

ORIGINAL ARTICLE

Prevalence of Second Mesio-Buccal (Mb2) Canal in Permanent Maxillary First Molar

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ABSTRACT

Objective: The aim of this study is to determine the prevalence of second mesio-buccal canal in permanent maxillary first molars.

Study Design: Cross sectional study.

Place and Duration: Dr Ishrat ul Ebad Khan Institute of Oral Health Sciences, Karachi during the period from February 2020 to January 2021

Patients and Methods: Three hundred and fifty cases of both genders were presented in this study. Patients were aged between 18-60 years. Patients' detailed demographics including age, sex and body mass index were recorded after taking written consent. Local anesthesia was given for isolation of rubber dam. The pulp chamber floor was clearly visualized and the access cavity was ready. The location of the MB2 channel in three phases was done. Complete data was analyzed by SPSS 22.0 version.

Results: Mean age of the patients were 30.14 ± 17.47 years with mean BMI 25.61 ± 8.25 kg/m². Among 350 cases, Majority of the patients 225 (64.3%) were male while the rest 125 (35.7%) were females. Majority of the patients were from age group 20-30 years and less patients were between 51-60 years old. Frequency of second mesiobuccal canal was found in 280 (80%) patients.

Conclusion: We concluded in this study that prevalence of MB2 channel was reported in 80% in the initially permanent maxillary molars. Most MB2 canal apertures are distal from the main MB channel and most MB2 apertures are palatal.

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

INTRODUCTION

Maxillary molar is also probably the post-moon tooth with the largest volume and most complex root and root canal structure. [1] The primary requirements for successful endodontic therapy are identifying and finding all spaces of root canals with the thorough preparation of chemomechanisms and achieving a hermetic seal with inert sealing material throughout the exit portal. [2,3] Anatomical voids in the root canal system which can operate as an infectious nest, causing treatment failures can be linked to a post treatment disease. [2] One of the greatest mysteries of endodontic activity is the elusive "second mesiobuccal" (MB2) channel.

It has been revealed that the MB2 teeth retracted from endodontic include a higher number of undiagnosed canals than the first time that the teeth are treated. [4] For maxillary molars, the second mesiobuccal orifice is normally placed on or off the main mesiobuccal canal and palatal canal mesially in the pulpar groove and in a distance of 3.5 mm palatally and 2 metric mesially from the main mesiobuccal canal.[5,6,7]

The tactile dexterity and mental image of the canal system have traditionally been used to detect most of the endodontic canal treatments, since it is extremely restrained to observe the channel orifices.[8] The surgical operating microscope(SOM) has made the location of the channels easier by magnifying and lighting the grooves on

the pulpal floor and separating the colors of the floor dentine from the walls. [9,10]

This study evaluated the possibility of increasing the identification of the second mesiobuccal channels in the permanent maxillary first molars with the additional use of SOM and selective dentin removal.

MATERIALS AND METHODS

This cross-sectional study was conducted at Dr Ishrat ul Ebad Khan Institute of Oral Health Sciences, Karachi during the period from February 2020 to January 2021 and 350 patients were recruited in this study. Patients' demographics were recorded after obtaining written consent. Patients with maxillofacial surgery, insufficient periodontal support, calcified canals, caries extending to the floor of the pulp chamber was excluded.

Patients were aged between 18-60 years and belonging to diverse races with maxillary first permanent pulpal exposure patients requiring root canal treatment. After administration of local anesthetic, rubber dam for was placed. The positioning of the MB2 canal in three phases; (i) canals were located using an endodontic explorer (DG-16) with naked eye. Canal was negotiated and confirmed with size 08 K file (Mani), (ii) further efforts to locate canals were examined with dental loupes x3.5 magnification for the presence of MB2. If MB2 was located with or without magnification, Size 6, 8, and 10 k-file was inserted in MB

and MB2 canals. Complete data was analyzed by SPSS 20.0 version.

RESULTS

Mean age of the patients were 30.14 ± 17.47 years with mean BMI 25.61 ± 8.25 kg/m². Among 350 cases, Majority of the patients 225 (64.3%) were male while the rest 125 (35.7%) were females. (table 1)

Table 1: Baseline details demographics of enrolled cases

Variables	Frequency (n=350)	%age
Gender		
Male	225	64.3
Female	125	35.7
Mean age	30.14 ± 17.47	-
Mean BMI	25.61 ± 8.25	-

Majority of the patients 175 (50%) were from age group 18-30 years followed by age group 31-40 years 87 (24.86%), 50 (14.3%) were from age group 41-50 years and the rest were 38 (10.86%) between 51-60 years.

Table 2: Distribution of cases with respect to age

Variables	Frequency (n=350)	%age
Age group (years)		
18-30	175	50
31-40	87	24.8
41-50	50	14.3
51-60	38	10.9

Frequency of second mesiobuccal canal was found in 280 (80%) patients and not found in 70 (20%) cases.(table 3)

Table 3: Prevalence of second mesiobuccal canal among permanent maxillary first molars

Variables	Frequency (n=350)	%age
Second mesiobuccal canal (MB2)		
Yes	280	80
No	70	20

DISCUSSION

Canal identification is the first crucial stage in channel debridging. An important therapeutic problem is created by the high incidence of MB2 in maxillary molars which are often recognized and ignored during root canal treatment. [12,13] In this cross sectional study 350 patients were presented. Majority of the patients were 64.3% were males and 35.7% were females. Mean age of the patients were 30.14 ± 17.47 years with mean BMI 25.61 ± 8.25 kg/m². These findings were comparable to the previous study.[14] Majority of the patients 175 (50%) were from age group 18-30 years followed by age group 31-40 years 87 (24.86%), 50 (14.3%) were from age group 41-50 years and the rest were 38 (10.86%) between 51-60 years. These were relatable to the recent study.[15] A Weine et al[16] study found that MB2 incidents in Japanese populations were different from those of other ethnic backgrounds for MB2 Canals. A study by Weine et al[16]. In terms of age, the number of MB2 channels decreases most likely with age due to calcification. [17,18]

In current study frequency of second mesiobuccal canal was found among 80% cases in permanent maxillary first molar. Some clinical studies[19-21] and clinical simulation studies[22,23] in which MB2 channels were discovered in >71% of the teeth may show a significant

increase in prevalence. This significant rise was mainly caused by a better understanding of the presence of MB2 channels[8] and the change in the creation of an access cavity.[24] Two channels were more prevalent in laboratory investigations in mesiobuccal root (60.5 per cent) than in clinical trials (54.7 percent). [24] In clinical research it was established that two MB channels comprise up to 93% of the first maxillary molars studied. [25]

Converse data from Sempira and Hartwell [26] revealed, though, that only 33 percent of maxillary first molars found the 2nd channel in mesiobuccal. Some research have evaluated the MB2 channel presence or absence outcomes in vivo with in vitro. In an in vivo study, Seidberg et al.[27] revealed that 33% of the teeth (n = 201) investigated possessed MB2 channels and in their in-vitro research the percentage was up to 62% (n = 100). 31% of teeth tested in vivo had a second mesiobuccal channel in a research conducted by Pomeranz and Fishelberg, compared to 69% of teeth in vitro (n=100 for both investigations). [28]

Three major conclusions from the present study may be seen while identifying the association between the root shapes and the incidence of MB2: The predominantly oval (combined) root shape has been detected, which suggests that the roots of MB are largely oval, i.e. flat or ribbon. Long oval or oval root shape with MB2 canals was not a significant preference, but the incidence of MB2 in long oval root forms was substantially greater than the Oval one and in oval root forms.

Taking into account the foregoing data, the occurrence of MB2 channels can be determined to be in definite correlation with the root shape of the permanent maxillary root of the first molar.

The inexperience of observer, the interobserver difference of methodologies used to research root canal anatomy and the technical variances have their own part, and those aspects must always be taken into consideration throughout the conduct and reporting of such investigations. Anatomy is fate and the destiny is buried in endodontics. As a physician, we have to do all in our power to better understand and study the anatomy.

CONCLUSION

We concluded in this study that prevalence of MB2 channel was reported in 80% in the initially permanent maxillary molars. Most MB2 canal apertures are distal from the main MB channel and most MB2 apertures are palatal.

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