Endodontic Management of a Maxillary First Molar with a Single Root & a Single Canal: A Case Report

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Abstract

Variations in dental anatomy are found in all teeth. Knowledge of these variations, particularly concerning the location and treatment of all canals, is very important for the success of endodontic therapy, because the inability to find and properly treat the root canals may cause failures. Variations in canal morphology, such as extra canals, apical ramifications, apical deltas, or lateral canals, are commonly encountered, and their incidence and significance have been well documented. Vertucci's classification is a standardized method for categorizing known root canal anatomical variations .However, the clinician should also be aware of the possibility of the existence of fewer root and/or canal numbers. The present report describes the root canal treatment in a maxillary first molar with single root canal.

Key words: maxillary first molar, single canal, single root

Introduction

Clinicians must have adequate knowledge about root canal morphology and its variations to achieve a technically satisfactory endodontic outcome. Therefore ,the root canal system of maxillary molars must be examined meticulously by the clinician, preferably under magnification provided by a surgical operating microscope. The literature describes complex root canal systems in maxillary molars that may be difficult to manage. Variations often occur in the mesiobuccal roots, the most common finding being the occurrence of 2 canals. In maxillary first molars, cases of morphologic variations, abnormal numbers of roots, or the existence of C-shaped canals have been reported previously1. Moreover, 4 and 5 roots with a corresponding number of canals have been reported in maxillary molars. However, the configuration of 1 canal in a 1-rooted maxillary first molar has rarely been described in studies describing tooth anatomy and root canal anatomy on the basis of extracted teeth and/or using cross-sections. The present report describes the root canal treatment in a maxillary first molar with 1 root canal.

Case Report

A 25-year-old female patient reported to our department with a complaint of pain in the left upper back tooth region for the past week. She gave a history of intermittent pain for the past 2months, which had increased in intensity for the past 4 days. The tooth was tender on percussion. Thermal and electrical pulp testing elicited a negative response in the left maxillary first molar. The preoperative radiograph (Fig. 1) showed widening of the periodontal ligament space with periapical radiolucency in relation to the left maxillary first molar. The radiograph also revealed an unusual anatomy of the involved tooth with a single root and a single canal. A diagnosis of a nonvital left maxillary first molar with chronic apical periodontitis was made and endodontic treatment was planned.

Access opening was done in the left maxillary first molar under rubber dam isolation.

On examination, clinical presence of a single wide canal orifice was found in the center of the pulpal floor To ascertain this unusual morphology, multiple X-rays in variable horizontal angulations were taken. On instrumentation, all the scouting files converged into a single broad canal(fig. 2)

Working length was determined using radiographs (Ingle's method) and an apex locator. Cleaning and shaping was done using crown-down technique with hand and protaper Ni-Ti rotary instrumentationIrrigation between each instrument was done using 2.5% Sodium Hypochlorite solution and the root canal space was sealed using cold lateral compaction of gutta-percha and zinc oxide eugenol sealer . The tooth was then subsequently restored.

Discussion

Human molars show considerable anatomic variation and abnormalities with respect to number of roots and root canals. Unusual canal anatomy associated with the maxillary molars has been investigated in several studies[1].

Most reports have focused on the morphology of the mesiobuccal root and particularly on its mesiopalatal canal [2,3].

Root canal morphology should be examined further during treatment through the evaluation of radiographs taken from different horizontal angles. The use of a preoperative radiograph and an additional radiographic view from a 20-degree mesial or distal projection is a good way to detect root canal morphology and anatomy[4].

Krasner and Rankow made a rational approach to study the relationships of the pulp chamber to the clinical crown and pulp chamber floor[5].Their observations put forth in the form of laws are valuable aids to the clinician searching for elusive canals. Although extra canals are more of a rule rather than an exception, the clinician should also be aware of the fact that in certain cases,there is a possibility of fused if not fewer canals than the normally presumed canal morphology.

Case reports of variations in the number of root canals of maxillary first molars have been published.

Beatty[6] reported a maxillary first molar with five canals, three of which were in the mesiobuccal root. Bond et al.[7] and Maggiore et al. reported maxillary first molars with 6 root canals. Michael Hulsmann reported maxillary first molars with 4 roots.

But aberrations such as 1 root canal have also been reported previously in maxillary second molars[8].

Conclusion

We conclude that this case report presents an unusual case of a maxillary first molar with a single root and a single canal.

Knowledge of possible variation in internal anatomy of human teeth and preoperative radiograph in different directions are important for successful endodontic treatment.

In every case, we should suspecta fused or single canal also.

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Legends

Fig. 1 Preoperative Radiograph of the left maxillary first molar

Fig. 2 Radiograph with scouting files in position

Fig. 3 Post obturation radiograph.

Fig. 4 Clinical photograph after metal - ceramic crown place ment.