



Research Paper

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

Received 13 July, 2017; Accepted 29 July, 2017 © The author(s) 2017. Published with open access at www.questjournals.org

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 dysaesthesia or impairment of sensory perception including paraesthesia and/or anaesthesia (4, 5). Dysaesthesia 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 dysaesthesia 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 dysaesthesia (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

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

Mandibular Third Molar And Inferior Dental Canal- A Tricky Situation

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

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

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).

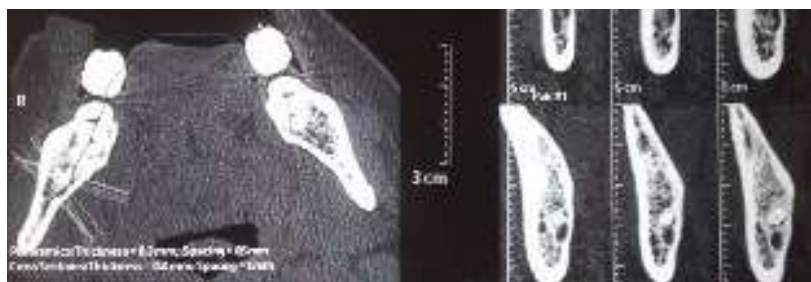


Figure 2: Dentascans for evaluation of root to IDC

Surgical removal of mandibular third molar was done (Figure 3) followed by sutures and antibiotics and analgesics coverage.



Figure 3: tooth removed uneventfully

Patient was reevaluated 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

1. Carmichael FA, McGowan DA. Incidence of nerve damage following third molar removal a west of Scotland Oral Surgery Research Group study. *Br. J Oral Maxillofac. Surg.* 30:78, 1992.
2. Van Gool AV, Ten Bosch JJ, Boering G. Clinical consequences of complaints and complications after removal of the mandibular third molar. *Int. J. Oral. Surg.* 1977; 6: 29-37.
3. Osborn TP, Frederickson G Jr, Small IA, Torgerson TS. A prospective study of complications related to mandibular third molar surgery. *J. Oral Maxillofac. Surg.* 1985; 43:767-769.
4. 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.
5. Cade TA. Paresthesia of the inferior alveolar nerve following the extraction of the mandibular third molars: a literature review of its causes, treatment, and prognosis. *Mil Med* 1992; 157:389-392.
6. Simpson HE. Injuries to the inferior dental and mental nerves. *J Oral Surg. Anesth. Hosp. Dent. Serv.* 1958; 16:300-305.
7. Howe GL, Poyton HG. Prevention of damage to the inferior dental nerve during the extraction of mandibular third molars. *Br. Dent. J.* 1960; 109:355-363.
8. Merrill RG. Prevention, treatment and prognosis for nerve injury related to the difficult impaction. *Dent. Clin. North Am.* 1979; 23:471-488.
9. Rud J. Third molar surgery: perforation of the inferior dental nerve through the root. *Tandlaegebladet* 1983; 87:659-667.
10. Brann CR, Brickley MR, Shepherd JP. Factors influencing nerve damage during lower third molar surgery. *Br. Dent. J.* 1999; 186:514-516.
11. Westesson PL, Carlsson LE. Anatomy of mandibular third molars. A comparison between radiographic appearance and clinical observations. *Oral Surg. Oral Med. Oral Pathol.* 1980; 49:90-94.
12. Smith AC, Barry SE, Chiong AY et al. Inferior alveolar nerve damage following removal of mandibular third molar teeth. A prospective study using panoramic radiography. *Aust. Dent. J.* 1997; 42: 149-152.
13. Miles AEW, West WH. The relationship of the mandibular third molar to the mandibular canal. *The Dental Practitioner* 1954; 4: 370-375.

Mandibular Third Molar And Inferior Dental Canal- A Tricky Situation

14. Durbeck WE. The impacted lower third molar. 2nd edn. London: Dental Items of Interest Publishing Company Inc, 1957:23-25, 109-110.
15. Seward GR. Radiology in general dental practice. VIII. - assessment of lower third molars. Br. Dent. J. 1963; 115: 45-51.
16. Waggener DT. Relationship of third molar roots to the mandibular canal. Oral Surg. Oral Med. Oral Pathol. 1959; 12:853-856.
17. Worth HM. Principles and Practice of Oral Radiologic Interpretation. Chicago: Year Book Medical Publishers Inc, 1963:63, 65.
18. Killey HC, Kay LW. The Impacted Wisdom Tooth. 2nd edn. Edinburgh: Churchill Livingstone, 1975:28-29.
19. Summers L. Oral surgery in general dental practice. Assessment of lower third molars. Aust Dent J 1975; 20: 368-370.
20. Poyton HG. Oral radiology. Baltimore: Williams & Wilkins, 1982:166-168.
21. Howe GL. Minor oral surgery. 3rd edn. Bristol: Wright, 1985:117-122, 126-129.
22. MacGregor AJ. The impacted wisdom tooth. Oxford Medical Publications, 1985:56.
23. Rood JP, Shehab BA. The radiological prediction of inferior alveolar nerve injury during third molar surgery. Br. J. Oral Maxillofac. Surg. 1990; 28:20-25.
24. Cogswell WW. Surgical problems involving the mandibular nerve. JADA 1942; 29:964.
25. Uotila E, Kilpinen E. Relationship of the roots of an impacted third molar and the mandibular canal determined by stereoradiography. Odontol Tidskr 1968; 76: 55-59.
26. Azaz B, Shteyer A, Piamenta M. Radiographic and clinical manifestations of impacted mandibular third molar. Int. J. Oral Surg. 1976; 5:153-160.
27. Feifel H, Riediger D, Gustorf-Aeckerle R. High resolution computed tomography of the inferior alveolar and lingual nerves. Neuroradiology 1994; 36:236-238.
28. Swanson AE. Incidence of inferior alveolar nerve injury in mandibular third molar surgery. J. Can. Dent. Assoc. 1991; 57: 327-328.
29. Gabell DP. Sensory paralysis of the face due to extraction of a wisdom tooth. Dent. Rec. 1902; 22: 565-566.
30. Robinson TO. Paresthesia: a postoperative complication following removal of the mandibular third molar. Am J Orthod 1940; 26: 278-284.
31. Beauchamp WS. Severance of mandibular nerve during extraction. Br. Dent. J. 1947; 83: 259-260.
32. Simpson HE. Injuries to the inferior dental and mental nerves. J Oral Surg 1958; 16:300- 305.
33. Rud J. Third molarsurgery: Relationship of root to mandibular canal and injuries to inferior dental nerve. Tandlaegebladet 1983; 87:619.
34. Kipp DP, Goldstein BH, Weiss WW Jr. Dysesthesia after mandibular third molar surgery: aretrospective study and analysis of 1377 surgical procedures. J. Am. Dent. Assoc. 1980; 100:185-192.
35. Howe GL, Poyton HG. Prevention of damage of the inferior dental nerve during extraction of mandibular third molars. Br. Dent. J. 1960; 109: 355-363.
36. Maegawa H, Sano K, Kitagawa Y, Ogasawara T, Miyauchi K, Sekine J, Inokuchi T. Preoperative assessment of the relationship between the mandibular third molar and the mandibular canal by axial coputed tomography with coronal and sagittal reconstruction. Oral Surg Oral Med. Oral Pathol. Oral Radiol Endod. 2003 Nov; 96(5):639-646.
37. Freisfeld M, Drescher D, Kobe D, Schuller H. Assessment of the space for the lower wisdom teeth. Panoramic radiography in comparison with computed tomography. J. Orofac. Orthop. 1998; (59): 17-28.
38. Kaepler G. Conventional cross-sectional tomographic evaluation of mandibular third molars. Quintessence Int. 2000 (31) 49-56.
39. Feifel H, Riediger D, Gustorf-Aeckerle R. High resolution computed tomography of the inferior alveolar and lingual nerves. Neuroradiology 1994 ;(36):236-238.
40. The Royal College of Surgeon of England. Faculty of Dental Surgery. The management of patients with third molar teeth: report of a working party convened by the Faculty of Dental Surgery. London: The Royal College of Surgeons of England; 1997.
41. Smith AC, Barry SE, Chiong AY, Hadzakis D, Kha SL, Mok SC, Sable DL. Inferior alveolar nerve damage following removal of mandibular third molar teeth. Aprospective study using panoramic radiography. Aust. Dent. J. 1997 ;(42):149-152.
42. Selection criteria for dental radiography. The Faculty of General Dental Practitioners. London: The Royal College of Surgeons of England; 1998. page20.