

Clinical Approach to Coronectomy in Horizontally Impacted Mandibular Wisdom Teeth

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Abstract

Objective: This study is focused on the identification of comprehensible radiographical and clinical features for the risk assessment of coronectomies in horizontally impacted mandibular third molars which require surgical treatment. A classification, based on a literature review and well-defined risk assessment algorithm, has been developed to streamline the decision-making process.

Methods: A PubMed, OVID Medline and Google Scholar search for articles related to keywords such as “Coronectomy, Horizontal Impacted Third Molar, Coronectomy vs Extraction” has been performed.

Results: Only horizontally impacted mandibular 3rd molars which required surgical intervention were included. The relationship of the apical portion of the roots with the IAN, evaluated on the CBCT, was used to classify the tooth as low, medium or high risk for extraction. If a tooth was classified as medium or high risk for total removal, it was further assessed and classified for coronectomy. According to a literature review and to our clinical judgement, 4 indicators can be identified as relevant in the individual risk assessment related to coronectomy. Based on a cumulative point score, the indication for a coronectomy has been appraised as ‘low risk’, ‘moderate risk’ or ‘high risk’.

Conclusion: Horizontal impactions of lower third molars are not necessarily to be considered a contraindication for coronectomy. Our classification offers a guideline in the decision-making process on whether a coronectomy represents a viable treatment option for mandibular horizontally impacted third molars.

Keywords: Coronectomy; Wisdom tooth extraction; Horizontal impaction; Nerve damage.

Introduction

Although widely accepted as a viable alternative treatment option for mandibular 3rd molars, coronectomies in horizontally

impactions are commonly considered to be contraindicated since the surgical procedure itself poses a substantial risk of damaging the Inferior Alveolar Nerve [1,2,3].

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Due to these controversial recommendations and considerations in the recent literature, the objective of this study has been focused on the identification of comprehensible radiographical and clinical features, displayed on panoramic radiographs and Cone Beam CT scans, and their relevance in the risk assessment for coronectomies in horizontally impacted mandibular third molars which require surgical treatment. A new classification, based on a literature review and a well-defined risk assessment algorithm, has been developed to streamline the decision-making process.

Material and Methods

A PubMed, OVID Medline and Google Scholar search for articles related to keywords such as “Coronectomy, Horizontal Impacted Third Molar, Coronectomy vs Extraction” has been performed. No articles about coronectomies performed on horizontal impacted third molars were found. Therefore, the research

has been expanded to articles related to coronectomy and to studies comparing coronectomy to extraction. References were selected based on the following criterias: Systematic Review, Reviews, Meta-Analysis and Case Report, English language. 12 articles were selected for literature review.

Results

Only horizontally impacted mandibular 3rd molars which required a surgical intervention were included in the study. Prior to the removal of the tooth, it is most relevant to define whether or not a coronectomy is indicated [4]. If specific radiological markers on the panoramic radiograph indicated a close anatomical relationship between the third molar roots and the mandibular canal [5,6] an additional CBCT is performed. Based on the findings of the CBCT, the location of the apical portion of the roots in relationship to the IAN is analyzed to classify the tooth as low, medium or high risk for extraction [2] (Table 1).

Extraction Related Risk		
Low risk extraction	Medium risk extraction	High risk extraction
2mm or more of bone between IAN and the roots	2mm or less of bone between IAN and roots	No cortical bone or interradicular nerve

Table 1: Extraction Related Risk.

If a tooth is classified as either medium or high risk for extraction, it is further assessed and classified for coronectomy procedure. According to the literature review and our clinical judgement, 4 indicators can be identified as relevant in the individual risk assessment related to coronectomy: tooth angulation, bone shield, root morphology and patient related factors. A classification can be obtained using a cumulative point score based on the following criteria (Table 2a). Based on the cumulative point score, a coronectomy surgery can be therefore

classified as low, medium or high risk (Table 2b).

Discussion

Coronectomy is indicated when the third mandibular molar is in contact with the inferior alveolar nerve, and where complete removal may cause injury to the nerve. The inferior alveolar nerve injury is rare but is a well-known complication during conventional extraction of mandibular third molar to be in intimate contact [4].

Coronectomy Risk Related Factors						
Tooth angulation⁷	85-88°	1 point	89-92°	3 points	93-95°	5 points
Bone shield	>2mm	1 point	1-2mm	5 points	<2mm	7 points
Root Morphology	Bulbous, not identifiable PDL, divergent roots				0.5 points	
Patient related factors²	<25 years & ASA 1	0 points	> 25 years old & ASA 1 or <25 years & ASA >2	1 point	>25 years old & ASA > 2	2 points

Table 2a: Coronectomy Risk Related Factors.

Coronectomy Related Risk Assessment		
Low Risk Coronectomy	Medium Risk Coronectomy	High Risk Coronectomy
< 5 points	5-7 points	>7 points

Table 2b: Coronectomy Related Risk Assessment.

The issue of iatrogenic inferior alveolar nerve damage during the removal of lower third molars continue to be a clinical and medico-legal problem as a valid treatment option in high-risk cases [8]. Injury to the IAN can occur from compression of the nerve, either indirectly by forces transmitted by the root during elevation or directly by elevators. The nerve may also become transected by rotary instruments or during removal of a tooth whose root is grooved or perforated by the IAN [9]. Coronectomy has been shown as an alternative to the conventional extraction of third molars in which there is a high risk of injury to the inferior alveolar nerve [3]. According to our most recent literature review, horizontally impacted third molars are a widely accepted contraindication or limitation for coronectomy [1,2]. However, under certain conditions, the coronectomy of a horizontally impacted third molar can be safely performed with a low risk of paresthesia. A careful case by case analysis and an evaluation of the factors mentioned in Table 2 is crucial in defining the relative risk associated with performing a coronectomy on any given horizontally impacted third molar [3]. The suggested

classification system (Table 2b) ultimately provides a guideline that may help to decide whether a coronectomy or a complete surgical extraction provides the best possible treatment option for each individual patient.

In summary, our experience and literature review, suggest that coronectomy is superior to total tooth removal regarding nerve injury protection for third molar extractions with moderate to high risk of nerve injury [4,9-11].

Conclusion

Our results suggest that if certain radiographic and clinical characteristics can be identified, horizontal impactions of lower third molars are not necessarily to be considered a contraindication for coronectomy. Our suggested classification offers a relatively simple guideline in the decision-making process on whether a coronectomy represents a viable treatment option for mandibular horizontally impacted third molars.

Conflict of interest statement

The authors declare no conflict of interest.

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