

## Original Research

# RELATIONSHIP OF IMPACTED MANDIBULAR THIRD MOLAR WITH MANDIBULAR CANAL - A CLINICAL STUDY

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### ARTICLE INFO



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### ABSTRACT

**Background:** The present study was conducted to assess the relationship with impacted mandibular third molar with mandibular canal with using panoramic radiographs and CBCT.

**Materials & Methods:** The present study was conducted on 80 patients with impacted mandibular third molar. OPG and CBCT were done and assessment of relationship between mandibular canal with 3<sup>rd</sup> molar was performed.

**Results:** Out of 80 patients, males were 35 and females were 45. Narrowing of canal (NC) in 8 males and 6 females, darkening of roots (DR) in 12 males and 20 females, diversion of canal (DC) in 7 males and 8 females, presence of cortication in 10 males and 8 females and interruption of white line (IWL) in 3 males and 5 females. PC was seen in 5 males and 6 females. The difference was significant ( $P < 0.05$ ). Molar relation with IAC was class 0 (3), subtype 1A (12), subtype 1B (10), subtype 2A (5), subtype 2B (7), subtype 3A (10), subtype 3B (15), subtype 4A (2), subtype 4B (10), subtype 5A (1), subtype 5B (1), subtype 6A (1), subtype 6B (2) and class 7 (1). The difference was significant ( $P < 0.05$ ).

**Conclusion:** The relationship of impacted mandibular third molar with inferior alveolar canal using newer classification of CBCT images would definitely proven to be the boon for the surgeon.

### INTRODUCTION

Extraction of third molar is a routine procedure in maxillofacial surgery, whether for prophylactic or for orthodontic reasons. Damage to the inferior alveolar nerve (IAN) during mandibular third molar extraction surgery is a significant and common complication, which can result in post-operative paresthesia in patients.<sup>1</sup> IAN paresthesia is characterized by prolonged sensory deficit and/or abnormal sensation in the lower jaw, mental region and lower lip of the affected side, and may be transient or permanent in nature. The incidence of IAN paresthesia following surgery is reported to be between 0.4% and 8%. Permanent paresthesia may lead to functional deficits, and a decreased quality of life. To

optimize surgical planning and avoid complications, such as paresthesia, precise identification of the mandibular canal is important.<sup>2</sup>

Thus a radiological study becomes mandatory to assess the risk of a possible post-operative injury to the IAN during extraction of impacted mandibular third molar. Hence, accurate preoperative radiographic examination is therefore considered indispensable before extraction of mandibular third molar.<sup>3</sup> Radiographic signs such as darkening, narrowing or deflection of the root, dark and bifid apex of the root, interruption of cortical outline of mandibular canal, canal diversion or narrowing, island-shaped apex were indicative of proximity between third molar and IAC on panoramic radiographs are suggestive

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of impaction. Being, 2-D imaging, OPG images lack third dimension. With the advent of CBCT, this drawback of OPG has eliminated. Cone-beam computer tomography (CBCT) can define the several types of relationships in a buccal/lingual, mesio- distal and superior- inferior direction.<sup>4</sup> To identify the different types of possible relationships between the third molar and the mandibular canal, a new radiological classification proposed by Michele et al.<sup>5</sup> The present study was conducted to assess the relationship of impacted mandibular third molar with mandibular canal radiographically.

## MATERIALS & METHODS

The present study was conducted in the department of Oral surgery. It comprised of 80 patients with impacted mandibular third molar of both gender. All were informed regarding the study and written consent was obtained. Ethical clearance for the study was taken from institutional ethical committee.

Demographic data such as name, age, gender etc. was recorded. OPG was taken with panoramic unit following standardized operating procedures. After obtaining panoramic images, signs such as darkening of the root, diversion of the canal, narrowing of canal, presence of cortication, interruption in white line were looked. If any of above signs were present, patients were subjected to CBCT taken with CBCT machine. The canal was traced, and the image formed was seen in three sagittal, coronal, and axial planes. Results thus obtained were subjected to

statistical analysis. P value < 0.05 was considered significant.

## RESULTS

**Table:** Gender wise patients distribution

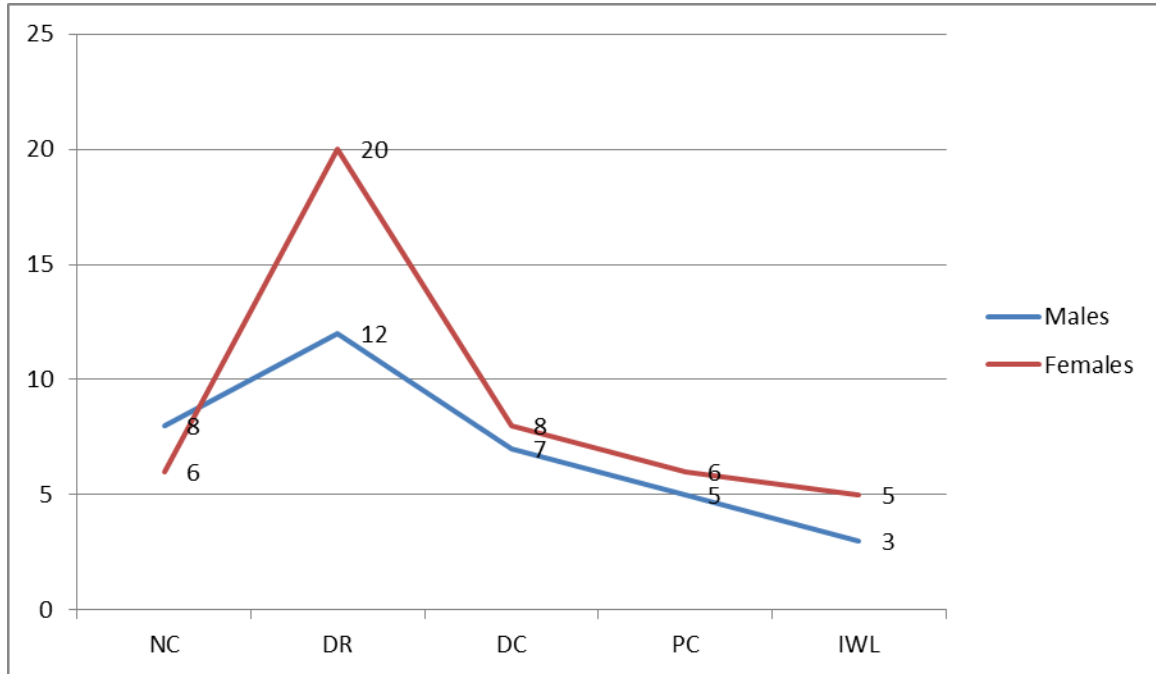
Total- 80		
Gender	Male	Female
Number	35	45

Table I shows that out of 80 patients, males were 35 and females were 45.

**Table II:** Presence of various criteria on OPG

Criteria	Males	Females	P value
NC	8	6	0.09
DR	12	20	0.05
DC	7	8	0.91
PC	5	6	0.82
IWL	3	5	0.85

Graph I shows narrowing of canal (NC) in 8 males and 6 females, darkening of roots (DR) in 12 males and 20 females, diversion of canal (DC) in 7 males and 8 females, presence of cortication in 10 males and 8 females and interruption of white line (IWL) in 3 males and 5 females. PC was seen in 5 males and 6 females. The difference was significant (P< 0.05).



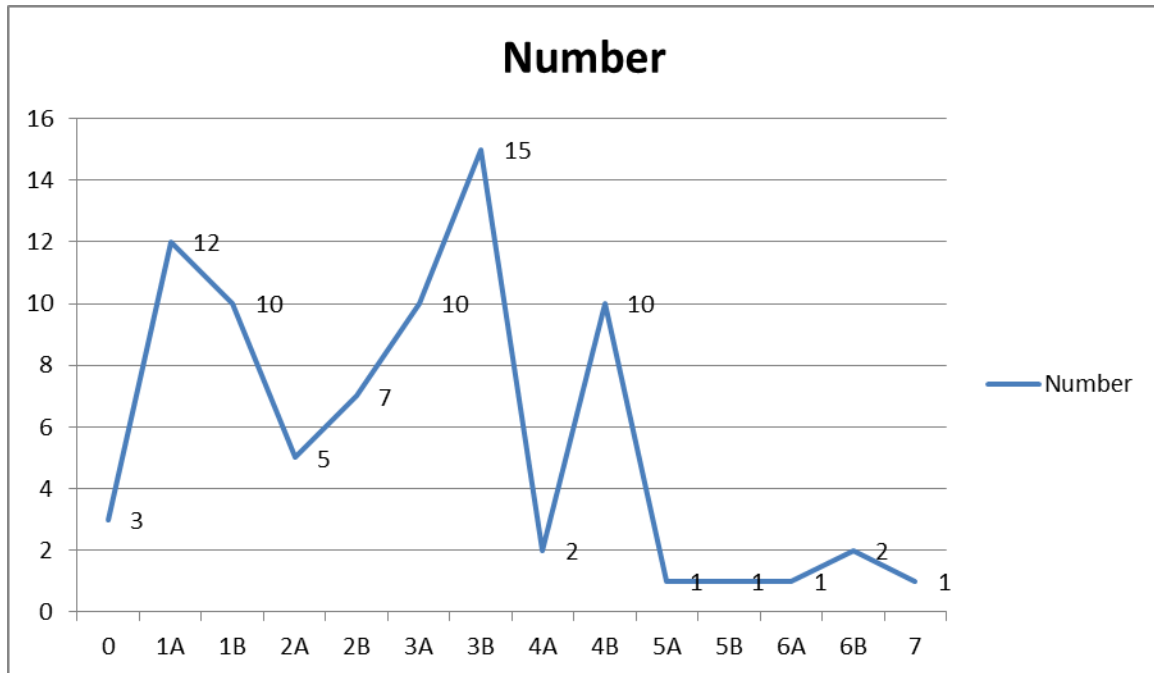
**Graph I:** Presence of various criteria in patients

**Table III:** Radiological classes and subtypes

Classes	Number	P value
0	3	0.02
1A	12	
1B	10	
2A	5	
2B	7	
3A	10	
3B	15	
4A	2	
4B	10	

5A	1	
5B	1	
6A	1	
6B	2	
7	1	

Table III, graph II shows that third molar relation with IAC was class 0 (3), subtype 1A (12), subtype 1B (10), subtype 2A (5), subtype 2B (7), subtype 3A (10), subtype 3B (15), subtype 4A (2), subtype 4B (10), subtype 5A (1), subtype 5B (1), subtype 6A (1), subtype 6B (2) and class 7 (1). The difference was significant ( $P < 0.05$ ).



**Graph II:** Radiological classes and subtypes

## DISCUSSION

The chances of mandibular third molar impaction are quite high which requires extraction of tooth. Most of cases require surgical extraction. In other cases, reasons for third molar extraction can be prophylactic or orthodontic.<sup>6</sup> The proximity of impacted third molar with inferior alveolar canal (IAC) needs more attention as damage to the inferior alveolar nerve (IAN) during extraction is a significant and common complication. Neurological involvement is a serious complication may leads to post-operative paresthesia.<sup>7</sup> Neurological involvement is a serious complication associated to a surgical removal of impacted mandibular third molars. Although the frequency of inferior alveolar nerve (IAN) injures is low, the third molar removal is one of the most common procedure in dental practice so that the absolute number of patients with neurosensory impairment after surgery is significant.<sup>8</sup> The present study was conducted to assess the relationship with impacted mandibular third

molar with mandibular canal by using panoramic radiographs and CBCT.

In present study, there were 35 males and 45 females. Various studies have shown the diagnostic accuracy of CBCT in predicting neurovascular bundle exposure prior to impacted mandibular third molar removal. However, due to the higher dose and cost of this imaging modality, many dental settings only rely on conventional radiographs such as intraoral periapical radiograph in the assessment of impacted mandibular third molar.<sup>9,10</sup>

We found that narrowing of canal (NC) in 8 males and 6 females, darkening of roots (DR) in 12 males and 20 females, diversion of canal (DC) in 7 males and 8 females, presence of cortication in 10 males and 8 females and interruption of white line (IWL) in 3 males and 5 females. PC was seen in 5 males and 6 females. Tantanapornkul et al.<sup>11</sup> showed that CBCT was superior to OPG in predicting neurovascular bundle exposure following assessment of the relationship of the

mandibular third molar root tip to the mandibular canal. They studied 161 impacted teeth and reported that the relative sensitivity and specificity of CBCT and OPG in predicting the nerve exposure was 93%, 77% and 70%, 63% respectively. In this study we found that maximum number of subtype 3A relation was seen followed by subtype 1B, subtype 3A, subtype 3B, subtype 1A, subtype 4B etc.

Bains et al<sup>12</sup> found that Darkening of roots (DR) were seen in 30 males and 20 females, diversion of canal (DC) in 12 males and 10 females, narrowing of canal (NC) in 9 males and 5 females, presence of cortication in 10 males and 8 females and interruption of white line (IWL) in 14 males and 7 females. The difference was significant ( $P < 0.05$ ). Darkening of roots (DR) was seen in 50 patients on OPG and similar number were confirmed by CBCT, diversion of canal (DC) in 22 patients on OPG and 24 on CBCT, narrowing of canal (NC) in 14 patients on OPG and 16 on CBCT, presence of cortication in 18 patients on OPG and 19 on CBCT and interruption of white line (IWL) in 21 patients both on OPG and CBCT. The difference was non-significant ( $P > 0.05$ ). Third molar relation with IAC was class 0 (0), subtype 1A (20), subtype 1B (24), subtype 2A (1), subtype 2B (2), subtype 3A (25), subtype 3B (22), subtype 4A (2), subtype 4B (16), subtype 5A (1), subtype 5B (2), subtype 6A (2), subtype 6B (2) and class 7 (1).

The shortcoming of the study is small sample size.

## CONCLUSION

Authors found that most common relation was 3B followed by 1A and 1B, 3A and 4B.

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