



Impacted Third Molars: Anatomical Considerations, Classification, and Surgical Planning

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ABSTRACT

Impacted third molars, also known as wisdom teeth, present a common anatomical and surgical challenge in dental practice. Successful management requires detailed knowledge of their anatomical position, classification, and potential complications. This article focuses on anatomical considerations, radiographic evaluation, classification systems, and surgical planning steps necessary for impacted third molar management. No clinical outcomes or patient study data are included.

I. INTRODUCTION

Third molar impaction is frequently encountered due to evolutionary reductions in jaw size and space constraints in the dental arch. These teeth may remain asymptomatic or contribute to local pathology. Accurate diagnosis and proper surgical planning rely on understanding their anatomical position, angulation, and proximity to vital structures. This article outlines the anatomical knowledge, diagnostic methods, and planning strategies essential for managing impacted third molars, without reporting on clinical outcomes.

II. MATERIALS AND METHODS

The methods described below represent a structured diagnostic and planning protocol that clinicians should follow when evaluating and managing impacted third molars. This approach is based on standard clinical guidelines, anatomical studies, and radiographic assessment protocols found in the literature.

1. Anatomical Evaluation

A thorough review of the following anatomical features is essential before planning surgical extraction.

- Position of the Third Molar:
- Relationship to adjacent second molars, mandibular ramus, and maxillary sinus (for upper third molars).
- Inferior Alveolar Nerve (IAN) Proximity:
- Assessment of the distance between mandibular third molar roots and the IAN canal.

Lingual Nerve Position:

-specially important when lingual bone plate is thin or absent.

Root Morphology:

-Number, curvature, and divergence of roots.

2. Classification

-For each impacted third molar, classification should be done using standardized systems:

Winter's Classification (by angulation):

-Mesioangular, distoangular, vertical, horizontal, buccolingual, or inverted.



-Pell and Gregory Classification (by depth and relation to ramus):

-Class I, II, III (ramus relation); and Class A, B, C (depth relative to occlusal plane).

3. Radiographic Assessment

A stepwise radiographic evaluation method is recommended

-First Step: Panoramic Radiography (Orthopantomogram - OPG):

-To evaluate overall position, angulation, depth, and proximity to anatomical landmarks.

-Second Step: Periapical Radiographs:

-For root morphology, periapical changes, and periodontal ligament space visibility.

-Third Step: Cone-Beam Computed Tomography (CBCT) (When Indicated):



Indicated in cases with:

-Close proximity to the IAN canal.



-Complex root morphology.
-Assessment of lingual plate thickness.
-Identification of sinus involvement (in maxillary cases).

4. Risk Assessment Process

For each case, the following risk factors should be evaluated based on radiographic and anatomical findings:

-Risk of inferior alveolar nerve injury.
-Risk of lingual nerve damage.
-Difficulty level based on tooth depth, angulation, and root shape.
-Proximity to the maxillary sinus (for upper molars).

5. Surgical Planning Guidelines

-Following anatomical and radiographic assessment, the surgical plan should include:
-Decision on flap design (envelope, triangular, or marginal incisions).
-Bone removal strategy (buccal, lingual, or occlusal approach).
-Determination of the need for tooth sectioning.
-Planning for nerve protection measures, such as coronectomy in high-risk IAN proximity cases.
-Selection of postoperative care protocols to minimize complications like infection or alveolar osteitis.

III. RESULTS

This article focuses on diagnostic and planning protocols. No clinical patient outcomes or study data are included.

IV. DISCUSSION

A systematic approach combining anatomical knowledge, radiographic classification, and risk assessment allows clinicians to effectively plan the surgical management of impacted third

molars. Proper evaluation reduces intraoperative and postoperative complications and guides the clinician in choosing the safest surgical technique.

Understanding the spatial relationship between impacted third molars and adjacent anatomical structures is critical, especially in cases with high risk of nerve injury or sinus involvement. CBCT imaging plays a key role in complex cases where two-dimensional imaging may not provide sufficient detail.

V. CONCLUSION

The management of impacted third molars requires a structured method of anatomical evaluation, classification, and radiographic analysis. A thorough understanding of these diagnostic steps ensures better surgical planning and reduces the risk of complications during removal. Clinicians should follow a systematic preoperative assessment protocol for each patient requiring third molar extraction.

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