reviewed after 3 and 6 month post obturation (figure-4

Figure.3 -Master cone confirmation

Figure.4- six month follow up

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DISCUSSION

The success of endodontic treatment is dependent on thorough cleaning, shaping and obturation of the root canal system. The root canal system is complex and canal may branch, divide and rejoin taking various pathways to the apex (5) It is essential to have a thorough knowledge of variations of root canal morphology as this helps in cleaning and shaping procedures(6).

All the anatomic study of mandibular incisors found that majority have single canal and incidence of two canal were 26%(7). Vertucci studied the root canal morphology of 300 extracted lower incisors and showed that two canals were present in 30% of mandibular central incisors(1). Even though two canals are present, there is high chance that the second canal may be missed. So a careful evaluation of preoperative radiograph taken in different horizontal angulations is necessary.

When the root canal shadow suddenly disappears in the radicular region, it can be assumed that it has bifurcated to narrow canals. This can be confirmed with a mesial angulation radiograph of 10 to 30 degrees. This is called the 'Fast Break appearance (8). In this case the fast break appearance in the radiograph along with exploration under microscope helped in detection and negotiation of additional canal.

CONCLUSION

This case report highlights the importance of knowledge of normal root canal anatomy and its variations. Multiple angled radiographs along with exploration under magnification can be greatly helpful in such cases with intricate anatomy. This in turn will determine the overall success of endodontic therapy.

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