

FREQUENCY & PATTERN OF MANDIBULAR THIRD MOLAR IMPACTIONS. A CROSS SECTIONAL STUDY

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ABSTRACT

The aim of the study was to evaluate the mandibular third molar incidence, position and depth in mandibular bone in order to plan and manage patients efficiently based on panoramic radiographs and clinical findings found at Foundation University College of Dentistry, Islamabad. A cross-sectional study was conducted from January 2019 to December 2019. It was done in the Department of Oral Medicine, Foundation University College of Dentistry Islamabad. Total of 160 patients with 258 impactions, were included in the study. Details were compiled regarding patient's age, gender, frequency of impacted mandibular third molars, angulation of impacted teeth, level of impaction, relationship of mandibular third molar with ramus of the mandible and pathologies associated with these teeth and relationship of inferior alveolar nerve in association with the impacted tooth. SPSS software version 2019 was used to analyze our data. Females (57.5%) presented with more impactions than males (42.5%). Mesioangular impactions (51.16%) were most commonly seen, followed by vertical impactions (19.37%) and most common pathology associated was pericoronitis (16.9%). Mandibular third molar impaction is the paramount procedure being carried out in oral and maxillofacial surgery department at FUCD. Early diagnosis with proper radiographic interpretation by orthopantomogram leads not only to the knowledge of proper position and depth of impaction but also to proper prognostic outcomes afterwards.

Keywords: Pericoronitis, Mandibular Impaction, Orthopantomograph (OPG)

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INTRODUCTION

A tooth is termed as impacted when there is a hindrance in its eruption's path which obstructs it from reaching into its normal position and occlusal level within specific time frame.¹ Hence, the impaction can be attributed to the incorrect position of the adjacent tooth leading to inadequate space between mandibular second molar and ramus, status of surrounding hard and soft tissue or it can be the position of the tooth itself. Mandibular third molars are the commonest impaction that is followed by maxillary third molar, maxillary canine and mandibular premolars respectively.¹

Ninety eight percent of all impacted teeth in the oral cavity suggest higher numbers of the mandibular third molar. The prevalence varies from 9.5% to 68% in different population according to diverse ethnicities and races in the whole world. The eruption time of wisdom

teeth is principally between 17 to 21 years of age. Most of the researchers submitted a higher prevalence of mandibular third molar impaction in females.²

As it has been determined that removal of third molar impaction is one of the most common procedures carried out in the oral surgery department. The age group of the patients varies, but utmost they are found at the age ranging from 20 till 45. It has been advocated by different researchers that the common reason of impaction in a population is due to the artificial feeding of babies and infants.³ It can also be due to the habits developed during childhood (para-functional habits). Factors like diet, reduction in the degree of utilization of the masticatory apparatus, position and quality of surrounding tissue and genetic inheritance can also effects the timing of third molar eruption.³

Many different etiological factors can cause change in orientation & the site of the erupting third molar tooth, which includes the size of the mandible or maxilla, growth of the jaws, lack of space, quality of compact bone, pathological conditions like odontogenic cysts and tumors or obstruction by any physical or mechanical stops, are the most common reasons.⁴

The aim of this study is to evaluate the incidence, position and depth of the third molar in mandibular

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bone constructively, based on pantomograms as well as clinical findings of our oral medicine department.

MATERIALS AND METHODS

A cross sectional study was conducted in the Department of Oral medicine at Foundation University College of Dentistry (FUCD) Islamabad to identify the incidence and position of mandibular third molar impaction in accordance with mandibular second molar as well as ramus along with depth of impaction in the mandibular bone. The study proposal was accepted and has Ethical Review Certificate of Foundation University, Islamabad. A comprehensive informed consent was taken from all patients before consideration for the research. The study was conducted for a period of one year from January 2019 and December 2019.

A total of one hundred and sixty patients with total of two fifty and eight teeth were included of both genders, between age group of 19 to 45 years, who reported for oral examination in FUCD. Patients presented with variation of complaints associated with the mandibular third molar impaction, starting with no symptoms to the complaint of wide set of symptoms; ranging from pain and pericoronitis to caries and cystic lesions. Patients who were fulfilling the inclusion criteria were selected and orthopantomogram was taken after thorough clinical examination. The Parameters of the current study were age of the patients, gender, location of impacted mandibular third molar (Right, Left, Bilateral), angulation of impacted teeth (Mesioangular, Distoangular, Vertical, Horizontal), position and level of impacted teeth (Class and Level), associated pathological conditions if found any, and also association of inferior alveolar nerve with impacted teeth. Inclusion Criteria was minimum age of 19 years, maximum age of 45 years, complete clinical record of the patients and a digital OPG.

Radiographic evaluation was completed by taking orthopantomogram (OPG) to evaluate the status of mandibular third molar. Radiation protection protocol was established effectively using the digital cephalometric system. The selected cases were examined clinically to assess the presence or absence of any signs of infection, fever, swelling, trismus, difficulty in swallowing and enlarged lymph nodes associated with mandibular impacted teeth. Radiographic assessment was done by two different examiners individually. The captured image was appraised and traced for the status and angulation of mandibular third molar.

Pell and Gregory classification was used to evaluate the position of the mandibular third molar with anterior border of ascending ramus and occlusal (vertical) position of mandibular third molar in relation to distal aspect of second molar as well. Winter's classification was used to evaluate angulation of mandibular third molar in relation to the long axis of mandibular second molar. Assessment of radiographs was done for further periapical and also pericoronal pathologies associated with impactions. Association of Inferior alveolar nerve

canal with impacted tooth was estimated (propinquity of the inferior alveolar nerve to the roots of the mandibular third molar was evaluated by darkening of root, deviation & narrowing of root, diversion or narrowing of the inferior alveolar nerve canal, position of the root in relation to the IAN & interruption of the white line) radio graphically on digital OPG.

Data was analyzed using SPSS version 21.0. Data for categorical variables are expressed in frequencies and percentages. Demographic variables are calculated as simple descriptive statistics. Quantitative variables are used in terms of mean and standard deviation.

RESULTS

In the current study of 160 patients, impactions were present in 92 females (57.5%) and 68 male patient (42.5%) as shown in table 1.

According to Winter's classification, most common impaction found in the current study was mesioangular (51.16%) followed by vertical impaction (19.37%). According to the Pell and Gregory's classification of impacted third molars, mostly were positioned with the occlusal level at level B (48.83%) as shown in table 4. The most commonly encountered relationship was that of Class II (41.47%).

Prevalence of proximity of the inferior alveolar nerve to the roots of the mandibular third molar was also evaluated; which was not in proximity to the roots 81.3% as in table 1. Statistical evaluation was also done for pathologies. It is suggested that no pathological lesion were associated with 114 patients (71.3%) whereas, the most common pathology seen was pericoronitis (16.9%).

DISCUSSION

Present study was performed to evaluate the incidence of impacted mandibular third molars in our natives. The outcomes of current clinico-radiographic study delineated that the most prevalent type of mandibular impaction was mesio-angular followed by vertical type. The most listed impaction depths according to Pell and Gregory's classification were Class II and Level B.

Present research included individuals over 19 years of age only, below this age the root formation is not completed and one cannot predict decisively if third molar has an insufficient space or is improperly positioned.¹⁴

According to the denouement of the current study, it was calculated that the rate of impaction in mandibular third molar was notably more in incidence in females than males, which is in consensus with studies of Alfergani et al¹ Ogawa et al², Kumar et al³ and Regme et al.⁵ The reason could be due to different growth potentials among males and females. Growth rate in females routinely ceases leading to a small jaw size and eruption of third molar eruption mostly occurs after growth of jaws is completed, whereas in males, the jaw

TABLE 1: BASELINE CHARACTERISTICS (N=160 NUMBER OF PATIENTS, N=258 NUMBER OF TEETH)

Variable		N (%)
Gender	Male	68(42.5)
	Female	92(57.5)
Presentation of impaction	Unilateral impaction	58(36.2)
	Bilateral impaction	102(63.8)
Associated pathology	None	114 (71.3)
	Pericoronitis	27 (16.9)
	Periodontal Pocket	3 (1.9)
	Caries	1 (0.5)
	Cyst	7 (4.4)
Inferior alveolar nerve proximity	Pain	1 (0.5)
	Away	130 (81.3)
	Deviation of root	13 (8.1)
	Darkening of roots	15 (9.4)
	Not seen	2 (1.3)

TABLE 2: CLASSIFICATION OF SURGICAL DIFFICULTY (N=258)

Variable		Number n (percentage)
Winter's classification	Mesioangular	132 (51.16%)
	Distoangular	26 (10.07%)
	Vertical	50 (19.37%)
	Horizontal	44 (17.05%)
	Buccolingual	6 (2.35%)
Pell & Gregory classification	Level A	90 (34.88%)
	Level B	126 (48.83%)
	Level C	42 (16.29%)
Ramus relationship	Class I	64 (24.81%)
	Class II	107 (41.47%)
	Class III	87 (33.72%)

endures to grow at the time of eruption of mandibular third molar.¹⁴ Whereas, in contrast, according to Amr M Bayoumi et al¹¹ there was no remarkable difference among both the genders.

In current study, the most frequent type of angulation found was mesioangular followed by vertical type and horizontal impactions, respectively as supported by Obuekwe et al¹³, M Alfergani et al¹ and Kumar et al.³ The reasons are the late development, late maturation, hindrance in the path of eruption and ultimately lack of available space in mandible at the older age.

In current study, left side of mandible was found to have higher rate of impactions in comparison to the

right side and is followed by the bilateral involvement. In contrary to this study, Kumar et al³ reported that the right side of mandible was frequently involved, whereas, Upadhyaya et al⁹ concluded higher incidence of the bilateral impactions.

The findings of the current study concluded that the most common impaction level was level B. The findings of studies of Alfergani et al¹ and Ogawa et al² were also in agreement with our study. Level A was found to be the most common according to a study by Upadyaya et al.⁹ The most frequent type of impaction in current study, regarding space available between anterior border of ramus and distal aspect of mandibular second molar (according to Pell and Gregory classification) is Class II, the results are similar to the study by Kumar et al³ conducted in Eritnerian study. The Classification system of Pell and Gregory is not only used to document the position of the impacted third molars, but also the classification helps to foresee the surgical difficulty by calculating difficulty index preoperatively and to lessen the risk of postoperative complications following by surgical or non-surgical extraction of impacted tooth. These findings remain divulged until the patient underwent for radiographic investigations for additional details.⁷

Majority of the patients in the current study were asymptomatic with no clinical symptoms (71.3%) seen. When we offered the choice of retention or extraction to our routine patients, most of the patients with asymptomatic impactions preferred extraction over retention. The extraction of impacted third molars is also suggested and favored for various therapeutic and prophylactic measures. However, the surgical removals of many asymptomatic impacted mandibular third molars have often been carried out for years to halt the development of any peri-apical pathologies leading to complications.

There are different schools of thought amongst researchers and authors regarding the extraction of impacted mandibular third molar. Some being of the opinion that it should be removed even if it is asymptomatic and not hampering daily lives. Yet another group suggested that the prophylactic surgical removal is not necessary at all, according to their findings, the prevalence of development of pathological conditions inside & around follicles of third molars is generally low in general population.¹⁴

The removal of impacted third molar, which is asymptomatic with no difficulties is a financial burden on the patient as well as state hence it has proved to be an economic encumbrance. Preventive removal of the impaction should only be kept in deliberation after much thought, comparison of the health benefits and cost effectiveness prior to the procedure. The health practitioner and operating maxillofacial surgeon should keep a close watch on potential pathologies which may afflict the health of impacted tooth.

Impacted third molars can remain asymptomatic for

years, which in our case were 114 asymptomatic out of total 160 patients (71.3%). The production of regional or systemic changes of variable severity is also related with the existence of impacted third molar. In current study, pericoronitis was reported most repeatedly which was found to be correlated with 27 impactions (16.9%). In contrast, the study of Obuekwe et al¹³ found the most frequent reason for extraction of third molar to be dental caries followed by pericoronitis, recurrent episodes of pain and trismus.

It is universally eminent that unless treatment is conclusive, pericoronitis has the tendency to linger on and reek as a persistent and chronic condition accentuated by acute or sub-acute flare-ups. Pericoronitis is the most common pathological variant that usually develops when the crown of erupting third molar encounters the oral cavity. Only then, it will have propensity to become chronic and hence will persist intermittently until the tooth is fully erupted or treated, making it a vicious cycle. Treatments of pericoronitis are variable, running from the very conservative of oral hygiene instructions and operculectomy to surgical removal therapy. The surgical risk and morbidity increases with patient's age in case the removal is postponed. Removal of tooth may intercept the panic of spread of infection, which may result in severe complications. Other symptoms and pathologies found in association with mandibular impacted third molar were periapical infection, lateral cyst, pocketing, caries and radiating pain towards ear in decreasing order.

Out of total 160 patients studied, relationship of impacted mandibular third molar and inferior alveolar nerve was found to be away from each other in 130 patients (81.3%). Propinquity of inferior alveolar nerve was found in 28 cases only, including deviation and darkening of roots. The vicinity of inferior alveolar nerve with impacted third molar can make the removal of tooth challenging and which in return can cause neurosensory deficit if proceed without precaution⁽¹⁷⁾. Limitations of our study are confined to duration and small sample size.

CONCLUSION

Mandibular third molar impaction is the paramount procedure being carried out in oral and maxillofacial surgery department at FUCD. Female patients between age groups of 20 to 40 years were more frequently affected. Early diagnosis with proper radiographic interpretation by orthopantomogram leads not only to the knowledge of proper position and depth of impaction but also to proper prognostic outcomes afterwards.

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CONTRIBUTIONS BY AUTHORS
All authors contributed substantially