RADIOLOGICAL ASSESSMENT OF IMPACTED MANDIBULAR THIRD MOLAR TEETH

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ABSTRACT-

Objective: The study was to evaluate impacted mandibular third molars (IM3M) for their angulation, level of eruption, third molar space.

Methods: Total 59 IM3M were studied in 30 individuals of age 18 years and above, dividing them into right and left sides. The choice of radiograph used for this study was orthopantomogram. Individuals were also divided according to age, sex of the individual IM3M. Panoramic radiographs were obtained after written consent and traced.

Result: Out of 30 individuals 23 (77%) were males and 7 (23%) females. Maximum number of IM3M were in 18-27 years age group (14 i.e. 61%). Out of 59 IM3M, 58% were mesioangularly placed. 49% IM3M were found at level B. Class III (41%) was the most common relation for third molar space.

Conclusion and significance: Panoramic radiographs can be used as reliable investigation for evaluation of IM3M.

INTRODUCTION-

The removal of impacted third molars is the most common procedure in the specialty of Oral and Maxillofacial surgery. The procedure can be simply performed using elevators and/or forceps, but may require surgical intervention. This increases the risk of complications, such as nerve paresthesia, alveolar osteitis, hemorrhage, or even fracture of the jaw [1].

Currently, the panoramic radiograph is the technique of choice to evaluate impacted mandibular third molars. All the impacted mandibular third molar included in the study were evaluated for type of angulation, level of eruption (depth of impaction), available space on the basis of panoramic radiographic presentation, also the intergroup and intragroup relation was evaluated for any significant difference.

SUBJECTS AND METHODS-

The present study consisted of 30 subjects. These were divided according to findings of right and left sides of mandibular third molars, age, and sex. Patients over 18 year of age visiting the Department of Oral Medicine and Radiology were evaluated. Patients were divided into three age groups. Age range of first group was 18 years to 27 years, age range of second group was 28 years to 37 years, and age range of third group was 38 years and above.

Exclusion criteria: any patient with history of extraction of permanent tooth, mandibular fracture, or orthodontic treatment was excluded from the study, also patients with developmental anomaly, congenital or systemic disease and/or major pathology in the mandible that has/had caused severe bone resorption/destruction, bone expansion, root resorption, and tooth migration were excluded from the study. Also third molars having underdeveloped roots (radiographically third molars having less than two-third root formation) were excluded [2], and considered as underdeveloped.

Patients were examined clinically under aseptic condition and informed consent was obtained. Radiographs were taken according to Panoramic Machine specification, which has a constant magnification of 1.2. Exposed panoramic films were processed manually by visual inspection method. Outline of the lower border of mandible, mandibular condyle and coronoid, anterior and posterior border of ramus of the mandible along-with all the first molars were traced as reference point. Outline of mandibular first molar, second molar and third molar of right and left sides were traced. Following Ganss Method [5], occlusal plane was drawn through the tip of the most superior cusps of the first premolar and the tip of the most superior mesial cusps of second molar, extending up to anterior border of the ramus of the mandible. A perpendicular line was drawn from the occlusal plane touching the most distal point of the second molar.

The available third molar space was determined as the distance between the intersection of the occlusal plane with the anterior border of the ramus and the intersection of the vertical line with the occlusal plane. Also the mesiodistal width of the third molar crown was recorded. If the available space is more or equal to mesiodistal diameter of third molar, it was considered as Class I (adequate space for eruption of a third molar if eruption could occur), if the available space was less than mesiodistal diameter of third molar it was considered as Class II (partial space between posterior of the second molar and the ascending ramus of the

mandible), and if the tooth was located completely within the mandibular ramus it was considered as Class IIII (the retromolar space is obliterated because the ascending ramus of the mandible was located immediately posterior to the second molar) [6, 7].

Level of eruption was recorded level A when there was crown to crown position between impacted third molar and second molar, level B when there was crown to cervical position between impacted third molar and second molar, and level C when there was crown to root position between third molar and second molar [2, 6–9].

Out of total 30 subjects, 23 (77%) were males and 7 (23%) were females. Mean age of the total male patients was 29 years. Mean age of the total female patients was 28 years.

After combining all the groups, a total of 60 sites were evaluated. Out of that, 59 impacted mandibular third molars were included in the study as 1 mandibular third molars was missing. A total of 34 (58%) impacted mandibular third molars were mesioangular, 3 (5%) impacted mandibular third molars were distoangular, 11 (19%) impacted mandibular third molars were horizontal, and 11 (19%) impacted mandibular third molars were vertical. There was significant difference between the angulations of different groups (considering $P < .05$). No significant difference between the angulation was found when right and left sides were compared.

Out of 59 impacted mandibular third molars included in the study 24 (41%) impacted mandibular third molars were at level A, 29 (49%) impacted mandibular third molars were at level B, and 6 (10%) impacted mandibular third molars were at level C. There was highly significant difference between the level of eruption of third molar in different groups (considering $P < .0001$). No significant difference between the level of eruption was found when right and left sides were compared.

Out of 59 impacted mandibular third molars, 20 (34%) impacted mandibular third molars were in class I relation, 15 (25%) impacted mandibular third molars were in class II relation, and 24 (41 %) impacted mandibular third molars were in class III relation. There was significant difference between the third molar spaces in different groups (considering $P < .05$). No significant difference between the third molar spaces was found when right and left sides were compared.

DISCUSSION-

Out of 30 samples of present study, 23 (77%) were males and 7 (23%) were females. For gender distribution this study is in accordance with study of Hazza [10] However, studies of Linden, Hattab, Yamaoka, Sandhu and Kapila, and Odusanya and Abayomi showed female predominance [11, 13–16]. This lack of definitive sex predominance in the third molar impaction raised the question against Hellmen's statement that the jaws of the females stop growing when third molar just begin to erupt, whereas in males the growth of the jaws continues beyond the time of third molar [14].

Highest number of mandibular third molars were in mesioangular position (34, i.e., 58%), followed by vertical (19%) , horizontal (19%) , and distiangular position (5%). Results of present study is in accordance with the study of Valmaseda-Castellon [20] as they also found highest number of mesioangular placed third molars followed by vertical, horizontal, and distoangular third molars. Rajasuo [19] found highest number of vertically placed third molars in their study. Number of vertically placed third molars are seen in the study carried by Hazza [10]. Linden, Hattab, Knutsso and Sedaghatfar in their study found maximum number of third molars to be mesioangular [3, 13, 14, 17]. In study of Richardson [21] he found maximum number of third molars in horizontal position. In another study by [22], 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 B (29, i.e., 49%), followed by level A (24, i.e., 41%) and level C (6, i.e., 10%). Level of eruption in the present study is in agreement with that of Sandhu and Kaur, Susarla and Dodson found maximum third molars at level B followed by level A and level C [2, 23]. Jerjes [1] and also with study of Hattab [14] results show that level A of eruption is maximum followed by level B and level C.

In the present study it was found that 24 (41%) mandibular third molars are in class III relation, followed by 20 (39%) in class I and 16 (25%) in class III. Results of present study are not in accordance with that of Susarla and Dodson [23] as they 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 [1] as they found maximum number of mandibular third molars in class I relation followed by class II and class III. An important variable to predict the eruption of third molar is mesiodistal space, measured from a panoramic radiograph. Lack of space seems to be major cause of abortive eruption. However eruption cannot be guaranteed, despite adequate space available in the jaw [2]. Hattab and Abu Alhaija [6] reported that the space behind the second molar was reduced in 90% of cases with mandibular third molar impaction. Radiographic techniques used to assess lower third molar space and mandibular linear dimensions and angles's panoramic radiography yielded one of the most accurate estimations [6, 24]. Lack of space is single most important cause of impaction of third molars. The average space/crown width ratio was 1:1 for erupted group and 0.8 for the

impacted group [6]. But according to Ventä [2, 25]. It may be inaccurate to predict the eruption of third molars before the age of 20 years because of continuously positional changes of the third molars during further development.

In the present study, 6 (10%) level C impacted mandibular third molars have less chance to erupt into the oral cavity, as they are in the mean age group of 36.8 years. This level C teeth are required to be observed in their eruption process, and those of symptomatic will require surgical removal. 29 (49%) of third molars may erupt in the oral cavity as they were at the occlusal level of second molar, if there is no any other obstruction like dense soft tissue/bony covering, reduced third molar space or mesioangular, distoangular and horizontal position of the third molar.

From the present study it is concluded that only 24 (41%) of third molars had sufficient space for eruption and may erupt. 15 (25%) showed increased mesiodistal width of crown when compared to the space available between distal to second molar and anterior border of ramus of the mandible, 3 (5%) impacted mandibular third molars had no chance of eruption from the radiographic analysis as there was no space available, these teeth will not erupt in the oral cavity and should be followed.

CONCLUSION-

The panaromic radiograph is used to evaluate impacted mandibular third molars (IM3M) for their angulation, level of eruption, third molar space. In conclusion panoramic radiograph can also be used as a valuable predictor of outcome of the impacted mandibular third molars position, as they appear to have quite good cost-information ratio.

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