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RESEARCH ARTICLE

INCİDENCE OF MESİO-BUCCAL CANAL (MB2) İN PERMANENT MAXİLLARY FİRST MOLAR İN AN INDİAN SUB-POPULATİON OF PUNE BY CBCT– A RADİOLOGİCAL STUDY

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ABSTRACT

Objective: This study was conducted to determine the most prevalent root canal configuration and the incidence of a second mesio-buccal (MB2) canal in maxillary first molar root in an Indian sub-population of Pune, Maharashtra, India by reviewing cone-beam computed tomographic (CBCT) images.

Methods: Patients who had undergone CBCT scanning for various treatment modalities were retrospectively viewed for the presence of second MB2 canal in the permanent maxillary first molar. Scanning was performed at Peraden & Elite CBCT, Pune, Maharashtra, India. Each tooth was assessed in 1 mm axial and 0.5 mm sagittal sections, to evaluate the presence of a MB2 canal. The images had been evaluated by a maxillofacial radiologist.

Results: In total of 117 teeth examined, MB-2 was present in 79 teeth. The prevalence of MB-2 in maxillary first molar was found to be 67.5% in an Indian subpopulation. As far as root canal morphology is concerned, Vertucci Type I was the most common type.

Conclusion: Knowing the incidence of presence of MB2 canal in the first maxillary permanent molar is very essential for the success of the root canal treatment & CBCT is very vital to serve this purpose.

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INTRODUCTION

The roots & root canal morphology plays a very significant role in the success of endodontic treatment. Having adequate knowledge about the structure of the root & canals is essential for achieving this goal. As molars in the maxillary molars bears the greatest number of roots and canals, significant amount of variation is commonly found in them. Without proper radiograph, it is impossible to locate, prepare and obturate the accessory canals i.e. mesiobuccal canal-2 [MB2], present in the mesiobuccal roots leading to a high rate of endodontic treatment failure (Sarang Sharma, 2014). A commonly available radiograph in dental clinic does not completely provide the required information as they are two dimensional and have several other limitations. Computed beam computed tomography (CBCT) provides detailed three-dimensional (3D) images & information about the number & shape of the roots as well as the root canal thereby helping in the treatment outcome.

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Objective

General Objective: To evaluate the presence of MB2 canal in the first permanent maxillary molars using CBCT

Specific objective: To compare the prevalence of presence of MB2 canal on right and left side in the first permanent maxillary molars

MATERIALS AND METHODS

Patients who had undergone CBCT scanning for various treatment modalities were retrospectively viewed for the presence of second MB2 canal in the permanent maxillary first molar. Scanning was performed at Peraden & Elite CBCT, Pune, Maharashtra, India. The images were evaluated by a maxillofacial radiologist. The incidence of MB2 canal in maxillary first permanent molar were evaluated and recorded in a data collection sheet.

RESULTS

In total of 117 teeth examined, MB-2 was present in 79 teeth. Hence, the prevalence was found to be 67.5% (79 teeth). Out

of these 79 teeth, 40 teeth were present on the right side and 39 teeth were present on the left side (Table 1). Hence no significant difference was seen. Also, all the teeth examined had one root. As far as root canal morphology is concerned, Vertucci Type I was the most common type.

Table 1. Prevalence of MB2 canal in first maxillary molars according to side

MB2 present	Right side	Left side
Yes	40	39
No	19	19
Total	59	58

DISCUSSION

The appropriate knowledge of the anatomy of a tooth is necessary to accomplish successful endodontic therapy as it depends on the location, cleaning, shaping and sealing of the root canals (Pattanshetti, 2008). Anatomical studies are of great importance to aid the understanding of the internal morphology and anatomical variations of the root canal system (Weine, 1962; Vertucci, 1984; Friedman, 2002). As maxillary permanent first molar exhibits, most complicated root canal anatomy. From the past until present, the anatomical structure of the maxillary first molar has gained more attraction in conducting different studies and research than any other tooth (Weng, 2009 and Blattner, 2010). The incidence of second mesiobuccal canals (MB2) has been reported in a range of between 33% and 96% (Pattanshetti, 2008; Weine, 1969; Weng, 2009; Blattner, 2010; Cleghorn, 2006; Kobayashi, 1987; Carvalho, 2000; Imura, 1998). However, the clinical detection of mesio-buccal canal-2 in maxillary first molars has been lower than that of laboratory based reports and can be identified in less than 40% of maxillary first molars (Weller, 1989 and Wasti, 2001). CBCT demonstrates detailed morphologic features in 3 dimensions which cannot be identified in any intraoral periapical, panoramic and cephalometric radiographs. Other advantages of CBCT includes providing data to provide interrelational images in three orthogonal planes, minute details can be studied by zoom magnification, adjusting contrast, window/ level adjustments, and by applying text or arrow annotation.

On screen measurements also allow interactive capability for dimensional assessment that is free of distortion and magnification (William, 2009). In our study, the prevalence of MB-2 in permanent maxillary first molar was 67.5 % which are similar to those of al Shalabi *et al*. (2000), who found a frequency of 78%, Lee *et al*. (2011), who concluded a frequency of 70.5% and the results of Abarca *et al*. (2015), who obtained 73.44% of MB2 canal in the first molars. This is in contrast to the results obtained by Silva *et al*. (2014), with frequencies of 42.65% for the maxillary first molar, and those obtained by Reis *et al*. (2013), with 91% for the first molar (Abarca, 2015; Lee, 2011; al Shalabi, 2000; Silva, 2014; Reis, 2013). In our study no statistically significant association was found for the presence of the MB2 canal according to side which is similar to those of Abarca *et al*. (2015).

Conclusion

Knowing the frequency of presence of MB2 canal in the first maxillary permanent molar is very essential for the success of the treatment and CBCT is very vital to serve this purpose.

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