

Prevalence and Pathologies Associated with Impacted Third Molar in Bareilly Population: Orthopantomogram Study

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ABSTRACT

Background: Impacted teeth are those which fail to erupt in dental arch within expected time. Any tooth may become impacted but the most common are mandibular third molars. The tooth may become impacted because of adjacent teeth, dense overlying bone or soft tissue, lack of space in the jaw, aberrant path of eruption, abnormal positioning of tooth bud or pathological lesions etc. Information on the impacted mandibular third molar etiology, clinical anatomy, radiologic examination, surgical treatment, possible complications and pathological condition associated with it, is important for dentist.

Aim and Objectives: The aim of study was to determine the prevalence and pattern of impacted third molars in Bareilly population with objectives to estimate the frequency of impacted third molars and to evaluate the association of impacted third molars with other pathological conditions.

Materials and Methods: The present study was done in Department of Oral Medicine and Radiology, Institute of Dental sciences, Bareilly (U.P.). A total of 1000 patients of both genders aged 17- 67 years who reported to the department of Oral Medicine and Radiology during the period of 2013-2015 was selected in this study. After explaining the procedure to the patient informed consent was obtained. Clinical examination was done according to Kerr, Ash and Millard followed by radiological evaluation of the patient using orthopantomogram. The position and depth of impacted third molar was recorded according to criteria given by Winter's classification.

Results: In present study we found that the most common age group of impacted third molar is in the age group of third decade (27-37) (40.98%). Impacted molar was common in mandible (61.2 %) and in males 67.8%. Most Common type of impaction was mesioangular (36.7%) and most common pathological condition was pericoronitis. It was found to be 38.8%.

Keywords: Impacted third molar, O.P.G.

INTRODUCTION

Impacted teeth are those which fail to erupt in dental arch within expected time. Any tooth may become impacted but the most common are mandibular third molars. The tooth may become impacted because of adjacent teeth, dense overlying bone or soft tissue, lack of space in the jaw, aberrant path of eruption, abnormal positioning of tooth bud

or pathological lesions etc. Most common impacted teeth are mandibular third molars. Impacted third molars erupt at 17 to 21 years of age and frequency of impaction is more in mandible than maxilla, with significantly higher frequency in males than females.¹ Clinical and radiographic examinations not only facilitate to classify impacted teeth but also

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help to diagnose and differentiate different pathologies associated with them. Pericoronitis is the most common pathology followed by dental caries of partially erupted third molar or adjacent second molar. There could also be root resorption of second molar, periodontal problems, odontogenic cysts and tumors etc.² For explaining the prevalence and incidence of dental impaction, various theories have been put forward from time to time. Mendelian theory, phylogenic theory and orthodontic theory are among the most dominant and widely accepted theories among all. The concept of discrepancy between the size of the tooth and space available in the jaws due to size variation occurring in the jaws is the most stressed one in all the major theories.³ Winter's classification system is usually considered for assessing the angle of impacted teeth which evaluates the angle formed between the intersected longitudinal axes of the second and third molars⁴

The purpose of this study was to review impacted third molar etiology, clinical anatomy, radiologic examination, surgical treatment and possible complications, such type of study is helpful tool for impacted tooth assessment as well as for planning for surgical operation. Such type of study will further raise peoples' awareness on the importance of regular dental checkups which could lead to an early detection of impacted teeth and of appropriate measures before complications arise. There are currently no data on the prevalence and pathology associated with impacted third molar in Bareilly population. Hence this study was designed to investigate the prevalence and pathology associated with impacted third molar in patient in Bareilly population.

MATERIAL AND METHODS

This retrospective analysis was planned done by collecting the data from 1000 patients of both genders aged 17- 67 years who reported to the Department of Oral Medicine and Radiology during the period of 2013-2015. The informed consent was taken from all the patients. The study was approved by the Ethical committee, Institute of Dental Sciences, Bareilly. All patients aged 17 years to 67 years who underwent O.P.G examinations. Patients with history of removal of impacted third molar, aged younger than 17 years and presence of facial

syndromes were excluded. After explaining the procedure to the patient, informed consent was obtained. Clinical examination was done according to Kerr, Ash and Millard followed by radiological evaluation of the patient using orthopantomogram (OPG) model orthoralix DDE (GENDEX, U.S.A) digital panaromicsystem (Tube potential 60-90 kv, Tube Current 2-15 mA, Total Filtration: >2.5mm, Time 13.9 s) The magnification factor for the region from posterior border of ramus to canine as reported by manufacturer is 1.25. other parameters which were followed are as follows:

- 1) The Frankfurt Horizontal Plane was parallel to the floor.
- 2) The Mid-Sagittal Plane bisected the face in to equal halves.
- 3) The Canine plane.

All images were taken by same radiologist following a standardized protocol for patient positioning and exposure parameter setting and radiograph were examined under standard light boxes to determine number, and types of impacted third molar and prevalence of associated pathologies.

The radiograph was chosen according to following criteria:

- 1) High quality with respect to angulations and contrast.
- 2) Mandibular and maxillary teeth obstructed on its path by adjacent tooth were included.
- 3) Panoramic radiograph should not have exposure or processing artifacts.

The position and angulation of was recorded according to criteria given by winter's classification with reference to angle formed between the intersected longitudinal axes of second and third molar.

- 1) Vertical impaction : 10° to -10°,
- 2) Mesioangular impaction : 11° to 79°
- 3) Horizontal impaction: 80° to 100°,
- 4) Distoangular impaction -11° to -79°,
- 5) Others: 111° to -80°.

Pathologies associated with impacted teeth were included:

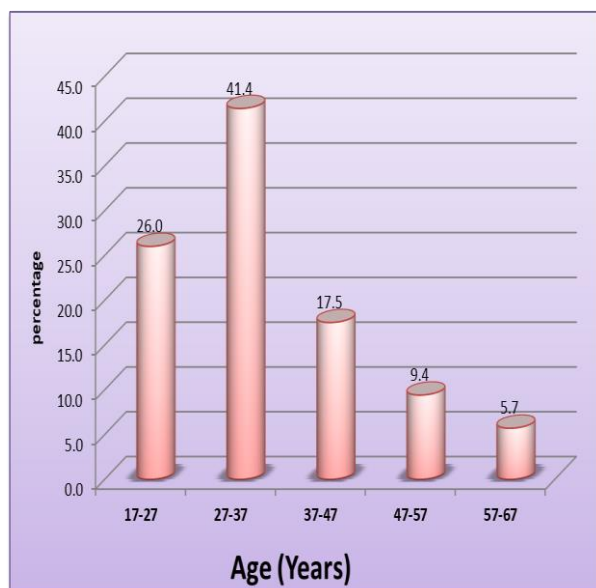
- 1) Caries of the impacted and/or adjacent teeth;

- 2) Periodontal bone loss of the adjacent tooth of more than 5 mm below the cemento-enamel junction;
- 3) Root resorption of the adjacent tooth.
- 4) An increase in the pericoronal space of the dental follicle of more than 4 mm around the impacted tooth.

Statistical Analysis: All the data was analyzed using SPSS software. Pearson Chi-square test was used to measure the level of significance.

RESULTS

Out of 1000 patients, the maximum patients belonged to the age group of 27-37 years. It was found out to be 414 accounting of 41.4% of the total study population. Followed by this there were 260 patients in age group of 17-27 years contributing 26% of the study population. In age group of 37-47 years the number of patients was found out to be 175(17.5%). The age group of 47-57 years consisted of 94(9.4%) patients and minimum patients were found out to be in age group of 57-67 years which was 57 accounting of 5.7% of the total study population. The age group in which the impacted third molar was most prevalent was 27-37. It was found out to be 541 contributing 40.98% of total study population. Minimum patients with impacted teeth were found out to be in age group of 57-67 years.(Graph 1)(table 1)



Graph 1: Distribution of Patients According to Age.

Table 1: Distribution of Impacted Tooth According to Age.

Age (in years)	Total patients		Patients with impacted teeth	
	No of patients	%	No of patients	%
17-27	260	26.0	356	26.97
27-37	414	41.4	541	40.98
37-47	175	17.5	243	18.43
47-57	94	9.4	128	9.69
57-67	57	5.7	52	3.93
Total	1000	100	1320	100

Out of 1000 individuals, there were 650(65%) male and 350(35%) female patient. Out of 650 male patients a maximum of 254 (39.08%) patients were in the age group of 27-37 years and minimum of 37(5.69%) patients were found in 57-67 years age group. Out of 350 female patients a maximum of 157(44.86%) patients were in the age group of 27-37 years and a minimum of 21(6.0%) patients were in 57-67 years age group. There was significant difference in between male and female patients.(Table 2).

Table 2: Distribution of Male and Female Patients According To Age.

Age (in years)	Male		Female		p- value
	No of patients	%	No of patients	%	
17-27	175	26.92	85	24.29	0.000*
27-37	254	39.08	157	44.86	0.000*
37-47	126	19.38	50	14.29	0.00*
47-57	58	8.92	37	10.57	0.03*
57-67	37	5.69	21	6.00	0.03*
Total	650	65%	350	35%	0.000*

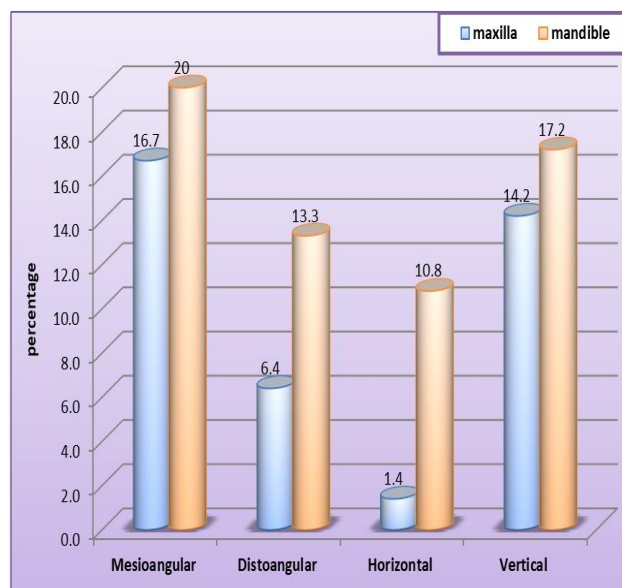
Total number of impacted teeth found in both jaws was 1320. Among these 510 (38.6%) were in maxilla while 810(61.4%) were in mandible. In both jaws mesioangular impaction was most common. It was found out to be 486 accounting of 36.7% of total impacted teeth found. While horizontal impaction ie.158 (12.2%) was found out to be minimum. In maxilla most common impaction was mesioangular impaction. It was found out to be 221 accounting of 16.7% of impacted teeth of maxilla while a minimum of 18(1.4%) was found out to be horizontal impaction. In mandible most common impaction was mesioangular impaction. It was

found out to be 265 accounting of 16.7% of the impacted teeth in maxilla while the minimum of 140(10.8%) was found out to be horizontal impaction. There was significant difference in type of impaction in maxilla and mandible.(Table no 3)(Graph 2).

Table 3: Frequency of Prevalence of Type of Impaction Of Third Molar In Both Jaws.

Type of impaction	Maxilla		mandible		Total in both jaws		p-value
	No:	(%)	No:	(%)	No:	(%)	
Mesioangular	221	16.7	265	20.0	486	36.7	0.04*
Distoangular	84	6.4	177	13.3	261	19.7	0.000*
Horizontal	18	1.4	140	10.8	158	12.2	0.000*
Vertical	187	14.2	228	17.2	415	31.4	0.044*
Total	510	38.6	810	61.4	1320	100	0.000*

*p< 0.05 consider statistically significant.



Graph 2: prevalence of type of impaction of third molar.

In both jaws pericoronitis was the most common pathological finding. It was found out to be 512 contributing 38.8% of the total pathologies. It was followed by the dental caries observed to a total of 184 accounting of (14.09%) of total pathologies. The next common pathology was cysts and tumors. It was found out to be 31, a total of 7.0 % of total pathologies. The other pathologies were periodontitis (3.0%), periapicalradiolucencies (2.0%), root resorptions (1.0%), abscesses 14(1.1%). Odontomes (0.1%) were the least common pathology found in both jaws respectively.(Table no 4)

Table 4: Frequency of Pathologic Condition Associated with Impacted Third Molar In Both Jaws.

Pathologic condition	Maxilla		Mandible		Total in both jaws		p-value
	No	(%)	No	(%)	No:	(%)	
Pericoronitis	140	10.6	372	28.2	512	38.8	0.000*
Caries	55	4.2	129	9.89	184	14.09	0.000*
Caries in 2 nd molar	47	3.6	54	4.0	101	7.6	0.486
Cyst and tumor	5	0.4	26	2.0	31	7.0	0.000*
Periodontitis	18	1.4	21	1.6	38	3.0	0.630
Periapical radiolucency	8	0.6	18	1.4	26	2.0	0.049*
Root resorption	3	0.2	10	0.8	13	1.0	0.052
Abscess	1	0.1	13	1.0	14	1.1	0.001*

*p< 0.05 consider statistically significant.



Fig 1: Armamentarium for clinical examination.



Fig 2: Orthopantomogram Machine.

DISCUSSION

An impacted tooth is one that is partially erupted or unerupted and will not eventually assume normal arch relationship with other teeth and tissues.⁵ Impacted teeth are often found to be associated



Fig 3: Armamentarium for radiological procedure.

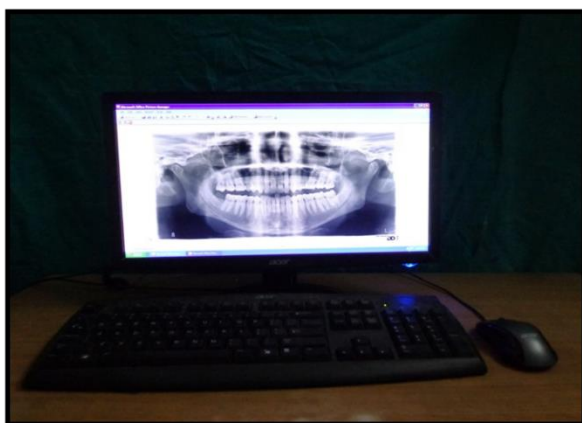


Fig 4: Desktop for radiological procedure.

with pericoronitis, periodontitis, cystic lesions, neoplasms, root resorptions and can cause detrimental effects on adjacent teeth. Impacted third molar weakens the angle of mandible and makes it susceptible to fracture and is implicated in the etiology of lower arch crowding, temporomandibular joint (TMJ) disorders, vague orofacial pain and neuralgias.⁶ The insufficient maxillofacial skeletal development or a low correlation between maxillofacial skeletal development and third molar maturation is most often the cause for third molar impaction. This leads to reduced space between the second molar and the mandibular ramus.⁷

In our study based on gender, impacted molars were predominant in males 67.8% and in females it was 32.2 %. Similar observation was found in study conducted by Mwaki and Guhuna et al⁸ and another similar study conducted in U.S.A reporting 58% male patients .

However converse to this some study has higher frequency in white Europeans (Lytle et al)⁹, Singapore and Chinese females than males

(Peterson et al)¹⁰. Female Predilection can be explained with Hellman's statement who proposed that jaw in females stop growing at time when third molar begins to erupt, where as in males, the growth continues beyond the time of third molar eruption. (Sandhu and kaur et al)¹¹.

Based on type of impaction, the most common type of impacted third molar was mesio-angular impaction (36.7%) followed by this, is vertical impaction 31.4%. The third most common type of impaction was disto-angular impaction .The least common type of impaction was horizontal impaction. Similar observations were found in study of Quek et al,¹² Kramer and William et al¹³ , .However the findings are in contrast to those of Hugoson and Kugelberg et al ¹⁴who found the vertical angulations to be the most common. This could be due to different method of classification of angulation was used in these studies. Based on frequency of pathological condition. The most common Pathology found both in maxilla and mandible was pericoronitis. In mandible it was found to be 28.2 % and maxilla it was 10.6%. Overall % of pericoronitis was 36.7% in both jaws. Followed by caries in third molar (14.09%) was present. While caries in 2nd molar (7.6%) and least prevalent pathological condition was odontomes. Similar observations were found in study by Santosh patilet al¹⁵. Conversely to this study Adeymo et al¹⁶ found dental caries and its sequel most prevalent followed by pericoronitis and and periodontitis .Caries in impacted tooth was found to be 14.09% comparatively higher than figures reported by Van der Linden et al ¹⁷(7.1%) and Laskin et al ¹⁸(6.5%). This may due to demographic changes.

Hence correct identification of impacted third molar is must for early diagnosis of associated pathologies and proper management of impacted third molar is necessary to prevent further consequences. This study that is done on such large patients size of 1000 is only study done on the Bareilly population but still further studies are recommended with larger sample size, so that radiographic determination of prevalence and pathology of impacted third molar can be evaluated.

CONCLUSION

Impaction is defined as failure of tooth eruption caused by a physical obstacle in the eruption path or the abnormal position of the tooth. Third molars account for 98% of all impacted teeth, and associated with various pathological processes ranging from caries and pericoronitis, pressure effects and resorption of adjacent 2nd molars, to cysts and neoplastic lesions. Several factors were reported as possible causes for third molar impaction, including lack of space distal to the permanent second molar, delayed third molar mineralization and early physical maturation.

It's very important to know impacted third molar etiology, clinical anatomy, radiologic examination, surgical treatment and for early diagnosis of associated pathologies and proper management of impacted third molar. So, this study was conducted in Bareilly population for determination of prevalence and pathology associated with impacted third molar. But still studies with larger population is required for better evaluation of prevalence and pathology associated with impacted third molar to prevent further consequences.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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