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Original article

Radiological Evaluation of Impacted Mandibular 3rd Molar

Md. Zubayer Khan[1], S. M. Anwar Sadat[2], Abu Hasan Mohammad Khaled[3], Mohiuddin Ahmed[4]

[1]Honorary Medical Officer, Dept of Oral & Maxillofacial Surgery,Dhaka Dental College Hospital, [2]Resident Surgeon,Dept of Oral & Maxillofacial Surgery,Dhaka Dental College Hospital, [3]Lecturer, MH Samorita Medical College & Hospital, [4]Professor & Head,Dept of Oral & Maxillofacial Surgery,Dhaka Dental College Hospital

Abstract:

Purpose: The purpose of this study was to assess impacted mandibular 3rd molar radiologically in 33 Bangladeshi patients.

Methodology: Radiographic evaluation (by orthopantomogram) of 53 impacted mandibular 3rd molar teeth of 33 Bangladeshi patients of ages ranged from 21 to 70 years was done who were conveniently selected from patients attended to department of Oral & Maxillofacial Surgery, Dhaka dental College Hospital & Confidence Dental Surgery, Dhaka.

Result: In the study of 33 patients, 21 (63.64%) were males and 12 (36.36%) were females. Out of 53 impacted teeth of 33 patients, highest number of mandibular third molars were in vertically position (39 teeth, i.e. 73.59%), followed by horizontal (8 teeth, i.e. 15.09%), mesio-angular (4 teeth, i.e. 7.54%), and disto-angular (1 tooth, i.e. 1.87%) position. Maximum number of third molars were at level A (29 teeth, i.e., 54.71%), followed by level B (18 teeth, i.e., 33.97%) and level C (06 teeth, i.e., 11.32%). 43 mandibular third molars were in class II relation (81.12%), followed by 8 teeth (15.09%) in class I relation and 2 teeth (3.78%) in class III relation.

Conclusion: The pattern of Impaction of mandibular 3rd molar is characterized by high prevalence in male. The most common type is vertical, the most common position is position A and the most common class is Class-II.

Introduction:

The word "Impaction" is from Latin word "Impactio" that means pressing together. Impacted tooth may be defined as- the tooth that has failed to erupt completely or partially to its correct position in the arch and its eruption potential has been lost.[i]

The third molar continues to generate more controversy concerning eruption pattern and pathologic sequel than any other tooth in the oral cavity. Despite racial variation in eruption sequence and dates, it is universally accepted that third molars are the last teeth to erupt. This late eruption explains the fact that third molars are the most frequently impacted teeth.[ii] Etiology of permanent teeth impaction includes several systemic and local factors. Cleidocranial dysplasia, Down syndrome, endocrine deficiencies (hypothyroidism and hypopituitarism), febrile diseases, and irradiation, are some of the systemic factors that may influence impaction of permanent teeth. More commonly, local factors include prolonged deciduous tooth retention, malposed tooth germs, arch-length deficiency, supernumerary teeth, odontogenic tumors abnormal eruption path, and cleft lip and palate.[iii] In recent days the change in the dietary pattern with advancement of civilization from hard food to soft food, probably one single factor which is responsible for reduction in jaw size.[iv]

The most frequently retained teeth are molars (90%), with higher prevalence in mandible (60%) than maxilla (30%), followed by upper canine teeth (5%), lower bicuspids and supernumerary teeth (5%).[v]

Upper and lower 3rd molars are the last teeth to erupt, regardless race and gender, and normally do not erupt at occlusal plane until mandibular growth is

complete.[vivii viii] Where mesio-angulation is the most common in mandible[7], some authors said vertical angulation is most common.[ix 5]

The highest retention incidence of 3rd molar, especially those located in mandible, results in a large number of studies because of their position variations, higher surgical treatment challenges, and their more frequent association to pathologies.[x xi xii xiii] If retained teeth are left within the alveolar ridge, it is likely that one or more problems occur and the patient may present a higher incidence of local tissue morbidity, such as bone and neighboring tooth loss and potential lesion to the surrounding vital structures.[xiv] Among the complications, the most important and common are pericoronaritis and the formation of odontogenic cysts and tumors arising from dental follicle. Therefore, it is important to evaluate the state of third molars, to prevent the aforementioned and other complications, such as periodontal disease, dental caries, root resorption, and mandibular fractures.[xv xvi 6]

Patients & Methods:

The descriptive cross sectional study of 53 impacted mandibular 3rd molar teeth of 33 consecutive patients were done by using Orthopantomogram with following inclusion & exclusion criteria in the Dept of Oral & Maxillofacial Surgery, Dhaka Dental College Hospital.

Inclusion Criteria:

1. Both genders.
2. Age range from 21 to 70 years.
3. Presence of at least one impacted mandibular 3rd molar.

Exclusion criteria :

1. Absence of impacted lower 3rd molar in ortho-pentamograph.
2. Orthopantomograph with absence of name, age & sex marking.

Evaluation Procedure :

In this study 3 types of classification were considered, such as:

1. Winter's classification-
   Based on position of long axis of impacted lower 3rd molar in relation to long axis of lower 2nd molar
2. Pell & Gregory's classification-
   Based on relationship of the impacted lower 3rd molar to the ramus of the mandible and the lower 2nd molar.

Class I: Where there is sufficient amount of space between anterior border of ascending ramus & the distal side of the 2nd molar for the eruption of the 3rd molar.

Class-II: The space between distal surface of 2nd molar & anterior border of ascending ramus is less than mesio-distal diameter of the crown of the 3rd molar

Class-III: When the 3rd molar is located within the ramus of the mandible.

3. Based on depth of the impacted 3rd molar in relation to the occlusal surface of the 2nd molar-

Position A: When highest point of the 3rd molar is at the level of occlusal line or above it

Position B: When the highest point of 3rd molar is below the occlusal level but above the cervical line of 2nd molar.

Position C: When the highest point of 3rd molar is below the cervical line of the 2nd molar.

Result :

The age study subjects ranged from 21 to 70 years with mean age 33.39%.

1. Age & sex wise distribution:

Age Group (Years)	*Total*		*Male*		*Female*	
	Patients	*Teeth*	*Patients*	*Teeth*	*Patients*	*Teeth*
21-30	16 (48.48%)	25(47.17%)	10(30.30%)	15(28.30 %)	6(18.18 %)	10(18.87%)
31-40	11(33.33%)	19(35.85%)	7(21.21%)	13(24.53%)	4(12.12 %)	6(11.32%)
41-50	2(6.06%)	3(5.66%)	0(0%)	0(0%)	2(6.06%)	3(5.66%)
51-60	3(9.09%)	5(9.43%)	3(9.09%)	5(9.43%)	0(0%)	0(0%)
61-70	1(3.03%)	1(3.03%)	1(3.03%)	1(3.03%)	0(0%)	0(0%)

2. Site & Sex wise distribution:

Sex	*Total*	*Bi-lateral*	*Unilateral*		
			Total	*Right*	*left*
Male	21(63.63%)	13(39.39%)	8(24.24%)	7(21.21%)	1(3.03%)
Female	12(36.36%)	7(21.21%)	5(15.15%)	2(6.06%)	3(9.09%)

3. Types of impaction:

Angles classification

Types	*Total*	*Right*	*Left*
Mesio-angular	4(7.54%)	3(5.66%)	1(1.87%)
Disto-angular	1(1.87%)	0(0%)	1(1.87%)
Vertical	39(73.59%)	17(32.09%)	22(41.5%)
Horizontal	8(15.09%)	3(5.66%)	5(9.43%)
Transverse	0(0%)	0(0%)	0(0%)
Inverted	0(0%)	0(0%)	0(0%)
Aberrant	1(1.87%)	1(1.87%)	0(0%)

Pell & Gregory's Classification

Types	*Total*	*Right*	*Left*
Class-I	2(3.78%)	1(1.89%)	1(1.89%)
Class-II	43(81.12%)	20(37.73%)	23(43.40%)
Class-III	8(15.09%)	3(5.66%)	5(9.43%)

Based on depth of the impacted 3rd molar in relation to the occlusal surface of the 2nd molar

Types	*Total*	*Right*	*Left*
Position A	29(54.71%)	14(26.41%)	15(28.30%)
Position B	18(33.97%)	6(11.32%)	12(22.64%)
Position C	6(11.32%)	4(7.54%)	2(3.78%)

Discussion:

A total 33 patients with 53 impacted lower 3rd molar were evaluated radiolographically with age ranged from 21 to 70 years. The maximum number of patients were in 21-30 years group (25 teeth, i.e 47.17%).

Out of 33 patients (53 teeth) of present study, 21 (63.64%) were males and 12 (36.36%) were females. For gender distribution this study is in accordance with study of Hazza'a et al[xvii]. However, studies of Linden et al., Hattab et al., Yamaoka et al., Sandhu and Kapila, and Odusanya and Abayomi showed female predominance.[xviii xix xx xxi xxii]

Highest number of mandibular third molars were in vertically position (39 teeth, i.e 73.59%), followed by horizontal, mesio-angular, and distoangular position. Results of present study are in accordance with the study of Hazza'a et al.[17] as they also found highest number of vertically placed third molars. Rajasuo et al.[xxiii] also found highest number of vertically placed third molars in their study. Number of mesioangular third molars in present study are in accordance with the study carried by Valmaseda-Castellon et al.[xxiv], as they found 358 mesioangular mandibular third molars in a total of 1000 teeth they evaluated, but result was not in agreement for vertically placed, distoangular, and horizontally placed third molars. Linden et al., Hattab et al., Knutsson et al. and Sedaghatfar et al. in their study found maximum number of third molars to be mesioangular.[19 20 xxv xxvi] In study of Richardson[xxvii], he found maximum number of third molars in horizontal position. In another study by Chu et al.[xxviii], they found that maximum number of third molars (80% of 3178 mandibular third molars) were horizontal or mesioangular. These variations in angular position of mandibular third molars may be because of the fact that the studied population in each study was quite different from each other.

Present study shows maximum number of third molars at level A (29 teeth, i.e., 54.71%), followed by level B (18 teeth, i.e., 33.97%) and level C (06 teeth, i.e., 11.32%). Level of eruption in the present study is in agreement with that of Jerjes et al.[xxix] and also with study of Hattab et al. [20] Study of Sandhu and Kaur, Susarla and Dodson found maximum third molars at level B followed by level A and level C[7 xxx].

It is found that 43 out of 53 teeth (81.12%) mandibular third molars are in class II relation, followed by 8 teeth (15.09%) in class I and 2 teeth (3.78%) in class III. Results of present study are in accordance with that of Susarla and Dodson[30] as they also found maximum third molars in class II relations followed by class I and class III relations. Results were not in agreement with that of Jerjes et al.[29] as they found maximum number of mandibular third molars in class I relation followed by class II and class III.

Conclusion:

The pattern of Impaction of mandibular 3rd molar is characterized by high prevalence in male. The most common angulation is vertical, the most common position is position A and the most common class is Class-II. The vertically impacted teeth were mostly in Position B and the horizontally impacted teeth were mostly in Class-III position. Most of the cases site of impaction is bi-lateral. Future studies with larger sample size with multi-centre involvment are required to evaluate the pattern of third molar impaction in mandible in Bangladeshi patients.

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