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EVALUATE OF POSITION OF IMPACTED MANDIBULAR THIRD MOLARS AND THEIR RELATIONSHIP WITH THE INFERIOR ALVEOLAR CANAL WITH PANORAMIC RADIOGRAPHS

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ABSTRACT **BACKGROUND:** Mandibular third molar removal is a frequent surgical procedure. This study was designed to evaluate the reliability of OPG in predicting the proximity of impacted third molar roots/root with inferior alveolar nerve canal.

MATERIALS & METHODS: This study was conducted on 1000 patients (males- 500, females- 500) which were further divided into four groups of 250 each. Group A consisted of patients in the age group of 18-30 years, group B consisted of 31-40 years of age, group C consisted of 41-50 years of age and group D 51-60 years of age. Close relationship between impacted mandibular third molars and IAN canal was evaluated on OPG based on Winter's classification and Pell and Gregory classification.

RESULTS: Majority of mandibular third molar teeth were of vertically impacted 790 (47.6%), followed by mesioangular 730 (43.9%), horizontal 90 (5.4%) and distoangular 50 (3%). Male (56%) had a higher percentage than females (44%). Age group 18-30 years had 250 males and 350 females, 31-40 years had 200 males and 110 females, 41-50 years had 40 males and 35 females and 51-60 years had 10 males and 5 females. Left side impaction was seen in 840 cases, right side in 720 and bilateral in 100 cases. Maximum males and females had class III relation seen in 558 cases and 365 cases respectively.

CONCLUSION: Panoramic radiograph is a valuable in most cases to identify whether the IAC is in close association with a tooth. Prevention of damage to the inferior alveolar nerve should be based on a thorough understanding of the anatomy, as well as on an accurate planning for surgery.

KEYWORDS : Impaction, inferior alveolar nerve, Panoramic radiograph, Winter's

INTRODUCTION

Tooth develops within the alveolar bone. After the crown formation is complete, the root begins to form and active eruption moves the tooth towards its functional position inside the mouth. Tooth eruption is thus defined as the movement of tooth from its site of development within the alveolar bone to its functional position in the oral cavity.[1]

Most commonly impacted tooth is mandibular third molar followed by canine and premolar. In all surgical procedures, proper preoperative planning and blending of surgical technique with surgical principle is of paramount importance for decreasing the complications. Mandibular third molar removal is not different, yet such a common procedure sometimes results in what are relatively rare complications.[2] Factors thought to influence the incidence of complications after III molar removal include age, gender, medical history, oral contraceptives, present of percoronitis, poor oral hygiene, smoking , type of impaction, relationship of III molar to IAN, surgical time, surgical technique, surgeons experience, use of perioperative antibiotics, use of topical antiseptics, use of inter socket medication and anesthetic technique.[3]

Anatomically, the nerve lies in the inferior alveolar canal which is enclosed within a tube of dense bone. Damage to inferior alveolar nerve is though not a common post-operative complication following removal of lower third molar removal, precise identification of nerve canal is important to avoid injury to nerve. Therefore the knowledge of the proximity of the root of the mandibular third molars to the inferior alveolar canal may minimize the possibility of the injury to the canal.[4] OPG images have been utilized to assess proximity of inferior alveolar nerve canal and mandibular third molar root. It is cost effective and an easy technique to perform. This study was designed to evaluate the reliability of OPG in predicting the proximity of impacted third molar roots/root with inferior alveolar nerve canal.[5]

MATERIALS & METHODS

This study was conducted in the Department of Oral & Maxillofacial Surgery, Institute of Dental Sciences, Bareilly. The time duration was 2012- 2018. It comprised of 1000 patients (males- 500, females- 500) which were further divided into four groups of 250 each. Group A consisted of patients in the age group of 18-30 years, group B consisted of 31-40 years of age, group C consisted of 41-50 years of age and group D 51-60 years of age. A written informed consent was taken for each patient.

INCLUSION CRITERIA

1. Adult Individuals above 18 years with impacted mandibular third molar.
2. Patients willing for surgical removal of impacted mandibular third molar.
3. Good quality radiographs.

EXCLUSION CRITERIA

1. Inability to accurately identify inferior alveolar nerve canal on radiograph.
2. Displacement of the root due to pathology such as cyst or tumors.
3. Medically compromised patients.
4. Patients not willing for surgical removal of impacted mandibular third molar.

From each patient file, the demographics such as gender, age and signs or symptoms of impacted mandibular third molar were recorded. The patients were then subjected to OPG, in standard head position. Close relationship between impacted mandibular third molars and IAN canal was evaluated on OPG. The orthopantomographs were examined using a standard radiograph viewing box.

Impactions were classified according to the Winter's classification i.e. angulation classification system for impacted third molars. It comprised of mesioangular impaction, horizontal impaction, vertical impaction, distoangular impaction, bucco version, linguo version and inverted. Pell and Gregory classification based on relationship to the anterior border of the ramus was also assessed.

(A) Class I impaction in which mandibular third molar has sufficient room anterior to the anterior border of the ramus to erupt.
(B) Class II, in which half of the impacted third molar is covered by the ramus.
(C) Class III, in which the impacted third molar is completely embedded in the ramus of the mandible.

The data was then recorded in a spreadsheet using Microsoft Office Excel. The statistical analysis was done using SPSS (Statistical

Package for Social Sciences) Version 15.0 statistical analysis software. The values were represented in frequencies and percentages. $P < 0.05$ was considered significant.

RESULTS

Table I shows that the majority of mandibular third molar teeth were of vertically impacted 790 (47.6%), followed by mesioangular 730 (43.9%), horizontal 90 (5.4%) and distoangular 50 (3%). Male (56%) had a higher percentage than females (44%).

Table II shows that age group 18-30 years had 250 males and 350 females, 31-40 years had 200 males and 110 females, 41-50 years had 40 males and 35 females and 51-60 years had 10 males and 5 females. Table III shows that most common type of relation was below root tip relation seen in 1245 cases, followed by super imposed relation in 250 cases and grooving relation in 165. Below root tip relation was maximum in 485 cases of mesio- angular impacted, 635 cases of vertical impacted, 50 in distoangular relation and 75 in horizontal impaction. Table IV shows that left side impaction was seen in 840 cases, right side in 720 and bilateral in 100 cases.

Graph II shows that maximum males and females had class III relation seen in 558 cases and 365 cases respectively. Table V shows that maximum number of parasthesia cases was seen in age group 18-30 years (11) followed by 31-40 (6) and 41-50 (1).

DISCUSSION

Most commonly impacted teeth is mandibular third molar. Various classifications have been documented.[6,7] Winter's classified impacted teeth based on the relationship of the impacted teeth to the long axis of adjacent second molar teeth. Pell & Gregory classification relates the position of the tooth to the ascending ramus of the second molar.[8]

In present study, there were 500 males and 500 females. The data coincides with university of Western Cape study. Majority of mandibular third molar teeth were of vertically impacted 790 (47.6%), followed by mesioangular 730 (43.9%), horizontal 90 (5.4%) and distoangular 50 (3%). Male (56%) had a higher percentage of impaction than females (44%).The present study deviates from other authors. Various other studies[9,10,11] have shown the order of impacted teeth to be different. Mesioangular impaction was the most common followed by vertical, distoangular and horizontal.

There is a definite geographical strata [12] of population considered hence, the possibility of change in the pattern of impactions. The present study is conducted in sub group of North Indian population and the results may vary for the entire Indian population. There was a definite gender predilection with males accounting for 56% of impacted teeth. Other studies have reported similar patterns with a high female predilection. Few studies have also reported a equal sex predilection for impacted mandibular third molar[13,14]

The mean age for third molar eruption is 17 year. We found that age group 18-30 years had 250 males and 350 females, 31-40 years had 200 males and 110 females, 41-50 years had 40 males and 35 females and 51-60 years had 10 males and 5 females.

The wide age range found with third molar eruption, as well as positional changes that occur after eruption may be due to difference in race, nature of the diet, the intensity of the use of the masticatory apparatus and possibly due to genetic background.[15]The incidence of impacted mandibular teeth on the left side was almost equal in both sexes. However there was a marginal increase in the number of impacted teeth on the left side in male patients. Left side impaction was seen in 840 cases, right side in 720 and bilateral in 100 cases. The study concludes that there is no statistical difference of impacted teeth on left and right side.

The study carried out by Bataineh AB et al[16] reported the rate and factors influencing sensory impairment of the inferior alveolar and lingual nerves after the removal of impacted mandibular third molars under local anesthesia. Postoperative lingual nerve paresthesia occurred in 18 patients. There was a highly significant increase in the incidence associated with raising of a lingual flap.

Statistical analyses revealed that inferior alveolar nerve paresthesia were unrelated to the other variables. Statistical analysis is to compare the relationship of the IAC and the relationship of the roots to the neurovascular bundle was performed. There was a significant statistical difference between the type of mandibular third molar and their relationship to the IAN.

The incidence of paresthesia was higher in female patients (10) compared to male (8) patients. Maximum number of cases in the age group of 18-30 years reported with paresthesia. Maximum number of parasthesia cases was seen in age group 18-30 years (11) followed by 31-40 (6) and 41-50 (1). We found paraesthesia in 1.8% population. Other authers[17,18] have reported parasthesia less than 5% population. This could be attributed to multiple surgeons who operated in the surgery.

The literature and logic dictates that the grooving of the root tip of the third mandibular molar around the neurovascular bundle would be associated with the injury to the inferior alveolar neurovascular bundle upon its removal which would manifest as paresthesia of the lower lip, of the ipsilateral half of the chin & jaw and that, the location of the neurovascular bundle below the root tip or apex would be the safest relationship as far as the paresthesia would be concerned.[19]

In our study, most common type of relation was below root tip relation seen in 1245 cases, followed by super imposed relation in 250 cases and grooving relation in 165. Below root tip relation was maximum in 485 cases of mesio- angular impacted, 635 cases of vertical impacted, 50 in distoangular relation and 75 in horizontal impaction. It could be probably attributed to other etiological factors like traumatic extraction technique, radiographic errors of magnification/diminution or patient movement/shaking while making the OPG resulting in image being out of the focal trough.

The limitation of the study is small sample size. Moreover only OPGs were taken whereas 3D imaging system could have been provided better relation of impacted mandibular third molar and inferior alveolar nerve canal.

CONCLUSION

The close proximity of the inferior alveolar nerve to the roots of impacted mandibular third molar is well known. Panoramic radiograph is a valuable in most cases to identify whether the IAC is in close association with a tooth. A patient with one or more high risk radiographic findings has a significantly increased risk for nerve injury, although overall this is still an uncommon event. Prevention of damage to the inferior alveolar nerve should be based on a thorough understanding of the anatomy, as well as on an accurate planning for surgery, avoiding impingement of the mandibular third molar roots on the mandibular canal.

Table I Type of impacted mandibular third molar according to gender

Gender	No. of patients	No. of impacted third molar	Mesioangular position	Vertical position	Distoangular position	Horizontal position
Male	500 (50%)	930 (56%)	450 (48.3%)	400 (43%)	50 (5.4%)	30 (3.2%)
Female	500 (50%)	730 (44%)	280 (38.3%)	390 (53%)	0	60 (8.2%)
Total	1000 (100%)	1660 (100%)	730 (43.9%)	790 (47.6%)	50 (3%)	90 (5.4%)

Table II Age wise distribution of cases

Age groups	Male	Female
18-30 (Group A)	250	350
31-40 (Group B)	200	110
41-50 (Group C)	40	35
51-60 (Group D)	10	5
Total	500	500

Table III Relationship between tip of impacted mandibular third molar to neurovascular bundle

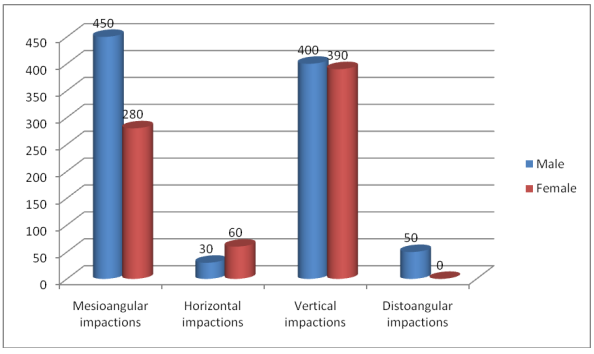
Type of impaction	Superimposed Relation	Below root tip relation	Grooving relation	Total
Mesioangular Relation	100 (40%)	485 (39%)	145 (88%)	730 (100%)
Vertical Relation	140 (56%)	635 (51%)	15 (9%)	790 (100%)

Distoangular Relation	0	50 (4%)	0	50 (100%)
Horizontal Relation	10 (4%)	75 (6%)	5 (3%)	90 (100%)
Total	250 (15%)	1245 (75%)	165 (10%)	1660 (100%)

Table IV Number of impacted mandibular third molars in male and female according to involvement of site

	Left side impaction	Right side impaction	Bilateral impaction	Total
Male	430	440	60	930
Female	410	280	40	730
Total	840	720	100	1660

Graph I Impacted mandibular third molars according to winter's classification



Graph II Impacted mandibular third molars according to Pell & Gregory classification

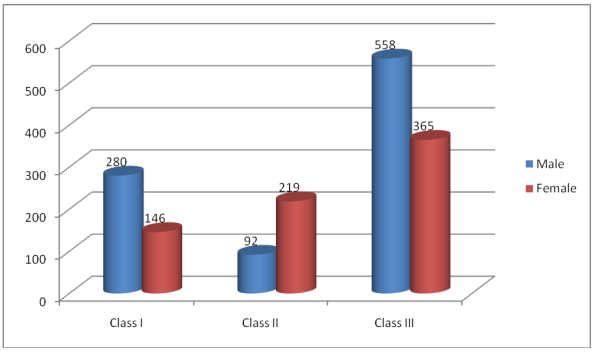


Table V Inferior alveolar nerve parasthesia after removal of impacted mandibular third molars

Age group (years)	Male	Female
18-30	4	7
31-40	3	3
41-50	1	0
51-60	0	0

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