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ENDODONTIC MANAGEMENT OF RADICULOUS TEETH USING NOVEL APPROACH

Dental Science

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ABSTRACT

Premolars represent to be transitional tooth between incisors and molars. This transition makes the tooth more prone to variable root canal configuration possessing one to three canals. A comprehensive understanding of tooth morphology, angled radiographs, magnification, proper access preparation and sound knowledge on state of art instrumentation and obturation techniques are needed to ensure successful endodontic treatment. This case report describes a case report of three rooted maxillary first premolar managed by TCA technique.

KEYWORDS

INTRODUCTION

Successful endodontic treatment requires effective biomechanical preparation of the root canals and three dimensional obturation of the root canal system. This can be achieved only by knowing and identifying the variations in the root canal system of the endodontically treated teeth. As one of the main reasons for unsuccessful endodontic treatment is identified the failure to find additional root canals due to anatomical variations.[1,2]

The maxillary first premolar has been shown to exhibit three roots in 0.5-6% of the cases[3]. Hence it is very imperative to diagnose the case from the pre-operative X-ray. The anatomy of maxillary premolars with three canals, mesiobuccal, distobuccal and palatal is similar to the adjacent maxillary molars and they are sometimes small molars or 'radiculous'. According to Vertucci's classification this is a type VIII configuration[3].This case report describes the management of a maxillary first premolar with three roots and three canals.

CASE REPORT

A 42-year-old patient reported to our dental clinic with chief complaint of missing teeth in right upper jaw. On examination #15, #16 was missing and patient wanted to replace it. Intentional endodontic treatment was planned in #14 due to distal tilt of the tooth. Endodontic treatment was initiated in #14 on same day. Local anesthetic (Lignox 2% A) was administered. Rubber dam was secured around the tooth with use of a dental floss and access opening was performed. Tooth exhibited three canals (mesiobuccal, distal and palatal).

Working length was determined as 18mm in mesiobuccal, 17.5mm in distobuccal and 19mm in the palatal canals using radiographs. Canals were irrigated with 3 % sodium hypochlorite. Canals were cleaned and shaped with tactile controlled activation technique using controlled memory files(Coltene/Whaledent). Three canals were negotiated, cleaned, and shaped to a size 30; .04 taper with precurved HyFlex CM and EDM controlled memory files. An EDM glide-path file size 10; .05 taper was inserted to length in three canals followed by a size 15; .04 taper, a size 20; .04 taper, a size 25; .04 taper, and a size 30; .04 taper HyFlex CM file. Every file was inserted into the canal until maximum frictional resistance was felt and then activated and advanced apically until the activated file resists further advancement. The procedure was repeated until the working length was reached. The same technique was used with all the files in the sequence. This new technique, called the tactile controlled activation(TCA) was used to minimize canal transportation and the risk of instrument separation. This standardized file sequence is suggested to be predictable and reproducible for most cases of highly complicated root canal anatomy.

As a final irrigation protocol, the canals were flooded with ethylenediaminetetraacetic acid 17% solution (Deo smearoff, Azure Lab.Pvt.Ltd) and followed by 2% chlorhexidine solution (Asep RC, Anabond Stedman, India). Canals were dried with paper points and obturated with 30, .04 gutta-percha cone (Coltene/Whaledent, Langenau, Germany) and AH PLUS sealer(Densply-maillefer, Ballaigues). Patient was reviewed after six month tooth was asymptomatic and no periapical change seen radiographically.

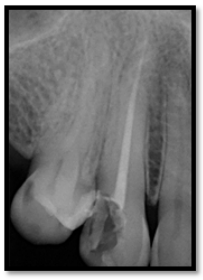
DISCUSSION

The presence of a missed canal, inadequate debridement and incomplete obturation of the root canal system are common reasons for failure. The process of identifying and accessing root canals is particularly challenging in endodontic treatment of a tooth with atypical canal configuration.Maxillary premolars having three roots usually resembles miniature of maxillary molar and often clinical challenge.Studies have revealed that upto 6 % of these teeth have three canals. Even though intraoral radiographs are two dimensional, they often give many clues on presence of accessory roots or canals. An abrupt straightening or loss of root canal radiolucency in premolars may indicate presence of an additional canal or even independent root. it has also been proposed that whenever the mesiodistal width of premolars is greater than or equal to that of the crown, three root may be suspected also additional canal is likely to be present when an intracanal instrument appears eccentric in a radiograph.[4,5]

In the present case, three radiographs in different angulation were taken which confirmed the presence of three separate roots. Canal curvature was determined using scheinder technique 18 degree in mesibuccal and 21 degree in distobuccal canal. Novel instrumentation technique called tactile controlled activation was used in this case.This technique consist of the activation of a motionless engine-driven file only after it becomes fully engaged inside a patent canal (Chaniotis, Filippatos, 2015). Controlled memory files were used in this technique which was found to be more resistant to cyclic fatigue than traditional rotary files.

With this instrumentation technique, most of the anatomical root canalvariations can be enlarged safely to the desired instrumentation size, irrespective of the degree andcomplexity of canal curvatures, by maintaining a tactile sensation of the anatomy throughout the whole procedure.[6]Keeping in mind the complexity of root canal systems and the need to minimize file engagement during instrumentation, a novel approach was developed and named as the TCA instrumentation technique. This new technique was used to minimize canal transportation and the risk of instrument separation.

Figure 1



Pre Operative Radiograph

Figure 2

Working Length Radiograph

Figure 3

Master Cone Radiograph

Figure 4

Final Radiograph

CONCLUSION

TCA technique can be effectively used for management of cases with complex root canal morphologies and to clean and enlarge challenging canal configuration thereby preventing the incidence of mishaps.

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