

Unusual Anatomy of a Second Maxillary Molar - a Rare four-Root Configuration Case Report

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Abstract: *Although it is a very rare situation, four-rooted maxillary second molars can occur. The existence of two palatal roots is extremely rare and ranges about only 0.4%. The aim of this study is to present and document a very rare anatomic configuration of a four-rooted maxillary second molar. Anatomic variation in the number of roots and root canals can occur in any tooth, although some cases can be extremely rare as the one presented here. Clinicians should be aware of this possibility before considering any kind of treatment.*

Keywords: *Molar, Dental Anatomy, Anatomical Variation*

1. INTRODUCTION

Usually the maxillary second molars are described in the literature as a teeth that have 3 roots with 3 or 4 root canals. Understanding of the presence of additional roots and unusual root canals is essential and determines the success of endodontic treatment¹.

The existence of maxillary second molars with 4 roots (2 buccal and 2 palatal) is extremely rare and ranges about only 0.4%. This information comes from a study that showed, after the examination of two different horizontally angled radiographs of 1,000 maxillary second molars, just four with four roots². They also examined two hundred cases of second molars with endodontic treatment and found only one with four roots. Although this situation is extremely rare, the unusual root and canal anatomy associated to maxillary molars has been presented in some studies²⁻⁹.

The aim of this study is to present and document a very rare anatomic configuration of an upper four-rooted second molar.

2. CASE REPORT

A 34 year old man presented to the Urgency Dental Care section at the Clinical Hospital of the Federal University of Uberlândia – Brazil. The patient had a volumetric augmentation of the left side of the face and was claiming of pain and pulsing sensation. At the intraoral examination, the patient presented poor oral hygiene and the maxillary left second molar crown was completely destroyed by caries. In the radiographic exam, the tooth presented no possibilities of treatment due to the severe destruction of the most part of it (Figure 1).



Figure1. *Periapical Radiograph*

No abnormality was noted in the radiographic image besides the massive destruction of the crown due to bacterial activity. There was no choice besides the tooth extraction. The patient presented no contraindications for the surgery and was immediately medicated and prepared for the extraction surgery. The surgery was performed under local anesthesia with lidocaine 20 mg/ml + adrenaline 12.5 µg/ml. The tooth presented some difficulty to be extracted and when it was finally removed, a big surprise came with it. A four rooted maxillary second molar (Figure 2). The suture was performed, the prescription was done and the patient was oriented about the post operative precautions.



Figure2. *Maxillary second molar with 4 roots*

3. DISCUSSION

Although it is a very rare situation, four-rooted second molars exist. A classification of 4-rooted maxillary molar was described, dividing this variation into 3 types, according to root separation level and divergence of the roots angles⁸. Type I has two widely divergent, long, and tortuous palatal roots. The buccal roots are often less divergent. Type II has four separate roots, but the roots are often shorter, parallel, and have buccal and palatal root morphology with blunt root apices. In the type III, the distobuccal root appears to stand alone and may even diverge to the distobuccal. Based on this classification, the maxillary left second molar presented in this clinical report could be classified as Type II.

The diagnosis of extra canals with a normal number of roots may be difficult and dangerous because of their superposition and their usual small size. In these situations, most of the extra root canals may be left untreated during endodontic procedures due to the difficulty to identify extra canals on the radiographic examination. In this way, a more accurate image examination as a CBCT scan must be performed when the presence of extra roots is a possibility. Thorough knowledge of anatomical variations and different types of anomalies in the maxillofacial region, multiple radiographs with different angles or cone-beam computed tomography (CBCT) could be helpful. The major advantage of the CBCT over the conventional radiograph is the possibility of three-dimensional image examination and also the obtaining of multiple slices of tooth roots and their canals. This image exam is able to add precious information to the diagnosis when dealing with uncommon anatomical variations¹⁰.

In the present case, the massive destruction of the crown contraindicated the endodontic therapy and the tooth was extracted. Although the incidence of maxillary molars with four roots is rare, they do occur and the clinicians should be aware of this fact and prepared to face this situation.

4. CONCLUSION

Anatomic variation in the number of roots and root canals can occur in any tooth. Although some cases can be extremely rare as presented in this case report. Clinicians should be aware of this possibility when considering endodontic treatment. Examination of several radiographs taken from different angles and CT scans should be considered before any decision of treatment planning.

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