

Frequency of Second Mesiobuccal (Mb2) Canal in Maxillary First Permanent Molar

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ABSTRACT

Objective: To examine the frequency of MB2 canals in maxillary first permanent molars.

Study Design: Cross sectional study.

Place and Duration of Study: This study was conducted at the Military Dental Centre, CMH Peshawar from April 2019 to September 2019.

Patients and Methods: Two hundred and thirty eight cases were included. Rubber dam for isolation was applied after achieving local anaesthesia. MB2 canal location was done in three stages.

Results: There were 65.1% males while 34.9% patients were females with mean age 31.12±11.74 years. Second mesiobuccal canal was found in 193 cases (81.1%).

Conclusion: The frequency of second mesiobuccal canal was high and the majority of second mesiobuccal canal openings were located distal to the main mesiobuccal canal.

Key Words: Frequency, MB2 canals, Permanent maxillary first molar

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INTRODUCTION

Worldwide most of the root canal treatments are performed in the permanent first molar teeth, because these are one of the first teeth to erupt into the oral cavity.¹ For successful root canal treatment, complete and accurate examination of internal and external tooth morphology is basic pre-requisite requirement.² Unsuccessful debacle of whole root canal system is the most important cause of endodontic failure in first permanent molars. It usually happens due to clinician's negligence to detect additional root canals.³ In maxillary first permanent molars, the number of canals and roots may vary. Maxillary first molars have three roots and 3 to 4 canals and the 4th canal being a 2nd mesio-buccal canal. The frequency of MB2 canal is reported to be 56.8% to 80.9%.⁴ MB2 is located 1-3 mm toward the palatal canal from the main/larger mesio-buccal canal MB.⁵ It is not so easy to diagnose MB2 orifice, so clinicians have to use microscope and ultrasonic toughing when performing root canal

therapy. In these teeth, use of microscope and ultrasonic tip is essential as these devices are very helpful in detecting MB2 canal orifices since they provide good visibility, access and can generate a deeper trough in the dentin on pulp chamber floor.⁶ Many of the studies reported that diagnosis of MB2 canal with aid of CBCT (cone-beam computed tomography) is very useful and incidence rate varies between 48% to 97.6%.⁷ A study was conducted by Khalid al Fouzan⁸ regarding frequency of MB2 canals in maxillary first and second molars and they reported the incidence of MB2 canals as 97% and 93% respectively in which they used micro computed tomography for the detection of MB2 canals. Globally the frequency rate of MB2 canals is reported 73.8% and diagnosis made by using CBCT.⁹ Multiple studies have been conducted to examine the frequency of mesiobuccal root of maxillary molars by using micro-CT and reported this device is very useful and effective for detection of this accessory root and canal.¹⁰

MATERIALS AND METHODS

This cross sectional study was conducted at Military Dental Centre, CMH Peshawar from 1st April 2019 to 30th September 2019. Two hundred and thirty eight patients (238) were included in study. Patients having pulpal exposure and requiring root canal treatment in maxillary first permanent molars, both genders between 15-60 years, and belonging to different races were included. Patients with maxillofacial surgery, patients having teeth with insufficient periodontal support, calcified canals, and caries extending to the floor of the pulp chamber were excluded. The patients clinically diagnosed with irreversible pulpitis, necrosed pulp and

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fulfilling inclusion criteria were selected. Detailed medical and dental histories were taken. Patient's demographic and clinical observations were recorded. Cross infection control measures were taken. Pulp chamber floor was carefully inspected by preparing the access cavity. Rubber dam for isolation was applied after giving local anaesthesia. MB2 canal location was done in three stages. Data was entered and analyzed using SPSS 20.

RESULTS

The mean age of patients in our study was 31.12±11.74 years with 155 (65.1%) were male while remaining 83 (34.9%) were female (Tables 1-2). Second mesiobuccal canal was found in 193 cases (81.1%) [Table 3].

Table No.1: Age-wise distribution (n=238)

Age (years)	No.	%
15-20	57	23.9
21-30	70	29.4
31-40	56	23.5
41-50	38	16.0
51-60	17	7.2
Mean±SD	31.12±11.74	

Table No.2: Gender-wise distribution (n=238)

Gender	No.	%
Male	155	65.1
Female	83	34.9

Table No.3: Distribution of cases by second mesiobuccal canal (n=238)

MB2	No.	%
Yes	193	81.1
No	45	18.9

DISCUSSION

The present study conducted was aimed to examine the frequency of MB2 canals in maxillary first permanent maxillary molars. In this regard we included 238 patients. In the present study, we found that 23.9% patients were ages 15 to 20 years, 29.4% patients had ages 21 to 30 years, 23.5% were ages 31 to 40 years, 16% patients were ages 41 to 50 years and 7.2% patients had ages above 50 years. The mean age of patients in our study was 31.12±11.74 years. Karabucak et al¹¹ reported majority of patients were aged 15 to 30 years. Some other studies showed similarity to our study in which the most common age group was 20-35 years.¹²⁻¹³

This study showed that 65.1% patients were males while 34.9% patients were females. These results were similar to many of previous studies in which male patients population was high as compared to females.¹⁴⁻¹⁵ A study conducted by Atif et al¹⁶ regarding canal

configuration and the frequency of mesiobuccal second canal reported majority of patients 56% were males.

The current study showed that the prevalence of MB2 canal was 81.1%. These results were similar to the study conducted by Burhley et al¹⁷ but higher than that reported by Badole et al.¹⁸ Another study done by Tayfun et al¹⁹ regarding frequency of MB2 canal in the maxillary first second and third molars was done using microscope and ultrasonic tip for troughing. They reported the incidence rate of MB2 canal 62%, 67% and 74% respectively.

Atif et al¹⁶ reported that the incidence rate of MB2 canal was 45%. Another study conducted by Vasundhara et al²⁰ regarding frequency of MB2 canal in maxillary first permanent molars and they reported 68.3% prevalence of MB2 canal. They reported CBCT was the most useful and effective method in detection of MB2 canals.

Das et al²¹ reported that patients with age group 18 to 25 years had prevalence of 74% MB2 canals, age group 26 to 35 years had 73% and the age group 36 to 45 years had 68% prevalence of MB2 canals. They also reported that operating under microscope along with adjunctive aids showed better results in detecting MB2 canals in maxillary first and second permanent molars.

CONCLUSION

Frequency of MB2 canals in maxillary first permanent molars was found in 81.1%. Majority of the MB2 canal orifices originate distal to the main MB canal and most of the MB2 canal orifices are palatal to main MB canal.

Author's Contribution:

Concept & Design of Study:	Faisal Nawaz Khan
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Final Approval of version:	Faisal Nawaz Khan

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REFERENCES

- Kakkar P, Singh A. Maxillary first molar with three mesiobuccal canals confirmed with spiral computer tomography. *J Clin Exp Dent* 2012; 4(4):e256-9.
- Chandrasekhar V, Jayaprakash T, Swathi A. Maxillary first molar with unusual morphology diagnosed with spiral computed tomography scanning: a case report. *Isra Med J* 2011;3:106-9.
- Rajput F, Memon RA, Kalhor FA, Kumar N. Validity of Dental Operating Microscope on

- identification of MB2 Canal in Maxillary Molars. *J Pak Dent Assoc* 2013;22:23-6.
4. Iqbal M, Jameel A, Charania A. Locating MB2 canal in maxillary first molars with magnification: in vitro study. *J Pak Dent Assoc* 2012;6:28-30.
 5. Hosoya N, Yoshida T, Iino F, Aria T, Mishima A, Kobayashi K. Detection of a secondary mesio-buccal canal in maxillary first molar: A comparative study. *J Conserv Dent* 2012;15: 127-31.
 6. Peeters HH, Suardita K, Setijanto D. Original Prevalence of a second canal in the mesiobuccal root of permanent maxillary first molars from an Indonesian population. *J Oral Sci* 2011;53:489-94.
 7. Gao X, Tay FR, Gutmann JL, Fan W, Xu T, Fan B. Micro-CT evaluation of apical delta morphologies in human teeth. *Sci Reports* 2016; 6(1): 36501.
 8. Alfouzan K, Alfadley A, Alkadi L, Alhezam A, Jamleh A. Detecting the second mesiobuccal canal in maxillary molars in a Saudi Arabian population: a micro-CT study. *Scanning* 2019; 2019: 9568307.
 9. Martins JNR, Alkhawas MBAM, Altaki Z, Bellardini G, Berti L, Boveda C, et al. Worldwide analyses of maxillary first molar second mesiobuccal prevalence: a multicenter cone-beam computed tomographic study. *J Endod* 2018; 44(11): 1641-9.
 10. Al-Shehri S, Al-Nazhan S, Shoukry S, Al-Shwaimi E, Al-Shemmary B. Root and canal configuration of the maxillary first molar in a Saudi subpopulation: a cone-beam computed tomography study. *Saudi Endod J* 2017; 7: 69-76.
 11. Karabucak B, Bunes A, Chehoud C, Kohli MR, Setzer F. Prevalence of apical periodontitis in endodontically treated premolars and molars with untreated canal: a cone-beam computed tomography study. *J Endod* 2016; 42(4): 538-41.
 12. Bauman R, Scarfe W, Clark S, Morelli J, Scheetz J, Farman A. Ex vivo detection of mesiobuccal canals in maxillary molars using CBCT at four different isotropic voxel dimensions. *Int Endod J* 2011; 44(8): 752-8.
 13. Das S, Warhadpande MM, Redij SA, Jibhkate NG, Sabir H. Frequency of second mesiobuccal canal in permanent maxillary first molars using the operating microscope and selective dentin removal: a clinical study. *Contemp Clin Dent* 2015;6(1): 74-8.
 14. Arnold M, Ricucci D, Siqueira JF Jr. Infection in a complex network of apical ramifications as the cause of persistent apical periodontitis: a case report. *J Endod* 2013; 39(9): 1179-84.
 15. Khan M, Khan RMA, Javed MQ, Ahmad A. Mesio-buccal root canal configuration of maxillary first molar. *J IIMC* 2018; 13(4): 210-14.
 16. Aqwa AS, Sheikh Z, Rashid H. Canal configuration and the prevalence of second mesiobuccal canal in maxillary first molar of a Saudi sub-population. *J Pak Dent Assoc* 2015; 24(4):182-7.
 17. Buhrlay LJ, Barrows MJ, BeGole EA, Wenckus CS. Effect of magnification on locating the MB2 canal in maxillary molars. *J Endod* 2002;28(4): 324-7.
 18. Badole GP, Warhadpande MM, Shenoi PR, Lachure C, Badole SG. A rare root canal configuration of bilateral maxillary first molar with 7 root canals diagnosed using cone-beam computed tomographic scanning: a case report. *J Endod* 2014; 40:296-301.
 19. Alacam A, Tinaz AC, Genc O, Kayaoglu G. Second mesiobuccal canal detection in maxillary first molars using microscopy and ultrasonics. *Aust Endod J* 2007; 34(3): 106-9.
 20. Das S, Warhadpande MM, Redij SA, Jibhkate NG, Sabir H. Frequency of second mesiobuccal canal in permanent maxillary first molars using the operating microscope and selective dentin removal. *Contemp Clin Dent* 2015; 6(1): 74-8.
 21. Vasundhara V, Lashkari KP. An in vitro study to find the incidence of mesiobuccal 2 canal in permanent maxillary first molars using three different methods. *J Conserv Dent* 2017;20(3): 190-3.