clinical practice

OD

Clinical Feature

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Double Palatal Roots

Introduction

Successful endodontic treatment depends upon the localization, debridement, shaping, disinfection, and three-dimensional obturation of the root canal system.[1] Knowledge of the internal and external anatomy of the tooth to be treated is of paramount importance. Teeth may present many variations, such as extra roots and root canals, and failure to recognize these anomalies may often result in failure of the root canal treatment.[2] Two pre-operative radiographs are highly recommended to help obtain a three-dimensional picture of the tooth to be treated.[3] Careful examination of these radiographs may reveal the presence of additional roots. In particular, indistinct images of the palatal aspect of maxillary molars may indicate that an extra palatal root may be present.

Many endodontic textbooks describe maxillary first molars as having three separate roots and three to four root canals.[4,5] It is the author's experience that these teeth have, in over 95 percent of the cases, four canals. The literature has also described other anatomic variations such as extra roots that have been identified *in vivo* and *in vitro*.[6,7,8] The reported percentage of maxillary molars with four roots (two buccal and two palatal) is low. A review and radiographic survey[9] of 1,200 teeth found only 0.4 percent exhibiting this condition. The study concluded that this anomaly is even rarer in maxillary first molars. This report will describe the endodontic treatment of a maxillary first molar with two separate palatal roots.

Figure 1.
Pre-operative radiograph. A double palatal root is suspected on the first molar due to the overlapping appearance.

Case Report

A 58-year-old female was referred for endodontic evaluation. The patient's chief complaint was mild pain to biting on her maxillary left first and second molars. She also reported sensitivity to palpation of the gum area associated with these teeth. No temperature sensitivity was reported. The patient had been seen by a periodontist who thought that these teeth were probably endodontically involved.

Clinical examination revealed that the first maxillary molar had an existing crown that was about five years old. The second maxillary molar showed the presence of a large amalgam restoration. Moderate periodontal pockets were recorded. No mobility was present. Both teeth were sensitive to percussion and palpation, and neither tooth responded to pulp testing. Pre-operative radiographs revealed periapical radiolucencies associated with both teeth. These radiographs also showed the presence of a second palatal root on the first maxillary molar.

Diagnosis

The final diagnosis was pulp necrosis with chronic apical periodontitis. It was recommended then to proceed with root canal treatment on both teeth. Medical history was non-contributory.

Treatment

Root canal therapy was completed initially on the second maxillary molar. The diagnosis was confirmed since the pulp tissue was found to be necrotic. Four canals were located and treated. The access was then sealed with a bonded temporary material.

At the patient's second visit, treatment was initiated on the first maxillary molar. Access through the porcelain was made with a small round diamond bur and copious irrigation in order to prevent the porcelain from chipping or cracking. Once the metal portion of the crown was exposed a transmetal bur was used. A tapered round-ended fissure bur was used to gain access to the pulp chamber. The pulp tissue was noted to be necrotic, thus confirming the initial diagnosis.

Preoperative radiographs had indicated the presence of a second palatal root, and this canal was located in the mesio-palatal aspect of the tooth. The opening was then extended in order to gain direct access to this canal. Two mesio-buccal canals were also discovered after careful use of an endodontic ultrasonic Buc No. 1 tip (Obtura Spartan). In total, five canals were located. It is important to note that all these steps were done with the aid of an endodontic microscope at high magnification.

After the working lengths were electronically established with an apex locator, all canals were shaped, cleaned, dehydrated and sealed using a warm vertical compaction technique.[10] Post-operative radiographs were taken and confirmed the presence of the second divergent palatal root.

Figure 2.
Post-operative radiograph. Treatment completed on the second maxillary molar confirms the existence of a second palatal root in the first molar.

Figure 3.
Digital picture taken via the microscope shows the location of the orifice of the second palatal canal.

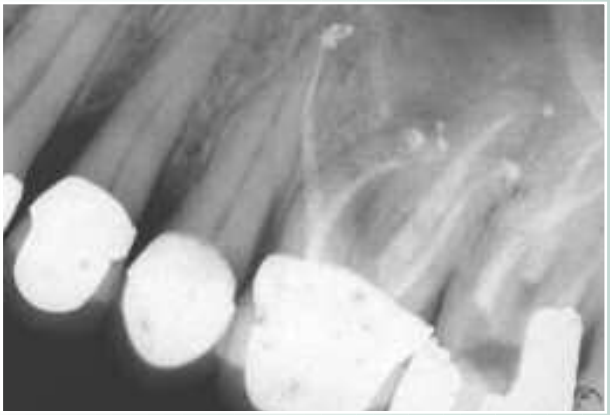

Figure 4.
Post-operative radiograph showing the divergence and separation of the four roots in the first maxillary molar.

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Discussion

This case report highlights the unusual anatomy of a first maxillary molar. Most endodontic textbooks describe the first maxillary molars as having three roots with three or four canals.[11,12] An anomalous morphology that occurs infrequently, such as two palatal roots on the first maxillary molar, is rarely mentioned. Slowey[2] first reported on endodontic treatment of maxillary molars with two palatal roots in 1974. Christie[13] speculated that maxillary molars with two palatal roots may be encountered only once every three years in a busy endodontic practice.

Careful examination of the pre-operative and working radiographs should always be performed, since indistinct images of the palatal aspect may mask the presence of an extra palatal root. Access preparation may need to be larger in order identify two palatal roots. Properly designed and prepared access cavities will eliminate many potential problems during canal preparation and obturation. This access should be wider than usual on the palatal aspect, with the outline square rather than triangular. The outline shape should reflect the anatomy of the chamber in these teeth. The prognosis for these teeth should be considered to be the same as that of any other maxillary molar.[13]

Conclusion

This clinical case report describes the treatment of a first maxillary molar with two separate and divergent palatal roots. Even though the occurrence of this anatomical anomaly is extremely rare, the clinician should be aware of its existence. Correct interpretation of the pre-operative and working radiographs and careful clinical inspection of the pulpal floor may reveal the presence of a second palatal root. Because inability to locate and treat all the canals is a common cause of failure in endodontics[7], the use of magnification and proper lighting, or a dental microscope as in the present case, is crucial.

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