

# Study of patterns and prevalence of mandibular impacted third molar amongst Indore's population- A retrospective study

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## ABSTRACT

**Background:** Impacted third molar removal is one of the common minor oral surgical procedures performed in routine dental practice. The cause of third molar impaction is due to inadequate space in the mandible, which may lead to pericoronitis, dental caries, and cystic lesions. **Aim of the study:** To study patterns and prevalence of mandibular impacted third molar amongst Indore's population. **Materials and methods:** The present study was conducted in the Department of Dentistry of Index medical college, Hospital & Research Centre. For the study, we studied 100 panoramic radiographs of 100 patients retrieved from the medical records at the Department of Dentistry. Demographic information regarding age and sex of patients and clinical information were collected in a checklist. The pattern of impaction was determined based on the depth of impaction, position relative to the mandibular ramus and angle of impaction relative to the occlusal plane. Depth of impaction was defined as the relationship of cemento-enamel junction (CEJ) of third molar relative to the bone crest according to the Pell and Gregory's classification. Position relative to the mandibular ramus was determined as the position of the distal surface of the third molar crown relative to the anterior border of the ascending ramus using Pell and Gregory's classification. **Results:** Radiographs of 230 patients were studied. We observed that impacted mandibular 3rd molar was seen among 100 patients. We observed that males were 55 % and females were 45%. It was observed from the results that bilateral mandibular 3rd molar impaction was most common in males and females. The number of patients were highest in 31-40 years age group. Left side mandibular 3rd molar impaction was most commonly seen in 18-30 years and 31-40 years age group. Right side mandibular 3rd molar impaction was most commonly seen in 41-50 years and 51-58 years age group. The results were found to be statistically non-significant. **Conclusion:** Mandibular 3rd molar was quite common in the study population. The bilateral impaction was most common. For right side, type C molar impaction was most common, and type B was most common for left side.

**Keywords:** molar impaction, mandibular third molar impaction, type of impaction

## INTRODUCTION

Impacted third molar removal is one of the common minor oral surgical procedures performed in routine dental practice. Tooth is considered impacted when its eruption into normal functional occlusion has been interfered with teeth, overlying bone, or soft tissue and it is not fully erupted by its expected age of approximately 20 years.<sup>1</sup> The third molar is the commonly impacted tooth with a frequency of 18%– 32%.<sup>2</sup> In third molar impaction, panoramic radiographs are used generally to assess the angular position, level of impaction, amount of covering bone, and relationship between inferior alveolar canal with the third molar. The frequency of third molar impaction varies substantially among different populations and was reported to range from 18% to 70%. This can be attributed to racial variation in the pattern of facial growth, jaw, and tooth size, which are crucial determinants of the eruption pattern.<sup>3</sup>

The cause of third molar impaction is due to inadequate space in the mandible, which may lead to pericoronitis, dental caries, and cystic lesions.<sup>4,5</sup> Panoramic radiograph orthopantomogram (OPG) is considered the technique of choice for evaluation of the status of third molar impaction with regards to the angulation of impaction, level of impaction, and amount of covering bone. In addition, OPG is used to evaluate the relationship between third molars with inferior alveolar canal.<sup>6</sup> According to Castella et al., the third molar impaction in the mandible was a predictable event both in extraction and non-extraction patients.<sup>7</sup> Hence, the present study was conducted to study patterns and prevalence of mandibular impacted third molar amongst Indore's population.

## MATERIALS AND METHODS

The present study was conducted in the Department of Dentistry of the Medical institution. The ethical clearance for the study was approved from the ethical committee of the hospital. For the study, we studied panoramic radiographs of 230 patients

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retrieved from the medical records at the Department of Dentistry. The inclusion criteria were good-quality panoramic radiographs of patients and availability of information regarding age and sex of patients. Radiographs of patients with a history of mandibular second molar or third molar extraction, maxillofacial anomalies and history of trauma to the maxillofacial region were excluded.

Demographic information regarding age and sex of patients and clinical information were collected in a checklist. Panoramic radiographs of patients were evaluated by a trained dentist under standard conditions. Intra-examiner reliability was calculated to be 1, which indicated excellent intra-examiner agreement. Third molars with complete roots but without functional occlusion were considered to be impacted. The pattern of impaction was determined based on the depth of impaction, position relative to the mandibular ramus and angle of impaction relative to the occlusal plane.

**Depth of Impaction**

Depth of impaction was defined as the relationship of cemento-enamel junction (CEJ) of third molar relative to the bone crest according to the Pell and Gregory’s classification, which was classified as follows: (A) CEJ above the bone crest; (B) Part of CEJ below the bone crest; and (C) Entire CEJ below the bone crest.

**Position Relative to the Mandibular Ramus**

Position relative to the mandibular ramus was determined as the position of the distal surface of the third molar crown relative to the anterior border of the ascending ramus using Pell and Gregory’s classification:

Class I: Distal surface of molar tooth in front of the anterior border of ramus (ramus not covering the crown).

Class II: Distal surface of molar tooth posterior to the anterior border of ramus (part of crown covered by the ramus).

Class III: Distal surface of molar tooth posterior to the anterior border of ramus (complete crown coverage by the ramus).

**Angle of Impaction**

The angle of impaction was defined as the angle between the longitudinal axes of the second and third molars according to Winter’s classification: Vertical: -10 to +10°; Mesioangular: 11 to 79°; Horizontal: 80 to 100°; Distoangular: -11 to -79°; Buccolingual: Superimposition of crown and roots and Others: 111 to -80.

The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student’s t-test were used for checking the

significance of the data. A p-value of 0.05 and lesser was defined to be statistically significant.

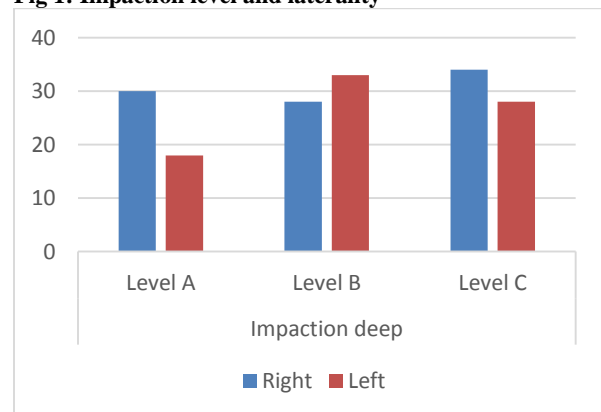
**RESULTS**

In the present study, we studied patterns and prevalence of mandibular impacted third molar amongst Indore’s population. Radiographs of 230 patients were studied. We observed that impacted mandibular 3<sup>rd</sup> molar was seen among 100 patients. Table 1 shows the demographics distribution and impaction distribution. We observed that males were 55 % and females were 45%. It was observed from the results that bilateral mandibular 3<sup>rd</sup> molar impaction was most common in males and females. The number of patients were highest in 31-40 years age group. Left side mandibular 3<sup>rd</sup> molar impaction was most commonly seen in 18-30 years and 31-40 years age group. Right side mandibular 3<sup>rd</sup> molar impaction was most commonly seen in 41-50 years and 51-58 years age group. The results were found to be statistically non-significant. (p>0.05) Table 2 shows frequency distribution of the level of impaction according to the side. It is evident that level C impaction had highest frequency for right side impaction, and level B impaction had highest frequency for left side frequency. The results on comparison were found to be statistically non-significant. (p>0.05) [Fig 1]

**Table 1: Demographics distribution and impaction distribution**

| Variables         |               | Right | Left | Bilateral | p-value |
|-------------------|---------------|-------|------|-----------|---------|
| Gender            | Male (n=55)   | 15    | 10   | 30        | 0.33    |
|                   | Female (n=45) | 16    | 8    | 31        |         |
| Age-group (years) | 18-30 (n=22)  | 8     | 11   | 3         | 0.82    |
|                   | 31-40 (n=33)  | 12    | 14   | 7         |         |
|                   | 41-50 (n=25)  | 11    | 5    | 9         |         |
|                   | 51-58 (n=20)  | 9     | 7    | 4         |         |

**Fig 1: Impaction level and laterality**



**Table 2: Frequency distribution of the level of impaction according to the side**

| Side  | Impaction deep |         |         | Total | P-value |
|-------|----------------|---------|---------|-------|---------|
|       | Level A        | Level B | Level C |       |         |
| Right | 30             | 28      | 34      | 92    | 0.51    |
| Left  | 18             | 33      | 28      | 79    |         |

## DISCUSSION

In the present study, we studied medical records of 230 patients. We observed that 100 patients had mandibular 3<sup>rd</sup> molar impaction. Among the patients found to have 3<sup>rd</sup> molar impaction, males were 55 % and females were 45%. Bilateral mandibular 3<sup>rd</sup> molar impaction was found to be most common. In addition, it was observed that level C impaction had highest frequency for right side impaction, and level B impaction had highest frequency for left side frequency. The results were found to be statistically non-significant. The results were compared with previous studies from the literature and were found to be consistent with the results. Deshpande P et al <sup>8</sup> assessed the radiographic proximity of impacted mandibular third molars to the inferior alveolar canal on panoramic radiographs. The study comprised of 64 subjects with 68 symptomatic impacted mandibular third molars for whom panoramic radiographs were made. The radiographs were interpreted for type of impaction, radiographic distance between impacted mandibular third molars to inferior alveolar canal and presence of one or more of the seven radiographic risk predictor signs. The overall mean distance from the impacted mandibular third molars to inferior alveolar canal was -0.50 mm. Most of the samples (61.8 %) extended beyond the superior border of the inferior alveolar canal with a mean distance of -1.40 mm. Mesioangular impactions were found to be in the close proximity (-1.14 mm) to inferior alveolar canal than any other type. Guthua S et al <sup>9</sup> analysed 110 records of patients who presented with impacted mandibular 3<sup>rd</sup> molars was carried out to determine the frequency of occurrence of unilateral and bilateral impactions and their characteristics. 68.2% of the patients had bilateral impactions. Among the patients with bilateral impactions, 72% had mesioangular impaction occurring either bilaterally or in combination with other types of impaction. Furthermore, 38.7% mesioangular impactions were observed on the right and left sides in the patients with bilateral impactions. Among the patients with unilateral impactions 40.2% presented with mesioangular impaction, while 25.7% presented with distoangular impactions.

Gbotolorun OM et al <sup>10</sup> investigated the pattern of presentation of impacted Mandibular third molars, the indications for extraction and the post operative complications after this procedure at the Lagos University Teaching Hospital. Three hundred and

thirty one (331) Mandibular third molars were extracted from 329 patients. The ages ranged from 17 to 55 years with a mean of 26.63 (+/- 7.39). There were 153 males and 176 females; with male to female ratio was 1:1.15. Recurrent Pericoronitis was the most common indication for extraction (209 extractions; 63.1%), while the mesioangular impaction was the most common angulation (117 impactions; 53.4%). 47 (14.2%) of the extractions had postoperative complications and dry socket which occurred in 25 (53.2%) cases was most common. Akarslan ZZ et al <sup>11</sup> evaluated the associated symptoms, pathologies, positions, and angulation types of bilateral occurring mandibular third molars among a group of young adult patients. A total of 342 patients (167 females, 175 males), aged between 20 and 25 years (mean: 22.2, SD: 1.8) participated in the study. Clinical and radiographic examinations were performed. No significant difference was found between the symptoms and pathologies related with the mandibular right third molar (RM) and the left third molar (LM) among both groups and genders. In the total sample, no significant difference was found between the RM and the LM in terms of mucosal coverage type, bony coverage type, and position both in group 1 and group 2; but gender had an influence on the bony coverage type and ramus distance of the RM and the LM in group 2. In the total the sample, symmetry was present for horizontal or distoangular and vertical or distoangular angulations in group 1 and group 2, respectively. Gender was found to also have an impact on angulation symmetry. Obiechina AE et al <sup>12</sup> studied three hundred and thirty eight patients between the ages of 16 and 54 years. They presented with 473 impacted mandibular third molars. A total of 341 (72.09%) impaction were seen in patients between the ages of 16 to 25 years, while 420 (88.8%) impaction were seen between the ages of 16 to 30 years. Assessing the level of impaction using Pell and Gregory classification showed that 358 (54.55%) impaction were in position A, 151 (31.92%) were in position B while 64 (13.53%) were in position C. One hundred and seven (22.62%) were in position I, 288 (60.89%) were in position II, while 78 (16.49%) were in position III. Of the 473 impacted mandibular third molars, 323 (68.29%) had symptoms of pain. Two hundred and seventy two (57.51%) impacted teeth were associated with pathology. Out of these, 203 (42.92%) were pericoronitis and periodontal disease, 66 (13.95%) were caries, while 3 (0.63%) were associated with cysts.

## CONCLUSION

Within the limitations of the present study, it can be concluded that mandibular 3<sup>rd</sup> molar was quite common in the study population. The bilateral

impaction was most common. For right side, type C molar impaction was most common, and type B was most common for left side.

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