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Third Molar Assessment at the Time of Extraction- A Clinico- Prospective Study

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Abstract

Purpose: *Third molar is usually referred as the most commonly extracted tooth or it is associated with the most frequent surgical procedure. The purpose of this study is to assess the prevalence and pattern of third molar extraction and to identify the demographic, dental, anatomic and operative variables associated with the third molar.*

Method: *A cross- sectional study was conducted among 2352 patients who required extraction of their third molar in the year 2020. The data collected were grouped into four variables including demographic, dental, anatomic and operative.*

Results: *Extraction of third molar is more common among 30- 39 years of age with women being the most common to get their third molar extracted till the age of 40. Routine extractions were most common than surgical extraction. Mandibular third molar are the most common to be extracted. Mesioangular was found to be the most common type of impaction. Dental caries is found to be the important cause for extraction.*

Conclusion: *We conclude that the treatment pattern of the third molars vary greatly over a lifetime from 0- 79 years of age.*

Key words: *Third molar, extraction, Impaction, Age, surgery.*

Introduction

Extraction of third molars (M3s) accounts for a large volume in contemporary oral surgical practice which requires much planning and surgical skill.**[**1**]** This procedure is performed in an atraumatic fashion with local anaesthesia, sedation, or general anaesthesia as a result of extensive training, skill and experience.**[**2**]** Third molars exhibit great variation in size, shape, position, root formation and morphology, time of development, and path of eruption.**[**3**]**

The third molar is most commonly extracted due to prophylactic or orthodontic reasons, impaction, pericoronitis, caries and periodontal diseases.**[**4**]** With the dental caries being the most common oral disease followed by periodontal diseases, impacted third molar stands third in occurrence.**[**5**]**

Recurrent pericoronitis being one of the most common reasons for extraction of third molars, it is an inflammation that occurs in the soft tissues around an erupting tooth. The inflammatory reaction is usually sudden in onset and rapid in development but may also be subacute or chronic if lasting or recurrent. Pericoronitis is usually related to the complications caused by eruption of the third molar.**[**6**]**

Patient factors have an impact on increasing difficulty of third molar extraction; particularly age, gender and ethnic background.**[**7**]** The reason for extraction of the third molar varies with age.**[**4**]** Assessment of difficulty of third molar surgery is necessary to form an optimal treatment plan in order to minimise complications.**[**7**]**

There are various methods to treat a third molar. It varies from a primary care unit to an Oral and Maxillofacial Surgery unit. Little data is available on both routine and surgical extraction together done in both general and surgical unit.**[**4**]**

This study is carried out to determine the patient factors and the tooth factors at the time of third molar extraction along with the method of extraction which can pave way for a better treatment planning. The results of this study can be used for earlier prediction, evaluation and therefore treatment of third molar to avoid problems in the future.

Materials and Methods

Study Design and Sample:

The study was designed as a prospective cohort study. The study sample included the patients treated at Department of Oral and Maxillofacial Surgery, Government Dental College and Hospital, Hyderabad. Patients with their third molar to be extracted were included in the study. Those with incomplete records, craniofacial anomalies or syndromes, any pathological dentoalveolar conditions were excluded from the study.

Study variables

The variables were grouped into the following variables like demographic, dental, anatomic and operative.

Demographic variables

The demographic variables included age and gender. The age was categorized into the following groups: 0-9 years, 10-19 years, 20-29 years, 30-39 years, 40- 49 years, 50-59 years, 60-69 years, 70-79 years.

Dental variables

Pre- operative reasons for extraction of the third molar were recorded. These include impaction, dental caries of third molar, damage to second molar due to third molar, pulp and periapical infection, pericoronitis, buccally erupted, root stumps, fracture, mobility.

Anatomic variables

The anatomic variables include the type of impaction in case of an impacted tooth.

Operative variables

The procedure involved in removal of third molar can be classified as surgical and non- surgical. These operative terms were defined as follows: 1) Nonsurgical: an erupted tooth removed with forceps and elevators only, not requiring incision of soft tissue or elevation of a flap; 2) surgical: an erupted tooth removed that required incision of overlying soft tissue, elevation of a flap or requiring removal of bone or the sectioning of a tooth using a surgical drill or chisels.

Data analysis

The x2 test was used for assessing differences in frequencies between these age groups, genders, jaws, and methods of extraction.

Results

During the 1year period, 2352 third molars were extracted, of which 78.5% were extracted non-surgically and 21.43% were surgically extracted. Among the total third molars extracted, 36.28% were in males and 63.72% were in females.

Almost 70% of the extractions were carried out between the age group of 30- 39 years (Table I). There was a predominance of third molar extraction among women upto the age of 40 years, with male predominance after 40 years. Extraction of mandibular third molars (62.21%) were more common when compared to maxillary third molars (37.7%). Among the third molars, prevalence of extraction was found to be more in the third quadrant (33.71%) followed by fourth quadrant (28.57%), first quadrant (19.98%) and second quadrant (17.73%).

Surgical extraction was found to be more common between the age group of 20-29 years (46.03%) and among females (57.72%) (Table II).

The number of surgical extractions done is observed to decrease with age.

The most common angulation of impaction was mesioangular, followed by vertical, distoangular and horizontal impaction (Table III) with left side being more common (Table IV).

With dental caries (51.1%) being the most common cause of extraction of third molar, impaction (19.72%), pericoronitis (6.59%), Dental caries of second molar (6.54%), periodontitis (5.86%), root stumps (5.82%) has led to extraction.

Age group (Years)	Male	Female	Total
0-9	0	0	0
10-19	31	27	58
20-29	270	536	806
30-39	257	589	846
40-49	120	217	337
50-59	111	75	186
60-69	62	44	106
70-79	4	9	13
Chi-square value	89.659		
df	6		
P value	<0.001		

Chi square test: Statistically significant

Table. I: Distribution (%) of the extracted third molars (n= 2352 teeth) according to gender, by age group.

Age group (Years)	Male	Female	Total
0-9	0	0	0
10-19	11	11	22
20-29	108	124	232
30-39	75	119	194
40-49	16	24	40
50-59	3	13	16
60-69	0	0	0
70-79	0	0	0
Chi-square value	7.03		
df	4		
P value	0.134		

Statistical Analysis: Chi-square test. Result: Not Significant

Table. II: Gender and age distribution in surgical extraction.

Variables	Male (n)	Female (n)	Total (n)	Chi-square value	P value
Mesioangular	113	122	235	11.510	0.009 Significant
Horizontal	28	40	68		
Vertical	37	88	125		
Distoangular	*31*	*45*	*76*		

Statistical Analysis: Chi-square test. Statistically significant at the 0.05 level

Table. III: Distribution of pattern of third molar impaction by gender.

Angulation	Right (n)	Left (n)	Total (n)	Chi-square value	P value
Mesioangular	94	141	235	39.985	0.000 Significant
Horizontal	56	12	68		
Vertical	57	68	125		
Distoangular	31	45	76		

Statistical Analysis: Chi-square test. Statistically significant at the 0.05 level.

Table IV: Distribution of third molar impaction by side.

Discussion

Third molars exhibit the greatest variability in timing in development, crown and root morphology and position. They are the last teeth to erupt into the oral cavity and supplement the function of the second molars.[8] The most common surgical intervention in dentistry is the removal of third molars in young adults, mostly after the age of 20 years.[9] This study is to document the prevalence of third molar extraction among different age groups, gender, tooth and jaw involved, method of extraction, angulation of impaction.

In our study, out of 2352 third molars that were extracted, 78.5% were extracted non- surgically and 21.5% were extracted surgically. This is similar to the studies carried out by A. Kautto et al at Helsinki and W. L. Adeyemo et al.[4,10] In the study carried out by Susarla SM et al, 76% of the third molars were removed surgically which is opposite to our observation.[1]

Prevalence of extraction of third molar was found to be more in female which is similar to some of the international studies.[4,10,11] Our findings of predominance of the third molar extraction among the age group of 30- 39 years was almost similar (26- 35 years) to the study carried out in US.[12] The result was different from other studies carried out by A. Kautto et al (20-39 years) and Aida. J et al (15- 34 years).[4,13] Extraction of third molars was found to be more common among women upto the age of 40 above which it was predominant among men. Our findings were different from the study done at Helsinki where the predominance changes from female to male at the age of 29.[4]

Mandibular third molars (62.21%) are most commonly extracted which is similar to a Jordonian study and a Nigeria based study in which 62% and 70% of the third molars extracted are from the mandible respectively.[10,14] 20- 29 years of age shows high prevalence of surgical extraction which is similar to a study carried out among Southeast Iran population.[15]

In our study, it was observed that the prevalence of surgical extraction decreases with age. Growth is usually completed by 17 years of age. However, some changes in angulation of the third molars may occur even upto the age of 32. This may attribute to the decrease in impaction cases with advancing age that we find on our study.[16]

Third molars have the highest rate of developmental abnormalities, are the last in the eruption sequence, and are the most frequently impacted, unerupted or displaced within the dental arch.[10] A tooth which is unable to erupt physiologically into its functional anatomic position with time is said to be impacted. More than one-third of the third molars get impacted because of insufficient space.

Mandibular third molars are most commonly impacted when compared to maxillary third molar. The higher predilection for mandibular arch may be attributed to compactness of the mandibular bone and variation in the mesio- distal diameter of the permanent posterior dentition of maxilla and mandible.[5]

Third molar impactions are more common among females (57.72%). This could be attributed to the fact that the physical growth in women usually stops earlier than men leading

to a smaller jaw size. Moreover, the initiation of third molar eruption in women normally happens after the completion of growth of the lower jaw. In men, the jaw growth continues during the third molar eruption and thus provides more space for the tooth.[18]

In the present study, the most common angulation type of impacted third mandibular molar was mesioangular followed by vertical, distoangular and horizontal. This pattern of prevalence was observed in another study carried out by V Raj Kumar et al.[16] The studies by Hashemipour et al, Eshghpour et al and Hassan AH et al showed a different pattern of distribution in which Horizontal angulation is the second most common angulation.[15,18,19] Mesioangular impaction was the most common type accounting for 46.6% which could be attributed to the fact that the mandibular third molar develops in the ramus with its occlusal surface facing upwards and forwards and as the space becomes available due to growth of the mandible, it rotates into a more upright position. This normal developmental process and eruption path of mandibular third molars may be responsible for high percentages of mesioangular impaction.[20]

Reasons for tooth extraction in general have been reported from different countries of the world.[10] 51% of the third molar extraction was due to dental caries. Dental caries is found to be the most common cause for extraction of third molar in a study carried out by Adeyemo WL et al.[10] It is simply due to the increased likelihood of bacterial accumulation and tissue inflammation with time. It is also unclear that the position of the third molar at the back of the mouth makes it more difficult to clean contributes to the reported association of asymptomatic impacted third molars with caries.[21] In the studies carried out by Kautto A et al and Chuang SK et al, periodontal disease was found to be the most common cause.[10, 12]

Conclusion

We conclude that our study demonstrated that extraction of the third molar is more common among 30- 39 years of age, with women predominating till the age of 40. It is done more commonly in mandible than in maxilla.

Dental caries is found to be the most common cause of third molar extraction. Impaction is also another cause with mesioangular pattern being the most common.

So all the results can be added for further voluminous study to set a gold standard for earlier prediction, evaluation and therefore treatment to avoid all the predictable problems in the future.

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