A Study of Mandibular Third Molar Impaction Audit at Outpatient Department of Oral Surgery Department of College of Dental Science, Amargadh District, Bhavnagar, Gujarat

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Introduction
Impaction of the tooth is a pathological condition, in which teeth fail to erupt in oral cavity within expected time.1,2 Guidelines from British Association of Oral and Maxillofacial Surgeons and the Royal College of Surgeons of England Faculty of Dental Surgery have included definitions of an unerupted tooth as that which is lying in the jaws, entirely covered by soft tissue, and partially or completely covered by bone.³

Any tooth can become impacted in the oral cavity, but the third molar is the most commonly found impacted tooth in the oral cavity and it accounts for 98% of all impactions.¹,²

The surgical removal of impacted third molars is one of the most common procedures performed in the specialty of oral surgery since these impacted third molar teeth are often associated with pathological conditions including caries, pericoronitis, cystic lesions, periodontitis, neoplasms, or root resorption.¹,⁴ Many impacted teeth may eventually erupt normally and can stay asymptomatic for a long period without creating disturbance for patient.³⁴

The aim of the present study was to determine clinical parameters, as well as angulation, level, pattern, and position of the impacted mandibular third molar.

Materials and Methods
Inclusion criteria
1. Complete root formation of impacted mandibular third molars
2. Patients with chief complaints related to mandibular impacted third molars
3. Patients ready to give informed consent.

Exclusion criteria
1. Incomplete root development of the third molar
2. Poor quality orthopantomogram
3. Patients younger than 20 year
4. Presence of maxillofacial trauma
5. Presence of any systemic anomaly or syndrome
6. Patients with history of extraction of any mandibular molar tooth.

Total of 500 mandibular third molars were examined in 308 patients. Both sides’ mandibular third molars were taken into consideration. For each patient, a number of variables were recorded including demographic details (age and sex), side (right or left), and rural or urban population.

Assessment of impaction in terms of angulations, eruption status, patterns, positions, and their associated pathologies was done by detailed relevant history, clinical examination, and radiographs, i.e., periapical and panoramic views.

Angulation of impacted mandibular third molar
Angulation of impacted mandibular third molars was assessed by Winter’s classification, and teeth were labeled as mesioangular, distoangular, vertical or horizontal, and other impactions (buccal, lingual, or transverse).

Pattern and position of impacted mandibular third molar
Pattern and position of impacted third molar were documented according to Pell and Gregory classification.
Class I: Space between anterior border of ramus and distal surface of the second molar was sufficient.
Class I: Space was less than the mesiodistal diameter of impacted tooth.
Class III: A tooth completely into ramus.

Position of impacted mandibular third molar
Position A: Third molar with its highest part at the level of occlusal plane of the second molar.
Position B: Impacted tooth was between occlusal plane and cervical margin of the second molar.
Position C: A tooth below cervical margin.

Results
Out of 338 patients examined, 30 (8.8%) patients showed the absence of mandibular third molar. A total of 500 impacted third molars audit was done in 308 patients. About 192 patients were having their both mandibular third molars impacted, whereas 116 patients were having only one-sided third molar impacted. Most of the patients (52%) belong to the age group of 20-25 years (Table 1). Most of the mandibular third molars impacted were seen in females (59.6%) (Table 2). The impacted mandibular third molars were seen more commonly in urban population (54.4%) as compared to the rural population (Table 2 and Graph 1). The most common angulation was seen to be mesioangular (49.2%) (Figures 1 and 2) followed by distoangular (26.8%) and vertical impaction (Figure 3).

About 60% third molars were partially erupted, and 26% were unerupted into the oral cavity (Table 4 and Graph 3). On consideration of the pattern of the eruption, 50.8%, 35.6%, and 13.6% were seen in Class I, II, and III pattern, respectively, whereas 46.8%, 19.2%, and 34% were seen in Position A, B, and C, respectively (Table 4, Graphs 4, and 5). Shows the distribution of patients with associated pathologies. In 48.6% cases, no pathology was seen and most commonly seen lesion was caries observed in 28% cases (Table 5 and Graph 6).

Discussion
Facial growth, tooth size, and jaw size differ between different races and population groups and definite inheritance patterns are present between these races. This racial variation is
important to the impaction status, eruption pattern, and incidence of agenesis of third molars. The cause of agenesis of one or more teeth is still unknown, but several reasons such as physical disruption of the dental lamina, space limitation, and an inherent defect of the dental lamina, or failure of induction of the underlying mesenchyme have been suggested.7

Various theories have been put forward to explain the etiology of third molar impaction, and this includes lack of essential eruption force for third molars, hereditary factors,
decreased growth at the posterior part of the mandible, and insufficient mesial shifting of the dentition of modern men as there is a lack of interproximal attrition. The theory of phylogenetic regression of the jaw size found to be widely accepted.6

There is diversity in opinion concerning the growth of the jaw bones as affected by masticatory function. Brash and Brodie studied that the size of the jawbone was affected by inherent genetic factors and that environmental condition was of little influence. Roger and Stillman, however, suggested that functional stimulus is essential consideration and that without this functional stimulus jawbones were not likely to develop to their fullest extent and providing space for the third molar to erupt.6

Usually, the risks associated with the surgical third molar removal are generally minor, such as pain, bleeding, infection, swelling, and dry socket. Some more serious complications can occur, such as injury to the temporomandibular joint, trismus, or permanent paresthesia. Furthermore, as many third molars are surgically removed, the costs of this procedure can be significant.6-10 Sinha and Pai have shown the importance of IOPA and cone-beam computerized tomography for assessing the proximity of impacted mandibular third molar roots to the mandibular canal, to avoid damage to the inferior alveolar nerve during surgery.11

Some of the important criteria that indicated for surgical removal of impacted third molar are the consensus recommended by National Institute of Health which includes recurrent pericoronitis, severe dental caries, periodontal disease, internal or external root resorption, and association of impacted tooth with pathologic oral lesions.9

The present study was carried out on patients over 20 years of age, because by this age, we can differentiate more reliably if the third molar has insufficient space, improperly positioned or its root formation has completed or not.1

In present study, 8.8% patients showed agenesis of the third molar, which was slightly higher than that observed in study by Byahatti and Ingafou7 and Saini et al.12 In present study, 52% patients were belonging to the age group of 20-25 years, which was also seen in study by Nazir et al., Byahatti and Ingafou,7 and Obimakinde et al.9 In our study, there was female predilection was observed, which was also in accordance to the study by Nazir et al.1 and Obimakinde et al.9 The literature also holds a significantly higher frequency of impacted third molars in females, the findings of current study also showed female preponderance. These observations are in favor of Hellman’s theory which states that jaws of females stop growing when third molars just start to erupt, whereas in males growth of jaws continues after the time of eruption of third molars and results in decreased incidence of third molar impactions in males compared to females.1,13

The present study, it was observed that mandibular third molar impaction was predominantly had urban predilection (54.4%), which was also observed in study by Olasoji and Odusanya.6

As classification systems vary across different studies, it is difficult to compare the prevalence of the different angulations of impaction.11 Mesioangular impaction was the most commonly seen type of impaction, and distoangular impaction was the second most common type of impaction, and we found a similar result in our study (49.2%). This was in accordance

### Graph 6: Distribution of patients according to associated pathology.

### Table 4: Distribution of impacted mandibular third molars according to eruption status, pattern of impaction, and position of impacted tooth.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Number of impacted mandibular third molars (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eruption status</td>
<td></td>
</tr>
<tr>
<td>Partially erupted</td>
<td>300 (60.0)</td>
</tr>
<tr>
<td>Erupted</td>
<td>70 (14.0)</td>
</tr>
<tr>
<td>Unerupted</td>
<td>130 (26.0)</td>
</tr>
<tr>
<td>Pattern of impaction</td>
<td></td>
</tr>
<tr>
<td>Class I</td>
<td>258 (50.8)</td>
</tr>
<tr>
<td>Class II</td>
<td>178 (35.6)</td>
</tr>
<tr>
<td>Class III</td>
<td>68 (13.6)</td>
</tr>
<tr>
<td>Position of impacted tooth</td>
<td></td>
</tr>
<tr>
<td>Position A</td>
<td>234 (46.8)</td>
</tr>
<tr>
<td>Position B</td>
<td>96 (19.2)</td>
</tr>
<tr>
<td>Position C</td>
<td>170 (34.0)</td>
</tr>
</tbody>
</table>

### Table 5: Distribution of impacted mandibular third molars according to position.

<table>
<thead>
<tr>
<th>Associated pathology</th>
<th>No lesion (%)</th>
<th>Caries (%)</th>
<th>Bone loss on distal aspect (%)</th>
<th>Root resorption (%)</th>
<th>Any other lesion associated (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of impacted mandibular third molars</td>
<td>243 (48.6)</td>
<td>140 (28)</td>
<td>59 (11.8)</td>
<td>33 (6.6)</td>
<td>25 (5)</td>
</tr>
</tbody>
</table>
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with the study by Byahatti and Ingafou and Amanat et al., in which mesioangular impaction was found in 41.6% and 52% of cases, respectively. Similar to the result of Quek et al., our study showed that bilateral impaction was more common. In our study, unerupted teeth were observed in 26% cases, which were in contrast to study by Saini et al., who observed 6.2% unerupted mandibular third molar teeth in their study. Most common observed lesion in our study cases was caries (28%), which was in accordance to the study by Jung and Cho.

The primordial germ of the third molar is said to develop high up in the mandibular ramus area with its occlusal surface slanting slightly mesially or sometimes, horizontally, and the developing crown then moves in response to postural change in the mandible induced by growth. Cessation of jaw growth before complete uprighting of the crown will most likely trap the developing tooth in a mesioangular position.

Thus, present study showed that the mandibular third molars were more commonly found impacted in the third decade of life, in female patients and in urban population. Mesioangular impaction was more commonly seen followed by distoangular impaction and partially impacted teeth were more commonly seen, and the pattern and position more commonly observed were Class I and Position A.

Conclusion
This study provided several indicators useful for audit, especially analysis of the clinical and radiological parameters such as eruption status, pattern of eruption, angulation, and position of impacted mandibular third molars.

References