Mandibular Third Molar And Inferior Dental Canal- A Tricky Situation

1Dr. Kanwaldeep Singh Soodan, 2Dr. Pratiksha Priyadarshni
1Department Of Oral & Maxillofacial Surgery
M M College of Dental Sciences & Research, Mullana (India)
2Dental Surgeon *Flat no.:167c, Kendriya Vihar apartment, Sector 25, Panchkula (India)
Corresponding Author Address: *Dr. Kanwaldeep Singh Soodan

ABSTRACT: The removal of impacted mandibular third molars is one of the most common surgical procedures performed in routine. Accurate assessment of the position of the inferior alveolar nerve in relation to the impacted third molar might reduce injuries to this nerve. When the inferior dental nerve is in close proximity to an impaction, the nerve is at a greater risk of injury during removal of the impaction. Surgical removal of such impactions is much safer when preceded by radiographic imaging to determine the location of the inferior dental canal.

I. INTRODUCTION

The removal of impacted mandibular third molars is one of the most common surgical procedures performed and can be complicated by inferior alveolar nerve damage (1). Injury to the inferior alveolar nerve has been related to deeply impacted teeth (2) and to roots in close approximation to the inferior dental canal (IDC) (3). Thus, accurate assessment of the position of the inferior alveolar nerve in relation to the impacted third molar might reduce injuries to this nerve. Anatomically, the nerve lies in the IDC which is enclosed within a tube of dense bone. The tube is seen on radiographs as two parallel radiopaque lines; one representing the roof of the canal and the other the canal floor. Surgical removal of mandibular third molars may sometimes leads to various types of complications. One of these complications is inferior alveolar nerve dysesthesia or impairment of sensory perception including paraesthesia and/or anaesthesia (4, 5). Dysesthesia is perceived by patients as a significant impairment to their well-being particularly coupled with the risk of permanency of effect (6-10). From a surgical perspective, the significant risk associated with dysesthesia is determined by the approximation of the inferior alveolar nerve (IAN), or radiographically the mandibular canal (MC), to the roots of the third molar. Because of this high variation in IAN/third molar relationship, a detailed pre-operative radiographic assessment is required to identify both the position (buccal, lingual or inferior) and approximation of MC to third molar to minimize the risk of postoperative dysesthesia (11, 12).

A detailed review of the last 30 years of research reveals a focus on nine common radiographic criteria (Table 1) (13-28).

Table 1. Common criteria used for assessment of the relationship between the inferior alveolar nerve and the lower third molars. These criteria are distilled from the literature of the past 30 years

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<thead>
<tr>
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<th>Criteria</th>
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<tr>
<td>1</td>
<td>Radiolucent band</td>
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<td>Increased radiopacity (radiolucent band) of the root(s) of the mandibular third molar where the mandibular canal crosses it.</td>
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<tr>
<td>2</td>
<td>Loss of mandibular border</td>
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<td>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.</td>
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<tr>
<td>3</td>
<td>Change in mandibular canal direction</td>
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<td>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</td>
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<tr>
<td>4</td>
<td>Mandibular canal narrowing</td>
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<tr>
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<td>Narrowing of the mandibular canal where it is superimposed on or is in contact with the root(s) of the mandibular third molar</td>
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<tr>
<td>5</td>
<td>Root narrowing</td>
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<tr>
<td>6</td>
<td>Root deviation</td>
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<tr>
<td>7</td>
<td>Bifid apex</td>
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<td>8</td>
<td>Superimposed</td>
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<td>9</td>
<td>Contact mandibular canal</td>
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**Case report**

A patient aged 34 years female reported with dental tooth pain in lower right mandibular region. Patient reported with history of pain since last 24 hours. Patient was evaluated thoroughly and orthopantomogram was advised along with intra oral peri-apical x-ray (Figure 1).

![Figure 1: Orthopantomogram for left mandibular third molar](image1)

On radiographic examination, distal root of mandibular third molar seemed to be involving the mandibular canal. Denta scan was done to evaluate the involvement of canal and was found out to that distal root was laterally to the canal and not involving mandibular canal (Figure 2).

![Figure 2: Dentascan for evaluation of root to IDC](image2)

Surgical removal of mandibular third molar was done (Figure 3) followed by sutures and antibiotics and analgesics coverage.
Patient was revaluated after seven days for any changes in sensation and to our finding there were no such complication. Sutures were removed and patient was advised Luke warm saline gargles for next three to four days.

II. DISCUSSION

When the inferior dental nerve is in close proximity to an impaction, the nerve is at a greater risk of injury during removal of the impaction. Surgical removal of such impactions is much safer when preceded by radiographic imaging to determine the location of the inferior dental canal. The mandibular canals are mostly bilaterally symmetrical, and the position of the inferior dental canal varies with respect to the apices of the roots of the impacted mandibular third molars with the majority being in superimposed or adjacent positions. One of the complications that may occur following the extraction of mandibular third molars is injury to the inferior alveolar nerve (29-34). Prior knowledge of the proximity of the roots of the mandibular third molars to the inferior dental canal may minimize such complications (35, 36).

Various preoperative radiographic techniques to evaluate the relationship between the mandibular third molar and the inferior dental canal have been used. These include intra-oral radiographs, orthopantomograms, crosssectional tomographs, scanographs, and computed tomograms (37, 38). However, the orthopantomograms has been recommended as the primary radiographic investigation of choice in the preoperative assessment of mandibular third molar teeth and their surrounding structures (39-42). For portrayal of subtle object structures, such as the inferior dental canal wall, it is well known two-dimensional imaging techniques provide limited information in terms of the buccolingual relationship between the mandibular canal and the roots of mandibular third molar. Compared with 2-D radiography, 3-D radiography provides more information about the position of the nerve; this knowledge can be used to determine a treatment plan.

References

24. Cogswell WW. Surgical problems involving the mandibular nerve. JADA 1942; 29:964.

* Corresponding Author * Dr. Kanwaldeep Singh Soodan