Original Research

Pattern and etiology of surgically removed Impacted Mandibular Third Molars in lower Himalayas region of state of Himachal Pradesh: A Retrospective Study

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ABSTRACT:
Introduction: Impaction may be defined as the failure of complete eruption into a normal functional position of one tooth within normal time due to lack of space in the dental arch, caused by obstruction by another tooth or development in an abnormal position. The mandibular third molar is the most frequently impacted tooth. The incidence varies from 9.5% to 68% in different populations. **Methods**: The study was conducted in Department of Dentistry, Dr Rajender Prasad government medical college Kangra, Himachal Pradesh (India) on pattern or etiology of impacted mandibular third molar. The data of the patients that came to the dental department seeking treatment between January 2017 and August 2018 were recorded. Following parameters were assessed. 1. Age. 2. Sex. 3. Etiology. 4. Location of impacted third mandibular third molar Right or Left. 5. Angulation (Winters classification). **Results**: A total of 21,106 patients, 10218 males and 10888 visited our institution between January 2017 and august. A total of 182 patients met the inclusion criteria. The age ranged from 18 to 60 years, with a mean age of 32.95±9.45 years. Among the 182 patients, there were 64 (35.2%) male patients and 118 (64.8%) female patients. The most prevalent type of impaction recorded was the mesio-angular position (52.2 %). **Conclusion:** This study demonstrated that females (64.8%) were more likely to present with impacted mandibular third molars than males (35.2%). The prevalence of third molar impactions was almost the same on both the left (47.8%) and right (52, 2%) sides. This study also noted that mesio-angular impactions (52.2%) were the most common type of impaction. The least common form of impactions was the transverse types (0.5%).
Keywords: surgical impaction, mandibular third molars, north Indian population

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INTRODUCTION

Peterson characterized impacted teeth as those teeth that fail to erupt into the dental arch within the expected time of eruption.[1] Later in 2004 Farman stated that impacted teeth are those teeth that are prevented from eruption due to a physical barrier within the path of eruption.[2]
Eruption times of third molars are variable, ranging from age 16 to 24 years.[3] The mean age for third molar eruption is 17years. The wide age range found with third molar eruption, as well as positional changes that occur after eruption may be due to differences in race, nature of the diet, the intensity of the use of the masticatory apparatus and possibly due to genetic background.[4]
Impacted third molar teeth can occur in both the mandible and maxilla but most impactions occur in the mandible. The prevalence of impacted mandibular third molars in the population varies in different studies from 16.7% to 68.6%.[5] The third molars being the last to

19

erupt have a relatively high chance of becoming impacted.[1] Many theories have been proposed to explain the incidence of impacted mandibular third molars. The prominent among these are mendelian theory, phylogenic theory and orthodontic theory. Most of these theories stress on the discrepancy of jaw size to the tooth size which further has been related to the dietary habits which varies from one region to the other. Various classifications have been given on impacted teeth such as WINTER'S classification, PELL AND GREGORY'S classification, KILLEY AND KAY, ARCHER'S classification of impacted maxillary teeth, etc. Winter's classification is classified based on the inclination of the impacted tooth to the long axis of the second molar into distoangular, mesioangular, horizontal, vertical and transverse. This classification is used for the study as it is simple and easily understandable.[6]

This study was undertaken to document the prevalence and pattern of third molar impactions in region of lower Himalayas region state of himachal pradesh in India. Another objective was to examine the relationship of the impacted third molars to age and gender. The final objective was to evaluate the more commonly affected jaw and the most frequent angulations of third molar impaction.

MATERIAL AND METHODS

This study was performed at the Department of Dentistry, Dr Rajender Prasad government medical college kangra, Himachal Pradesh (India) on prevalence and pattern of impacted mandibular third molar. The data of the patients that came to the dental department seeking treatment between January 2017 and August 2018 were recorded. Following parameters were assessed. 1. Age. 2. Sex. 3. Etiology. 4. Location of impacted third mandibular third molar Right or Left. 5. Angulation (Winters classification).

The inclusion criteria for this study were the records of patients with orthopantomographs and IOPAs of the impacted mandibular molar underwent surgical removal of the impacted tooth under local anesthesia by Transalveolar method and above the age of 18 years. The minimum age for inclusion was 18 years because

the accepted view is that third molars normally start to erupt by that age. The orthopantomographs were examined using a standard radiograph viewing box to evaluate the presence and type of impactions. Impactions were classified according to **Winter's classificatio**n system as follows: 1. Mesioangular 2. Horizontal 3. Distoangular 4. Vertical angulation, and 5. Transverse as shown in figure 1,2,3,4 and 5.

RESULTS:

A total of 21,106 patients, 10218 males and 10888 visited our institution between January 2017 and august 2018. A total of 182 patients met the inclusion criteria.

The age ranged from 18 to 60 years, with a mean age of 32.95 years and the standard deviation was 9.45 years(Table-1). Among the 182 patients, there were 64 (35.2%) male patients and 118 (64.8%) female patients (Table- 2). The male to female ratio of the study group was 0.54 (64:118). The distributions of impaction on the right and left sides do not differ significantly between males and females. (Table- 3)

The most prevalent type of impaction recorded was the mesio-angular position (52.2 %). The distributions of the angulations of impaction for males and females do not differ significantly. The mesial angulation is most prevalent- 52.2 %, Vertical position- 18.1%, Distal position 15.9%, Horizontal position- 13.2%, Transverse position – 0.5% (Table-4)

The distributions of the angulations of impaction on the right and left sides do not differ significantly.(Table-5,6)

Pathologies that were noted in association with impacted teeth are summarized in Table 7 and included: caries of the impacted tooth, caries of the adjacent teeth, abscess formation, periodontal pocketing formation, root resorption of the adjacent teeth, Follicular hyperplasia/ dentigerous cyst formation (fig- 6), and crowding.

Recurrent pericoronitis was most common pathology for removal of tooth (22.5%) followed by caries of adjacent teeth (19.2 %) (Table -7).The distributions of pathology of impaction on the sides and between gender do not differ significantly. (Table -8)

Total	Minimum	Maximum	Mean	Std. Deviation
182	18	60	32.95	9.456

Table 1: Age distribution

Sex	Frequency	Percentage (%)
Male	64	35.2
Female	118	64.8
Total	182	100.0

Table 2: Distribution of impactions according to sex

20

Side in mandible		Gender		Total
		male	female	
1	**Right**	30	53	83
2	**Left**	34	65	99
	Total	64	118	182

Table 3: The distribution of impaction on the right and left sides, P=0.80 (Chi-square test)

	Type of impaction	Frequency	Percentage (%)
1	Mesio angular	95	52.2
2	Distoangular	29	15.9
3	Vertical	33	18.1
4	Horizontal	24	13.2
5	Transverse	1	0.5
	Total	182	100.0

Table-4: Prevalence of different types of impactions

	Type of impactions					Total
Side in Mandible	mesioangular	distoangular	vertical	horizontal	transverse	
Right	36	14	18	15	0	83
Left	59	15	15	9	1	99
Total	95	29	33	24	1	182

Table-5: Distributions of the angulations of impaction on the right and left sides (P= 0.135)

	Type of impaction	Gender		Total
		male	female	
1.	**mesioangular**	38	57	95
2	**distoangular**	10	19	29
3	**vertical**	7	26	33
4	**horizontal**	9	15	24
5	**transverse**	0	1	1
	Total	64	118	182

Table 6: distributions of the angulations of impaction on the right and left sides (P= 0.355)

	Type of Pathology	Frequency	Percent
1	Caries of impacted teeth	16	8.8
2	Caries of adjacent tooth	35	19.2
3	Abscess formation	16	8.8
4	Periodontal pocket formation	22	12.1
5	Root resorption of adjacent teeth	9	4.9
6	Follicular hyperplasia or dentigerous cyst	5	2.7
7	Pericoronitis with trismus	11	6.0
8	Cheek bite	12	6.6
9	Recurrent pericoronitis	41	22.5
10	Caries of impacted and adjacent tooth	15	8.2

Table-7: Different types of pathologies of impactions

	Distribution of Pathology	Right	Left	Total
1	Caries of impacted teeth	6	10	16
2	Caries of adjacent tooth	17	18	35
3	Abscess formation	10	6	16
4	Periodontal pocket formation	9	13	22
5	Root resorption of adjacent teeth	6	3	9
6	Follicular hyperplasia or dentigerous cyst	3	2	5
7	Pericoronitis with trismus	4	7	11
8	Cheek bite	3	9	12
9	Recurrent pericoronitis	17	14	41
10	Caries of impacted and adjacent tooth	8	7	15
		83	99	182

Table- 8: The distribution of pathologies of impaction on the right and left sides (P = 0.566)

Distribution of pathology		Gender		Total
		Male	Female	
1	caries of impacted teeth	7	9	16
2	Caries of adjacent tooth	12	23	35
3	Abscess formation	6	10	16
4	Periodontal pocket formation	7	15	22
5	Root resorption of adjacent teeth	2	7	9
6	Follicular hyperplasia or dentigerous cyst	2	3	5
7	Pericoronitis with trismus	5	6	11
8	Cheek bite	4	8	12
9	Recurrent pericoronitis	14	27	41
10	Caries of impacted and adjacent tooth	5	10	15
Total		64	118	182

Table 9: The distribution of pathologies according to sex (P=0.992)

Fig 1: Mesioangular impacted 38

Fig 4: vertical impacted 38

Fig 2: Horizontal impacted 48

Fig 3: dIstoangular impacted 38

Fig 5: Transverse impacted 48

Fig 6: impacted 48 associated with cystic lesion

DISCUSSION:

Removal of Impacted mandibular third molars are common oral surgical procedures that are routinely done in oral surgical clinics. Mandibular third molars are the most common tooth to get impacted in jaws than maxillary third molars , this is due to the presence of compact bone in the mandible and greater mesio distal width of posterior arch in maxilla. India being the most diversified country with dense population presents with varied differences in the prevalence of impacted mandibular third molars from different states. This is due to racial differences and difference in food habits.[7] We found that the incidence of mandibular third molar impaction was significantly higher in females in comparison to males. In agreement with the current study, Hashemipour *et al*, Quek *et al*, and Kim *et al*. also reported a gender predilection for females.[8] This is due to early growth spurt in females and late mineralisation of mandibular third molars. In females the end of growth spurt coincides with the onset of menarche and now the age of menarche is found to be early by 2. 8 years, in this era because of change in life style and dietary pattern.[7]

In men, however, the jaw growth continues during the third molar eruption and thus provides more space for the tooth. In contrast with the results of this study, other researchers indicated no gender differences in the pattern of third molar impaction.[8] As far as age is concerned, impacted tooth removal was mostly done at the age group of 26 to 35 years according to our study. This is because in India prophylactic removal of potentially impacted third molars were not done and only symptomatic tooth were removed one by one under LA generally. This can also be attributed to lack of insurance cover for these elective oral surgical procedures widely.[7]

In the current study, patients less than 19 years of age were excluded because human growth continues beyond this age. In addition, at the age of 19, the root formation of the third molar would be complete. As the eruption of the tooth continues till the end of root formation process, we excluded patients with incomplete root formation of the mandibular third molar. Patients who had any conditions interfering with normal tooth eruption were also excluded to ensure that the study evaluated the pattern of mandibular third molar impaction in healthy subjects.

It should be noted that changes in human lifestyle have resulted in smaller jaws. Hence, the space available for the third molars, which are the last teeth to erupt has decreased. In addition, delayed third molar mineralization and early physical maturation is a possible etiology of high impaction rate of third molars. Furthermore, racial differences can affect the maturation and eruption timing and also the size of the jaw; this would explain the different rates of incidence reported for different countries.[8]

Most impacted mandibular third molars were mesioangular in orientation. This may be due to their late development and maturation, path of eruption and lack of space in mandible at later age. Horizontal and vertical angulations were less common but the least common angulation for mandibular third molars was transverse. These findings are in exact agreement with the Hassan et al and Syed *et al.* studies. [9] However, some studies show that vertical impaction is the most common. This could be due to the fact that a different method of classification of angulation was used in these studies.[10]

The distributions of the angulations of impaction on the right and left sides do not differ significantly . Also the distributions of the angulations of impaction for males and females do not differ significantly. These findings are in exact agreement with the muhamad *et al.* study.[11]

Early recognition of third molar impaction is very important from a therapeutic point of view. Impacted teeth including third molar teeth result in many complications and their early detection and surgical removal is imperative. Abscess formation and periodontal pocket formation were among the more commonly encountered complications of impacted third molars. Another potential complication that was noted in this study was dentigerous cyst formation (one case) around the crown of the impacted third molar. These changes are important to note because they can potentially complicate the surgical removal of the impacted third molar. Root resorption was recorded for only few cases in this series.

The limitation of this study was that it was cross-sectional without randomization. In addition, it covered only a limited region. It is recommended to implement further studies to evaluate the etiology of third molar impaction in the Iranian population and also to perform randomized studies in populations from different regions to evaluate the pattern of third molar impaction more comprehensively.

CONCLUSION

This study on the north Indian population analyses prevalence and patterns of impacted mandibular third molars in this region. Mandibular third molar impactions are the most common oral surgical procedures done. Incidence of impacted tooth is increasing because of modern dietary habits and evolution. With this trend it is imperative to equip Indian health care system with oral and maxillofacial surgeons in all government run hospitals.

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