

AN INSIGHT INTO ANATOMICAL VARIATIONS IN MAXILLARY MOLARS: A CASE SERIES

Manisha Nepal,¹ Vanita Gautam,¹ Snigdha Shubham,¹ Rupam Tripathi,¹ Rinku Sah¹

ABSTRACT

The aim of this article is to show different anatomic complexities of the root canal system related to maxillary molars. Maxillary molars are presumed to have only three roots with three canals but this is not always the case, it might present with different variations. Some of the anatomical variations such as, mesiobuccal2 (MB2) canals in maxillary 1st and 2nd molars, two rooted maxillary 1st and 2nd molar, one rooted maxillary 2nd molar, C-shaped upper 2nd molar and maxillary 2nd molar with extra palatal root are reported in this case series. Hence, in treating each tooth every dentist must keep foresight that complex anatomy occurs often enough to be considered normal and manage them accordingly.

KEYWORDS Anatomical variations, extra palatal root, maxillary molars, mesiobuccal

1. Department of Conservative Dentistry and Endodontics, Universal College of Medical Sciences, Bhairahawa, Nepal

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For Correspondence

Dr. Manisha Nepal
Dept. of Conservative Dentistry and Endodontics
Universal College of Medical Sciences
Bhairahawa, Nepal
Email: manisha.nepal.mn@gmail.com

INTRODUCTION

Anatomical variations frequently encountered may present challenges for cleaning, shaping and obturation. The several anatomic variations that might exist in the root canal system have contributed to endodontic treatment failures.¹ The maxillary 1st molar is the largest tooth in volume and one of the most complex in root and canal anatomy.² Maxillary first molars have exhibited a frequent radicular anatomy of 3 roots and 3 or 4 canals.³ Maxillary 2nd molar root and canal anatomy are similar to those of the 1st molar, although variations may frequently occur.⁴ Three separate roots and three separate canals is common occurrence but the variation may be three separate roots and four canals (two in the mesiobuccal root) that is less likely to be present than 1st molars; two separate roots with a single canal in each; one main root and canal; and four separate roots and four separate canals including two palatal.

CASE REPORT

During the endodontic treatment in the Department of Conservative Dentistry and Endodontics, UCDS, Ranigaon, Bhairahawa, the following anatomical variations in maxillary molars were observed.

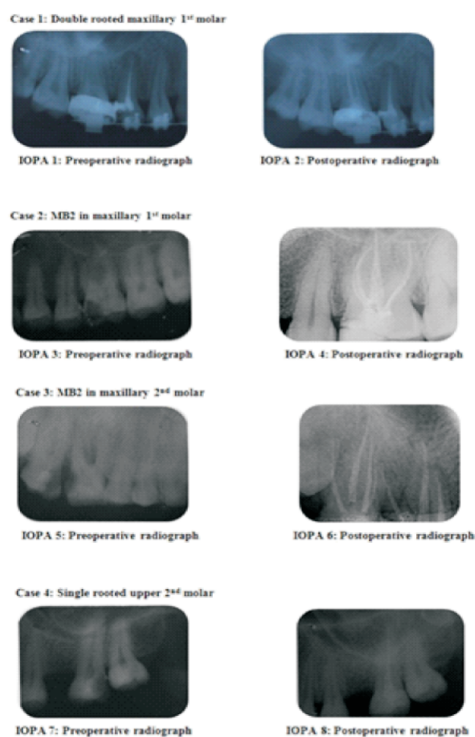


Figure 1. Double rooted maxillary 1st molar (IOPA 1 and 2), MB2 in maxillary 1st molar (IOPA 3 and 4), MB2 in maxillary 2nd molar (IOPA 5 and 6), single rooted upper 2nd molar (IOPA 7 and 8)

Intraoral periapical radiographs (IOPA) 1 to 14 depicts the following cases respectively: Double rooted maxillary 1st molar (IOPA 1 and 2), MB2 in maxillary 1st molar (IOPA 3 and 4), MB2 in maxillary 2nd molar (IOPA 5 and 6), Single rooted upper 2nd molar (IOPA 7 and 8) {Figure 1}, Double rooted maxillary 2nd molar (IOPA 9 and 10), Extra Palatal root in maxillary 2nd molar (IOPA 11 and 12), C-shaped 2nd molar (IOPA 13 and 14) (Figure 2)

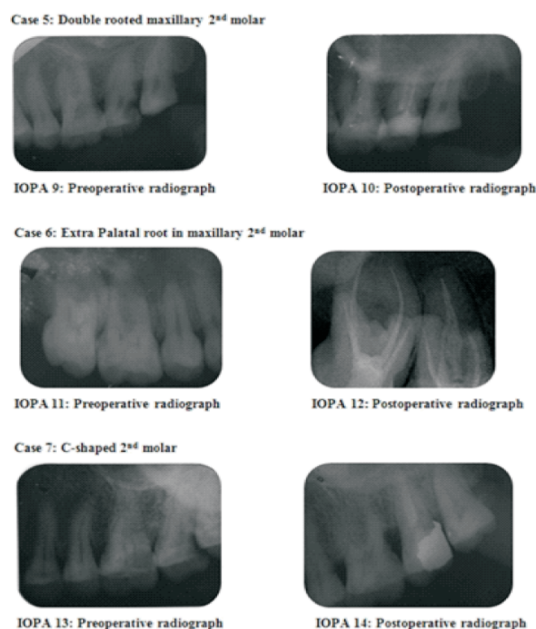


Figure 2. Double rooted maxillary 2nd molar (IOPA 9 and 10), Extra Palatal root in maxillary 2nd molar (IOPA 11 and 12), C-shaped 2nd molar (IOPA 13 and 14)

DISCUSSION

Knowledge of the most common root canal configuration as well as their anatomic deviations allows for more effective cleaning and shaping, which have been associated with higher success rates.⁵ An inability to recognize the presence of and to adequately treat all of the canals of the root canal system has been attributed to be the major cause of root canal treatment failure. Blaine et al reported over 399 (95.9%) of maxillary molars had three roots and 16 (3.8 %) had two roots.⁶ Likewise Al Shalabi et al. reported only 2 out of 83 teeth (2.4%) studied had two roots.⁷ The two root form is rarely reported and may be due to the fusion of the distobuccal root to the palatal root or the fusion of DB root to the MB root. The MB root of maxillary 1st molar contains a double root canal system more often than a single canal according to most of the anatomic studies. Vertucci F demonstrated 55% teeth with MB2 canal by clearing technique.⁸ Likewise, Çaliskan, MK et al using clearing technique reported that 66% had MB2 canals.⁹

The anatomical studies found a wide range of MB2 canal incidence in upper 2nd molar. Ingle et al reported 47.1% (1273 out of 2705) had MB2 canals in upper second molar.⁴ Pecora studied the internal anatomy of 370 maxillary molars by clearing the roof of the pulp chamber and located a second canal in mesiobuccal root of maxillary second molars, with frequency of 42%.³

Out of 1272 teeth studied, majority of maxillary second molars presented with 3 roots (88.6%). However, 2.8%, 7.8% and 0.4% of maxillary second molars presented with one, two and four roots respectively.⁴ Peikoff et al conducted a retrospective study of 520 endodontically treated maxillary 2nd molars and reported 3.1% teeth with one main root and canal, 6.9% with two separate roots with a single canal in each and 1.4% four separate roots with extra palatal root.¹⁰ Al Shalabi et al reported 6 out of 40 (15%) had 2 roots but their study did not find maxillary second molars with single root and extra palatal root.⁷

C-shaped anatomies are uncommon in upper molars. The first authors to describe a maxillary C-shaped molar were Newton and McDonald, who, in the year 1984, described a C-shaped canal appearance connecting both distobuccal and palatal root canals linked in the pulp chamber floor to the mesiobuccal root canal by developmental grooves.¹¹ Martins et al demonstrated 49 teeth presented C shapes out of 1299 second molars, which represents a prevalence of 3.8%.¹¹

CONCLUSION

Deviation from normal expected anatomy often exists which may complicate the endodontic procedure of cleaning, shaping and obturation. Hence, in treating each tooth every dentist must keep foresight that complex anatomy occurs often enough to be considered normal and manage them accordingly.

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