

ORIGINAL ARTICLE

Relationship between the Mandibular Third Molars with Inferior Alveolar Canal and associated Dysaesthesia

Prasant MC¹, Fareedi Mukram Ali², Anuoop Sanghai³, Muzaffer A Khan⁴, Mahesh Aher⁵,
Professor & HOD¹, Reader², Lecturer^{3,4,5}, SMBT Dental College Sangamner^{1,2,3,5}, Jizan University Hospital, Kingdom of Saudi Arabia⁴ <http://dx.doi.org/10.18049/jcmad/115>

Abstract

Background: It is not uncommon to find one of the Mandibular third molars in close proximity to the Inferior Alveolar Canals and surgical procedures in such area will sometime result in injuries to the Inferior Alveolar Nerves. The clinical manifestations of such injuries may vary from mild tingling sensations (paraesthesia), abnormal touch sensations (Dysaesthesia) to severe loss of sensations (anaesthesia) in the areas supplied by Inferior Alveolar Nerves depending upon the damage to the nerve bundle. This article tries to establish the cause and relationship between the mandibular third molar extraction and associated neurological complications as a result of damage to Inferior Alveolar Nerves. **Aims and objectives:** To statistically associate relationship between mandibular third molars to the Inferior Alveolar Canal and surgical extraction of third molars with mandibular nerve dysaesthesia. **Materials and Methods:** Previous records of patients were reviewed that included the preoperative panoramic radiographs, complete operative and anaesthetic records, preoperative and postoperative notes, medical histories and pre and postoperative neurological signs and symptoms. Data was then tabulated and the cases of altered sensation were compared with cases of unaltered sensation for immediate after extraction, 7 days after extraction to 7 months post operatively. **Results:** patient previous records were evaluated between February 2011 to January 2012 in SMBT Dental College and Hospital Samgamner, Maharashtra. Panoramic radiographic images of about 105 patients showed close approximation between roots of third molars and Inferior Alveolar Canal. There was nerve Dysaesthesia/paraesthesia seen in 24% post-operatively, out of which 24% was seen after 7 days and in 13% after 7 months. **Conclusion:** The Inferior Alveolar Nerve Dysaesthesia/paraesthesia was seen in the patients showing close approximation of nerve with root apices. However paraesthesia was not permanent, in 50% of the patients and nerve sensation were regained within 6 months post-operatively. This indicates that the presence of mandibular third molar roots close to Inferior Alveolar Canal increases the surgical risk of potential complications.

Key Words: Inferior Alveolar Canal, Mandibular Third Molars.

Address for correspondence:

Dr. Prasant MC, Prof and HOD, Dept of Oral & Maxillofacial Surgery. SMBT Dental College, Sangamner Taluka. Maharashtra

Introduction

Extraction of mandibular impacted third molar teeth is one of the most frequent surgical procedures carried out by oral surgeons. The prevalence of unerupted third molars varies widely and is influenced by age, gender and ethnicity. Many theories have been suggested to explain the etiology of impaction, and these

include the Mendelian theory¹, the phylogenetic theory², orthodontic theory³, and the rotation of the tooth buds.⁴ Impaction is an abnormality due to developmental discrepancies which predisposes to pathological changes such as pericoronitis, caries, resorption and periodontal problems. Cysts and tumors may also arise and can proceed to an advanced stage before the presentation of any symptoms. There has been disagreement about the appropriateness of removal of third molars which are not associated

with local pathology but there is no controversy about the value of the removal of impacted third molars when they are associated with pathological changes⁵. The prophylactic removal of third molar unassociated with pathological changes is proposed if the counterpart of other side is being removed due to any pathological changes.

The inferior alveolar nerve is most commonly seen in close approximation with root apices of mandibular third molars. Surgical extractions in such cases sometimes results in damage to the Inferior Alveolar Nerve. The nerve damage observed may be in the form of neurosensory deficit in areas supplied by that nerve especially in the mental nerve region. The incidence of nerve damage post operatively after mandibular third molar extraction was studied in this cross sectional study.

Materials and Methods

Approval from the Human Ethics Committee of SMBT dental college was taken for carrying out the study. Patient previous records were evaluated between February 2011 to January 2012 in SMBT Dental College and Hospital Samgamner, Maharashtra.

Initial pre surgical assessment included a full medical and dental history, extra-oral and intra-oral clinical examination records were obtained. Assessment regarding the mandibular third molars included assessment of:

1. Eruption status of the third molar
2. Presence of local infection
3. Caries, resorption of third molar and the adjacent tooth
4. Periodontal status
5. Occlusal relationship
6. Temporomandibular joint function
7. Regional lymph nodes.
8. Radiological assessment records done prior to surgery.

The study excluded those records that were associated with pathology. Orientation and relationship of tooth to the Inferior Alveolar Canal was assessed. The Imaging modalities include panoramic, peri-apical, Lateral Oblique radiographs. They were classified according to the following points.

Common criteria used for assessment of the relationship between Inferior Alveolar nerve and Lower Third Molars.

1. **Radiolucent Band:** Increased radiolucency (radiolucent band) of the root(s) of the mandibular third molar where the mandibular canal crosses it.
2. **Loss of mandibular border:** Interruption of the radiopaque lines which represent the superior and inferior borders of the mandibular canal where it crosses the root(s) of the third molar.
3. **Change in mandibular canal direction:** significant change in the direction of the mandibular canal where it is superimposed on or is in contact with the root(s) of the mandibular third molar
4. **Mandibular canal narrowing:** narrowing of the mandibular canal where it is superimposed on or is in contact with the root(s) of the mandibular third molar
5. **Root Narrowing :** Narrowing of the root(s) of the mandibular third molar where the mandibular canal crosses it
6. **Root Deviation :** abrupt deviation in form (dilaceration) of the root(s) of the mandibular third molar where it is superimposed on or is in contact with the mandibular canal
7. **Bifid Apex :** Bifid and dark apex of the root(s) of the mandibular third molar where the mandibular canal crosses it
8. **Superimposed :** Superimposition of the root(s) of the mandibular third molar and the mandibular canal
9. **Contact mandibular canal Root(s)** of the mandibular third molar in contact with the superior border of the mandibular canal.

The post operative occurrence of dysaesthesia/paraesthesia which was reported at the end of 7 days to seven months was analyzed. The results were tabulated and analyzed statistically for nerve damage.

Results

A total of 105 cases were selected which showed at least any one or more of the nine radiological signs seen and their percentage of occurrence were calculated (Table 1.)

The records available were checked thoroughly to evaluate any complication reported by the same patient post surgically there was No dyesthesia / paraesthesia in 63% of patients. There was presence of Dyesthesia / paraesthesia in about 24% of these patients who had reported back within 7 days to 7 months after mandibular third molar surgical removal. It was also found that about 13% of the patients reported past seven months after surgical extraction of mandibular third molars reporting dyesthesia / paraesthesia on the same side as recorded in table 2.

Table- 1: Percentage occurrence of relationship between the teeth to the inferior Alveolar canal

1. Radiolucent band	21%
2. Loss of MC border	30%
3. Change MC direction	37%
4. MC narrowing	60%
5. Root narrow	36%
6. Root deviation	33%
7. Bifid apex	22%
8. Superimposed	5%
9. Contact MC	7%

Table- 2: Post operative occurrence of Dysaesthesia was recorded

No Dysaesthesia	63%
Dysaesthesia/paraesthesia (seen after 7 days but not after 7 months)	24%
Dysaesthesia/paraesthesia (after 7 months)	13%

Discussion

Surgical procedures performed in mandibular third molar areas may have a number of associated complications.⁶⁻⁸ One of these complications is Inferior Alveolar Nerve dyesthesia or impairment of sensory perception⁹ (including paraesthesia and/or anaesthesia). Dyesthesia is perceived by patients as an unpleasant, abnormal sense of touch, and it may be or may not be considered as a kind of pain. This may be coupled with the risk of permanency of effect. From a surgical perspective, the risk associated with

dysaesthesia is determined by the approximation of the inferior alveolar nerve (IAN) or radiographically the proximity of the root of third molar to mandibular canal (MC). Literature shows many anatomical variation of the mandibular canal¹⁰. Because of this high variation in IAN/third molar relationship, a detailed pre-operative radiographic assessment is required to identify both the position and approximation of Mandibular Canal to third molar to minimize the risk of postoperative dysaesthesia.

The surgical approach and technique utilized in the removal of impacted mandibular third molars contributes to the risk of postoperative dysaesthesia. In some instances, the knowledge of the precise relationship between the inferior alveolar nerve and the roots of the mandibular third molar may be crucial in allowing the appropriate planning of the procedure in order to minimize the risk of postoperative dysaesthesia. Despite many studies and reports in the literature there is still debate about the etiology, incidence and outcome of neurological damage during third molar surgery. It has been shown by this study that the panoramic radiograph is a valuable in reducing the probability of neurological deficit. It is clear that panoramic radiography is readily available and relatively low in radiation dose, provides the optimum method of predicting neurological damage. At present coronal section of Computerized Tomographic Scans is the only way to image with precision, the relationship of the tooth root to the mandibular canal. Radiation dosage, availability and cost do not allow it to be a part of standard procedure in this part of the country.

Conclusion

The inferior alveolar nerve dyesthesia/paresthesia was seen in the patients showing close approximation of nerve with root apices. Inferior alveolar nerve damage was observed in cases having nerve in close approximation with root apices. The paraesthesia was not permanent in half of the patients. Nerve sensation was regained within 6 months post-operatively in 50% of cases exhibiting nerve paraesthesia. This indicates that the presence of mandibular third molar roots close to Inferior Alveolar Canal

increases the surgical risk of potential complications.

Acknowledgement

Authors wish to thank Dept of Oral and Maxillofacial surgery SMBT Samgamner.

Source(s) of support: Nil

Conflict of Interest: None declared

References

1. Berger A: The principles and techniques of oral surgery. Brooklyn. Dental items of interest 1930;39;543-9.
2. Nodine AM: Aberrant teeth, their history, causes and treatment, Dental items intrest 1943;65;894-910.
3. Durbeck WE: The impacted lower third molar. Publisher Henry Kimpton, London.1943.
4. Shafer WG, Hine MK Levy BM: A textbook of oral pathology. Third edition, pp63. Publisher WB Saunders Co., London,1974.
5. National Institute of Health. NIH consensus development conference for removal of third molars. J Oral Surgery 1980; 38:235-236.
6. Mercier P, Precious D. Risks and benefits of removal of impacted third molars. A critical review of the literature. Int J Oral Maxillofac Surg 1992;21:17-27.
7. Checchi L, Alessandri Bonetti G, Pelliccioni GA. Removing high risk impacted mandibular third molars: a surgical-orthodontic approach. J Am Dent Assoc 1996;127:1214-1217.
8. Robert GD, Harris M. Neurapraxia of the mylohyoid nerve and submental analgesia. Br J Oral Surg 1973; 11:110-113.
9. Kipp DP, Goldstein BH, Weiss WW Jr. Dysesthesia after mandibular third molar surgery: a retrospective study and analysis of 1377 surgical procedures. J Am Dent Assoc 1980; 100:185-192.
10. Tammisalo T, Happonen RP, Tammisalo EH. Stereographic assessment of mandibular canal in relation to the roots of impacted lower third molars using multiprojection narrow beam radiography. Int J Oral Maxillofac Surg 1992; 21:85-89.