ORIGINAL ARTICLE

Pattern of Impaction of Mandibular Third Molar and Its Relation with Caries in Mandibular Second Molar

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ABSTRACT

Objective: To determine caries frequency in mandibular second molars in proportion to level of angulation and depth of impaction of mandibular third molars established on winters and Pell and Gregory classification system.

Study Design: This was a Cross-sectional study.

Place and Duration of Study: This study was regulated in Department of Oral and Maxillofacial Surgery at Islamic International Dental Hospital, Islamabad from 1st January 2018 to 30th June 2018.

Materials and Methods: An overall 100 cases of caries were investigated on clinical and radiographic basis in mandibular second molars. Each panoramic radiograph was studied for the presence of carious lesion in lower second molars. The depth and angulation of impacted third molars was being assessed using Pell and Gregory and winter's grouping respectively. Chi square test was applied for analysis of data.

Results: The participants in this study had age range from 18 to 60 years old. Mean age was 39.24 ±9.77 years. Majority of the patients 59 (59.0%) were between the ages 18 and 40. Among these patients, males were 83 (83.0%) and females 17 (17.0%) having a 4.9:1 male-to-female ratio. Caries at the distal aspect of mandibular second molars were seen in 39 percent of individuals with impacted lower third molars and mesioangularly impacted teeth most resulted in caries.

Conclusion: This study concluded that 39% of the patients with impacted mandibular third molars caused distal cervical caries in second molars, with mesioangular impaction being the most prominent type causing caries. So, an attentive follow up of impacted mandibular third molars should be considered as health of lower mandibular second molar is influenced by pattern of impaction.

Key Words: *Caries, Lower Second Molar Impaction, Lower Third Molar Impaction, Mesioangular, Preventive Removal.*

Introduction

An impacted tooth is defined as being partially or totally embedded in the soft tissue or bone, having an obstruction in its eruption pathway and is unlikely to erupt within the expected time frame.[1] Third molars are classified using Pell and Gregory (1933) and Winters (1926) grouping that describes depth and angle of an impaction respectively relative to the adjacent second molars.[2]

Third molars are related to various complications such as tooth decay, root resorption, periodontal problems, pericoronitis, infections, cysts, dental crowding, and neoplastic lesions. Distal caries on mandibular second molar are a frequently noted complication associated with impaction of mandibular third molar tooth. Extraction of third molar is a commonly performed surgical procedure due to various reasons but removal due to caries on distal surface of mandibular second molars ranges from 4.2 to 37.5%.[3]

The caries prevalence seems to be significantly influenced by the positioning of the impaction. There are numerous studies in literature regarding this subject highlighting the association of distal caries with mandibular third molar mostly related to mesioangular impaction.[4,5] Also a statistically important link was found between horizontally impacted third molar and caries along with mesioangular impaction.[6] So, to preclude the development of caries and early loss of second molar teeth, removal of third molars should be given consideration.[7]

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This study was conducted with an objective to determine the mandibular third molar impaction pattern and its consequences in causing carious lesions in mandibular second molars so a better practice can be formulated for early diagnosis to prevent caries in the adjacent tooth in our Centre.

Materials and Methods

This cross-sectional study was conducted over a duration of 6 months, in the department of Oral and Maxillofacial Surgery at Islamic International Dental Hospital, Islamabad commencing from 1st January to 30th June 2018.

Total 100 subjects satisfying the criteria for inclusion and exclusion were included in this study with Non-probability, Consecutive Sampling method. The World Health Organization sample size calculator was used to compute sample size. After selecting patient informed consent and demographic details were recorded in a study pro forma.

Participants who were included in this study were 18 to 60 years old, having both mandibular second and third molars with caries present in lower mandibular second molars being identified clinically and radiographically. Patients with already missing/extracted mandibular second molars and filled mandibular second molars were not involved in this study.

All the patients were approved from the OPD of Oral and Maxillofacial Surgery department in IIDH. After patient selection associated complaints like pain, caries and pericoronitis were also documented. Further, clinical examination was done to investigate the extent of caries clinically and then patient was subjected to standard preoperative OPG (orthopantomograms) and periapical radiographs to confirm carious lesion. Each radiograph was studied for presence of carious lesion in lower second molar and also depth and angulation of impacted third molar teeth was evaluated. The Pell and Gregory classification system was used to evaluate depth based on extent of tooth enclosed by anterior border of ramus (class I, II, and III), and when considering occlusal surface (Class A, B and C). Winter's classification was used to assess the angle by measurement of angle between second and third molar, intersecting longitudinal axes[8]. Angles measurements were done using a protractor (180º) with vertical impaction angle (10º-10º), mesioangular impaction(11º -79º), horizontal impaction(80º-100º) and distoangular impaction(-11º-79º).

Age, gender, impaction type, angulation and depth were study variables to assess carious lesions in lowers second molar teeth in relation with impaction pattern of third molar.

The statistical analysis of data was done by IBM SPSS software version 16 (Statistical Package for the Social Sciences). For qualitative factors such as gender, caries presence, depth of impaction and type of angulation, frequency and percentage were determined. For all quantitative data such as age, the mean and standard deviation were computed. Chi square test was applied to evaluate relation among caries in mandibular second molar to both depth and angle of impacted third molar. The effect modifiers like age and gender were measured by stratification. The post-stratification chi square test was used. Confidence level was 95%. Statistical significance was considered as P value ≤ 0.05.

Results

The participants in this study were in age from 18 to 60 years old, with mean age 39.24 ± 9.77 years. Majority of the patients 59 (59.0%) were between ages of 18 and 40.

Among these patients, males were 83 (83.0%) and females 17 (17.0%) having a 4.9:1 male-to-female ratio.

Table I shows the patient distribution according to angulation type and impaction depth.

Tables II and III indicate the relation between mandibular second molar caries and impaction depth and angulation type.

In this study, cervical caries at the distal side of second molars occurred in 39% of patients having impacted mandibular third molars, and mesioangular impaction was the most occurring as shown in figure I.

Table I: Distribution of Patients with Respect to Type of Angulation

		Frequency	%Age
Type of angulation	Vertical	22	22.0
	Mesioangular	31	31.0
	Horizontal	19	19.0
	Distoangular	15	15.0
	Others	13	13.0
Depth of impaction	Level A	21	21.0
	Level B	33	33.0
	Level C	46	46.0

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Table II: Relation Between the Mandibular Second Molar Caries to Depth of Impaction

Depth of impaction	Caries		p-value
	Present	Absent	
Level A	10	11	**0.151**
Level B	14	19	
Level C	12	34	

p value = 0.05*

Table III: Relation Between the Mandibular Second Molar Caries to Type of Angulation

Type of angulation	Caries		p-value
	Present	Absent	
Vertical	06	16	**0.183**
Mesioangular	13	18	
Horizontal	05	14	
Distoangular	04	11	
Others	08	05	

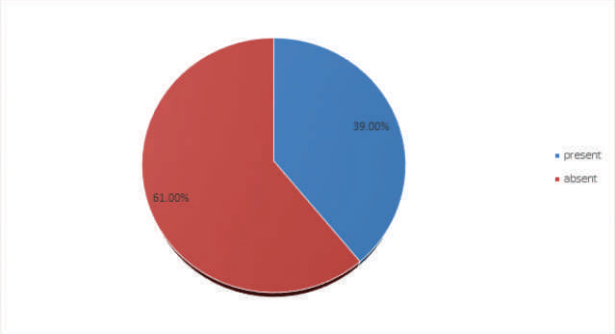

Figure 1: Percentage of Caries (n=100)

Discussion

Diverse patterns are seen in impacted third molars in relation to depth, position, and angle in comparison with mandible and plane of occlusion respectively. Understanding of these pattern forms is essential as some of these are linked to greater caries risk in next immediate tooth that is second molar[5], discomfort and pericoronitis[8] and early loss of second molar tooth[9]. According to a research distal caries was the highest stated pathology between the second and impacted third molars, second being the periodontal pocketing[10].

In light of the abovementioned issue, this study was conducted to determine frequency of caries in mandibular second molar in relation to level of angulation and depth of impaction, established on Winter's and Pell and Gregory's categorization system so a close follow-up of impacted molars should be considered to protect the second molar tooth.

In this study, of 100 patients, 83.0% were male gender and 17.0% female having a 4.9:1 male-to-female ratio. Majority of patients with impacted mandibular third molar showed in their second and third decade, that is, 59.0%. Distal cervical caries in second molars occurred in 39 percent of patients having impacted mandibular third molar teeth, and mesioangular impaction the most commonly occurring.

A study carried by Srivastava et al[5], supports the outcomes of our study, male predominance and majority of patients being in the second decade. Although, numerous former studies advocate a female predominance.[9]

A study shows consistent results reporting caries to be more common in those with mesioangular impaction, that is, 68.3%, then vertical with 25.4%, followed by horizontal being 4.2% and lastly distoangular impaction 2.1%[11]. Also, third molars above the level of cemento-enamel junction of adjacent second molar were related to causing distal cervical caries.[12] Several other studies show caries on the distal side of second molars occurred with unerupted mandibular third molars, and the mesioangular impaction was the common kind.[4,6,13]

According to pentapati et al[3] caries on the distal surface of mandibular second molars may not be related with all impacted mandibular third molars but teeth with mesioangular and horizontal angulations may lead to caries on the distal aspect of second molars.

Some studies have shown increased risk of caries associated with other types of impactions, vertical and horizontal mostlyx.[7,14]

Altan et al suggested that prophylactic removal of mandibular third molar between 51º to 71º can lead to avoidance of distal carious lesions.[15]

However, sample size and duration of our research work are the limitations of our study

In view of these studies prophylactic removal of third molar can be beneficial for the health of second molar tooth but in our region, it can also be an economic burden for the patient. So, consideration should be given to keep follow up of an impacted molar and attempting its removal when required. Further studies need to be carried out to devise a specific protocol for management and follow up of patients with impacted mandibular third molars to

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maintain long term health of mandibular second molar.

Conclusion

According to the findings, cervical caries is seen on the distal aspect of mandibular second molars in 39 percent of individuals and most common impaction was the mesioangular impaction.

To ensure the continuing health of mandibular second molars next to impacted third molars with mesial angulation between 30° and 70°, notably located at Level A and Class I, should be called for an attentive follow-up of impacted mandibular third molar.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.

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