

Evaluation of Pattern and Indications for Extraction of Impacted Mandibular Third Molar: An Institute Based Observational Study

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ABSTRACT

Aim

To evaluate the patterns and clinical indications for the removal of impacted mandibular third molars. The study aims to enhance treatment planning by understanding angulation types and associated pathologies prompting extraction.

Materials and Methods

Over the course of three months (March–May 2024), 45 patients were the subjects of this observational study at Bareilly International University, Department of Oral and Maxillofacial Surgery. Orthopantomograms (OPGs) and clinical examinations were used to evaluate impaction patterns using Winter's and Pell & Gregory's classifications.

T-tests with a 95% power were used to assess the data.

Results

Overall, mesioangular impaction was more prevalent, especially in females, whereas vertical impaction was more common in males. Pericoronitis, inflammation, swelling, and trismus were the primary clinical indications for extraction; trismus was more common in females and pain was more common in males.

Conclusion

The most common type of impaction in mandibular third molars is mesioangular. The most common reason for extraction continues to be recurrent pericoronitis. For the most effective patient care, early

diagnosis along with individualized assessment based on clinical and radiographic results are crucial.

Keywords

Mandibular third molar, Tooth impaction, Mesioangular impaction, Third molar in the mandible, wisdom tooth, Mesioangular impaction, tooth impaction, Pericoronitis Winter's classification, Gregory and Pell classification, oral surgery, indications for the extraction process, assessment of radiography Pericoronitis, Winter's classification, Pell and Gregory classification, Oral surgery, Indications for extraction, Radiographic evaluation.

INTRODUCTION

The most often impacted tooth in the human mouth is the mandibular third molar, also known as the wisdom tooth. Tooth that did not erupt into the dental arch within the normal developmental time frame are known as impacted teeth. This is usually the result of insufficient space, unfavorable angulation, or obstruction by nearby structures. Due of its distinct developmental and anatomical placement, the mandibular third molar has the highest rate of impaction among them. It has been noted that the prevalence of impacted third molar teeth ranges from 18 to 30%.¹

In recent decades, there has been noticeable growth in the impaction phenomenon. The impaction has numerous causes. A few of these include a decrease in the frequency of tooth loss, a lack of retromolar space, a small jaw, and genetic linkage. Given their varied expressivity, the MSX1 and AXIN2 genes could be regarded as elements of the genetic background.²

Based on angulation types of impaction can be horizontal, vertical, mesioangular, distoangular, transverse impactions are among the several impaction patterns that bring different therapeutic

considerations and difficulties.³ In addition to helping to classify impacted mandibular third molars, clinical and radiographic assessments also help to identify and differentiate other related disorders.^{4,5}

One of the most common surgical procedures performed in oral and maxillofacial surgery is the extraction of impacted mandibular third molars. Extraction can be done for a variety of reasons, it can be due to prevention to avoid future problems like caries, periodontal disease, or cystic alterations, or for symptomatic ones like pericoronitis, pain, or infection.^{6, 7}

Effective treatment planning involve an understanding of the patterns and indications for the extraction of impacted mandibular third molars. The surgical strategy and potential problems are mostly determined by factors such the impaction's angulation, depth, and relationship to neighboring structures.⁸

In order to gain an understanding of the factors impacting extraction decisions, improve treatment planning, and ultimately improve patient outcomes in dental care, this study aims to evaluate patterns of impaction and assess the clinical and prophylactic indications for removal of impacted mandibular third molars in a defined population.

AIM

To evaluate the pattern and indications for removal of impacted mandibular third molar.

OBJECTIVE

- To evaluate the different patterns of impacted mandibular third molar.
- To evaluate the common indications for extraction of impacted mandibular third molars.

MATERIALS AND METHODS

This was the observational study and was carried out in the Department of Oral and Maxillofacial Surgery,

Institute of Dental Sciences, Bareilly International University, Bareilly, over a period of three months, from March 2024 to May 2024.

Sample Size: 45

t tests - Means: Difference from constant (one sample case)

Analysis: A priori: Compute required sample size

Input: Tail(s) = One
Effect size d = 0.5
 α err prob = 0.05
Power (1- β err prob) = 0.95

Output: Noncentrality parameter δ = 3.3541020
Critical t = 1.6802300
Df = 44
Total sample size = 45
Actual power = 0.9512400

The sample size was determined using G*Power software (Franz Faul, University of Kiel, Germany) A sample size of 45 patients would yield a power of 95%. The t test was used to compare means with effect size of 0.5 (According to Subedi S, et al.,)⁴ and significance level at 0.05.

Patients over the age of eighteen who presented with fully developed roots of impacted mandibular third molars, with or without related diseases, and who had pre-extraction radiographs available were included in the study. Only patients classified under the American Society of Anesthesiologists (ASA) physical status I and II were considered eligible. Patients were excluded if they had maxillofacial trauma, systemic disorders, or craniofacial anomalies/syndromes such as Down syndrome or cleidocranial dysostosis; absence of the mandibular second molar;

unwillingness to undergo extraction; or failure to provide consent for participation.

METHOD

All eligible patients presenting to the Department of Oral and Maxillofacial Surgery, Institute of Dental Sciences, Bareilly International University, were examined according to the study protocol. A customized case history proforma was used to record demographic details, clinical findings, and radiographic observations.

Pre-extraction panoramic radiographs (orthopantomograms, OPG) were obtained for all patients, ensuring optimal image quality, proper head positioning, adequate film density and contrast, and clear visualization of the lower border of the mandible, posterior border of the ramus, and third molar region. Only radiographs meeting these quality standards were included for analysis.

The pattern of impaction for each mandibular third molar was assessed using Winter's classification⁹ (based on the angulation of the impacted tooth) and Pell and Gregory's classification¹⁰ (based on the relationship of the tooth to the ramus and occlusal plane). Clinical examination was performed to identify symptoms or signs indicating the need for extraction, including pericoronitis, pain, swelling, and trismus.

Indications for removal were determined by correlating clinical findings with radiographic evidence. Both newly diagnosed and previously recorded cases from the outpatient department were included, provided they met the inclusion criteria. All collected data were entered into a master chart for systematic analysis.

Assessment Criteria were

- The pattern of impaction for each case was documented according to Winter's classification⁹ and Pell and Gregory's classification¹⁰ systems.
- Indications for removal of impacted mandibular 3rd molar will be assessed using clinical diagnosis and will be correlated with OPG.

RESULT

The study comprised 45 patients, including 24 males (53.33%) and 21 females (46.67%) (Figure 1, Figure 2). Analysis of impaction patterns showed that mesioangular impaction was the most common in

females, whereas vertical impaction was the most frequent in males (Figure 3).

Regarding indications for extraction, pericoronitis, pain, swelling, and trismus were the main clinical reasons identified (Figure 4). Pain was reported more frequently by males, while trismus was observed more commonly in females.

These findings indicate a gender-based variation in both the pattern of impaction and the predominant clinical presentation prompting surgical removal of impacted mandibular third molars.

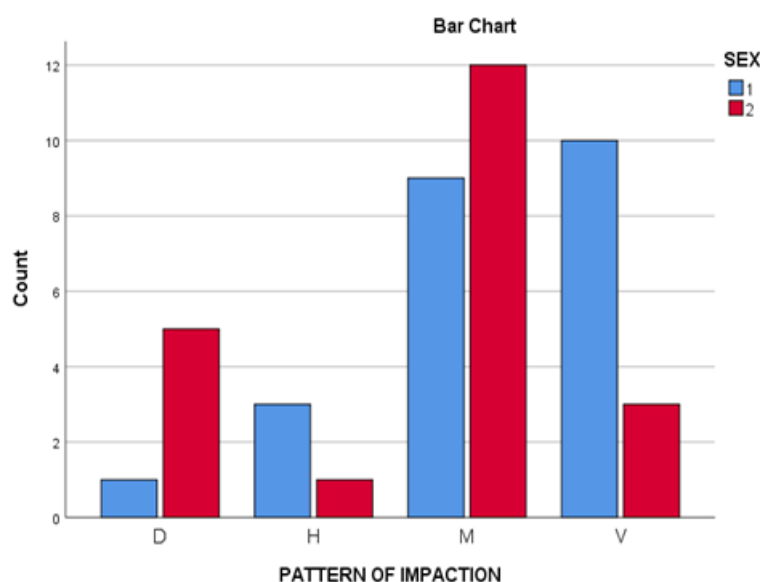


Fig.1: Index- Blue- Males and Red- Females

Figure 1: Shows the gender wise distribution (N = 45, Males =24 Females =21) in the study population and pattern of impaction in the study population where mesio-angular impaction was found to be the most common pattern of impaction in females and vertical impaction was found to be most common pattern of impaction in males.

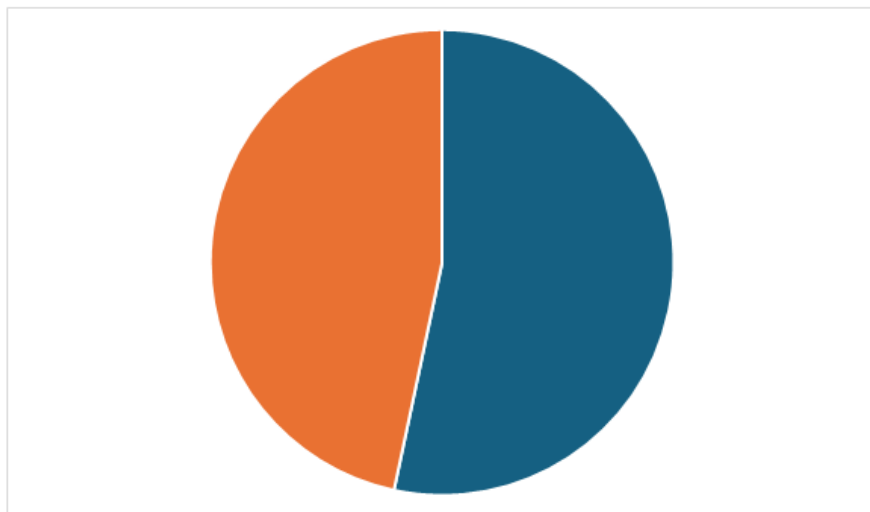


Fig.2: Gender – Wise Distribution of Study Population - Males =24, Females=21

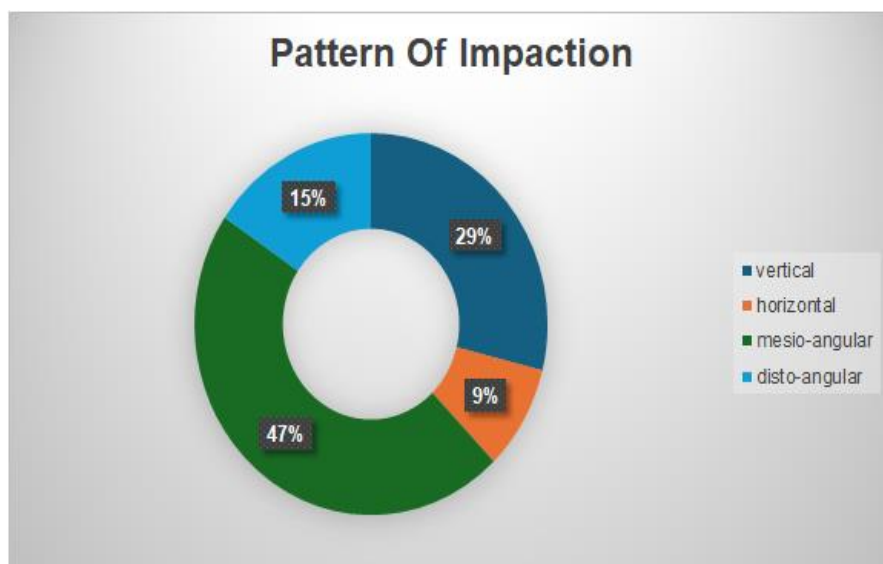


Fig. 3: Pattern of Impaction in Study Population

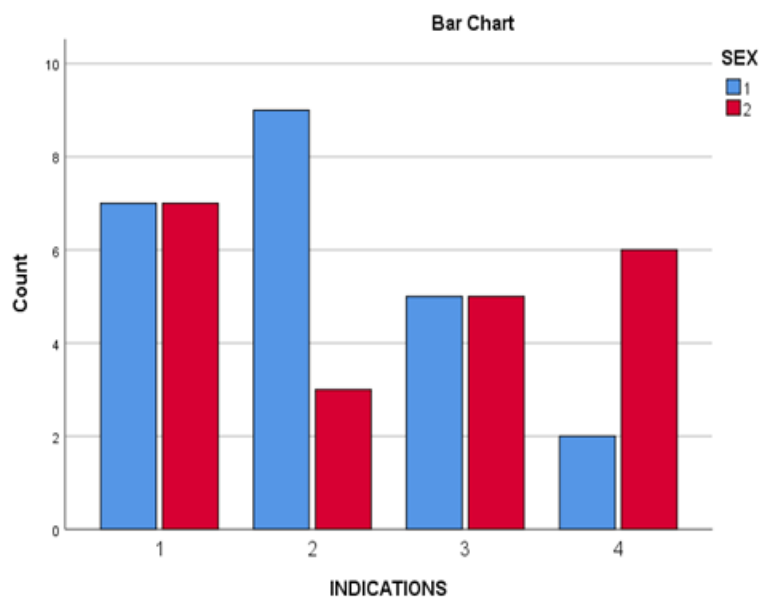


Fig. 4: Distribution of Indications for Extraction in the Study Population

Figure 4. Shows the gender wise distribution of indications (1.Pericoronitis, 2.Pain, 3.Swelling, 4.Trismus) for extraction in the study population in which it was found that pain was more common in males as compared to females and trismus was more common in females as compared to males

DISCUSSION

Third molar impaction in the mandible is a common condition with variations in patterns and can be associated with pathologies. Impaction can occur when a tooth does not erupt into the oral cavity in the anticipated amount of time because of inadequate space, unequal angulation, or obstruction by nearby structures.²

Most commonly chosen method for spatial assessment of impacted teeth is Winter's classification. It is most commonly used because of its simplicity. It does not require the use of additional measuring instruments .The classification of impacted mandibular third molars based on spatial orientation is crucial in

understanding the difficulty of surgical removal and the risk of complications as stated by Jaron & Trybek et al.²

The present study it is seen that mesioangular impaction was the most common pattern of impaction, followed by vertical, distoangular, and horizontal impaction. This finding is consistent with previous studies, such as Subedi et al. who reported a higher incidence of mesioangular impaction (33%), followed by vertical impaction (31.5%). Additionally, Jaron & Trybek² noted that Winter's classification is widely used to assess the angular position of impacted third molars, with mesioangular impaction being predominant in their retrospective study.

According to Pell & Gregory's classification¹⁰, Class IIA were most commonly seen, indicating that the impacted tooth was positioned halfway within the mandibular ramus with its occlusal surface at the same level as the second molar Jaron & Trybek et al.² The difficulty of removal increases in cases where the

impacted tooth is located deeper within the bone or obstructed by surrounding structures. Moreover, Lanza Galvão et al. emphasized that pericoronitis is most commonly associated with vertically impacted mandibular third molars, suggesting that the degree of impaction influences the likelihood of associated inflammatory conditions.⁴

Extraction of an impacted mandibular third molar is guided by clinical symptoms, radiographic findings, and the risk of future complications. The most common indication for surgical extraction in our study was recurrent pericoronitis, which is consistent with their findings by Subedi et al.⁴ who stated that recurrent pericoronitis accounted for 62.9% of extractions. Other variables that required removal included the presence of caries (11.7%), external resorption of the adjacent second molar (9.4%), and cystic lesions (3.9%).⁴

In impacted mandibular third molar most common angulation which causes recurrent pericoronitis is vertical angulation, according to Lanza Galvao et al.,³ which supports the rationale for prophylactic removal of impacted tooth. In addition, orthodontic crowding, periodontal disease, and an elevated risk of caries in adjacent teeth have all been linked to impacted third molars. This is especially important for younger people, as early treatment can stop the gradual decline of oral health.³

In contrast, some studies are against prophylactic removal, mostly in asymptomatic cases, to avoid surgical complications such as nerve damage, alveolar osteitis, and postoperative infection Jaron & Trybek et al.² The decision must, therefore, be individualized based on clinical evaluation, patient symptoms, and radiographic assessment.

The study emphasizes the need for early diagnosis and classification of impacted mandibular third molars to facilitate appropriate treatment planning. The use of panoramic radiographs (OPG) remains a very important diagnostic tool in evaluating angulation, depth of impaction, and proximity to vital structures. Furthermore, newer imaging modalities, for example cone beam computed tomography (CBCT), may enhance the accuracy of diagnosis in complicated cases.⁶

In order to evaluate the results of retained vs extracted impacted mandibular third molars, particularly in asymptomatic people, future research should concentrate on longitudinal investigations. To improve patient care and reduce problems, more research into minimally invasive surgical methods and risk assessment models will be helpful.⁴

CONCLUSION

The present study confirms that mesioangular impaction is the most common pattern of mandibular third molar impaction, followed by vertical and distoangular impactions. Most common cause for extraction of impacted tooth was recurrent pericoronitis and leading indication for surgical removal. Understanding the Classification and risk assessment before extraction is essential to avoid any future complication associated with an impacted third molar. Given the associated complications and variations in impaction patterns, a case-by-case approach is recommended, supported by thorough radiographic evaluation and clinical assessment. Therefore, patients with impacted mandibular third molars need to have regular and periodic clinical and radiological examinations.²

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