



ISSN: 0976-8031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 8, Issue, 3, pp. 16103-16106, March, 2017

**International Journal of
Recent Scientific
Research**

DOI: 10.24327/IJRSR

Research Article

DIGITAL PANORAMIC RADIOGRAPH TO PREDICT DIFFICULTY FACTORS IN IMPACTED MANDIBULAR THIRD MOLARS IN MELMARUVATHUR – A RETROSPECTIVE STUDY

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DOI: <http://dx.doi.org/10.24327/ijrsr.2017.0803.0075>

ARTICLE INFO

Article History:

Received 16th December, 2016
Received in revised form 25th
January, 2017
Accepted 23rd February, 2017
Published online 28th March, 2017

Key Words:

Impaction, Mandibular third molar,
panoramic radiograph

ABSTRACT

The removal of impacted third molars is the most common procedure in the specialty of oral and maxillofacial surgery. The use of panoramic radiograph has been recommended as the primary radiographic investigation of choice in the assessment of the impacted mandibular third molar teeth. It is useful to assess the position, depth, and the type of impaction as well as the texture of the investing bone. We have conducted 300 cases of retrospective panoramic radiographic study at Adhiparasakthi dental college and hospital, Melmaruvathur, the main objective of this study to evaluate predictors associated with the impacted mandibular third molars such as age, gender, angulation, root formation, root tip relation to the inferior alveolar canal and measurement of the depth of bone in relation to the impacted mandibular third molar. For all the predictors significant variables are noted and concluded panoramic radiographs can be used as reliable investigation for evaluation of impacted mandibular third molar.

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INTRODUCTION

A tooth which fails to erupt into the dental arch within the expected time is referred to as an impacted tooth(1,2). As Oral & Maxillofacial Surgeons, the most common problem we face is the impacted lower third molar (3). In 2004, Farman stated "teeth which get impacted are those that are prevented from eruption due to a physical barrier within the path of eruption"(4). It has been noted that different races have different times of third molar eruption. The eruption time of mandibular third molars in Nigerians has been documented as early as 14 years of age and up to 26 years in Europeans(5,6). The maximum incidence of impacted mandibular third molars are seen in females(7). The average eruption age of a mandibular third molar for males is 3 to 6 months ahead of females(7). Prior to any form of surgical intervention, it is necessary to have a radiological examination to predict the variations in relation to impacted mandibular third molar(IM)(7).

The use of the dental panoramic radiograph (OPG) has been recommended widely to assess the position, depth, and relationship to the inferior alveolar nerve canal (IAN),

angulation, type of impaction and the texture of the bone in relation to the IM(8).

The aim of this study was to review third molar impaction retrospectively with the use of OPGs to evaluate predictors associated with the IM such as age, gender, angulation, root shape, root formation, root laceration, root tip relation to the inferior alveolar canal and measurement of the depth in relation to occlusal plane and gonial plane.

MATERIALS AND METHODS

This retrospective study was conducted in the Department of Oral & Maxillofacial Surgery, Adhiparasakthi Dental College & Hospital, Melmaruvathur from June 2014 - June 2015. All panoramic radiographs taken at the Department of Oral Medicine & Radiology, Adhiparasakthi Dental College & Hospital, Melmaruvathur from June 2014 - June 2015 were collected. Only digital radiographs taken using the Sidexis software at the Department of Oral Medicine & Radiology were included in the study. The radiographs of the patients who had dental caries, periapical pathologies, previous history of surgeries in the head and neck region and patients who had received orthodontic treatment were excluded from the study. All measurements were computed from digitized landmarks

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through use of the Sidexis software connected to a compatible computer.

Measurements

Dimensional radiographic measurements (in millimetres) of the IM and mandible were carried out as follows:

Occlusal Plane (O) - A line drawn occlusally which connects all the bicuspids which represents the white line

Gonion Point (G) - Atangential line drawn posteriorly from the condyle to the ramus of the mandible and another line drawn to the lower border of mandible. The point where the two lines bisected each other was noted. This point is the most inferior, posterior and lateral point on the angle of the mandible.

D1 - Measurements were made from the mesial most tip of the alveolar bone in relation to impacted mandibular third molar to the Gonion (G)

D2 - Measurements were made from the distal most tip of the alveolar bone in relation impacted mandibular third molar to the point Gonion (G)

N - Measurements were made from mesial root apex of IM to the IAN canal.

R - Measurements were made from the furcation point of the impacted mandibular third molar to the occlusal line.

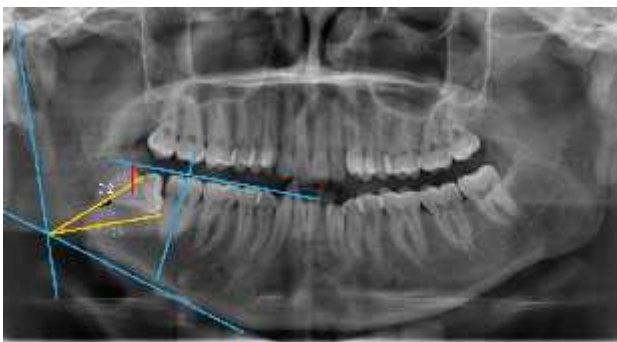


Fig 1 Schematic Drawing of Panoramic Film Shows Reference Points, And Lines For Estimation of Mandibular Variables In Relation To Impacted Mandibular Third Molar (IM).

- D1 - Distance From Mesial Most Tip of The Alveolar Bone To Gonion
- D2 - Distance From Distal Most Tip of The Alveolar Bone To Gonion
- N - Distance From Root Apex To The IAN Canal
- R - Distance From Furcation Point of The Im To The Occlusal Line

RESULTS

A total of 300 digital panoramic radiographs were taken at the Department of Oral Medicine & Radiology from June 2014- June 2015 and these digital panoramic radiographs were included in this study. 142 radiographs were that of male subjects (47.4%) and 158 radiographs were that of female subjects (52.6%). All subjects were over the age of 21 years. The age range was from 21- 31 years and the mean age of the subjects was 25. 5 years.

The distribution of the type of impacted mandibular third molar in our study were as follows - mesio angular (MA) 182 cases (60.66%), horizontal (H) 101 cases (33.67%), vertical (V) 14 cases (4.67 %) and distoangular type (DA) 3 cases (1%). On the basis of root formation it was found that incomplete root were seen in 3 cases and dilacerated root were seen in 2 cases.

The average distance of root relation to the inferior alveolar nerve canal (N) (FIG: 01) were for V it is 2.63 mm, H it is 2.06 mm, MA it is 4.50 mm and DA it is 4.20 mm.

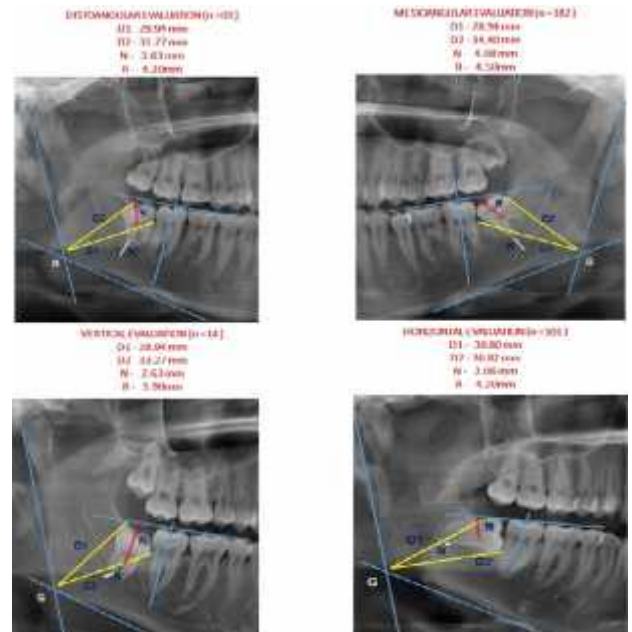


Fig 2 Average Distance From Root Apex Of Impacted Mandibular Third Molar To The Inferior Alveolar Nerve Canal (IAn), The Average Distance From The Mesial Part Of Alveolar Crest (D1) And Distal Part Of Alveolar Crest (D2) To The Point Gonion (G)

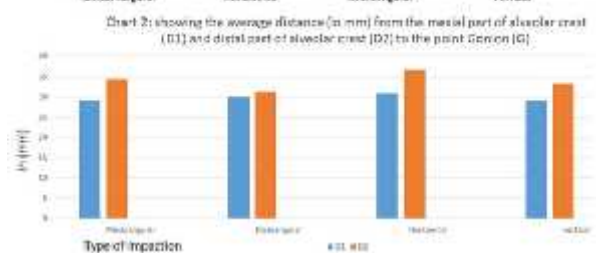
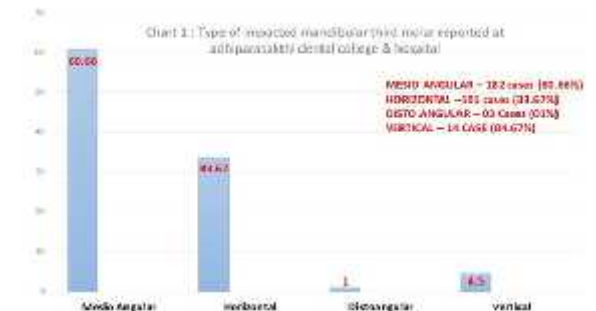


Chart 1 - Type of Impacted Mandibular Third Molars In Patients Reporting To Adhiparasakthi Dental College & Hospital During 2014-2015

Chart 2 - Average Distance of D1 & D2 in mm

Chart 3 - Average Distance of N & R in mm

The average distance from the mesial part of alveolar crest (D1) and distal part of alveolar crest (D2) to the point Gonion (G) were evaluated as for MA-D1 is 28.94 mm: D2 is 34.40 mm, DA-D1 is 29.94 mm: D2 is 31.27 mm, H-D1 is 30.80mm: D2 36.82 mm and for V is D1 is 28.94 mm: D2 is 33.27 mm. The average distance of occlusal plane to the point of furcation (R) were evaluated as for MA-4.50 is mm, DA- 4.20 mm, H-04.20 mm and for V is 3.90 is mm.

DISCUSSION

The removal of impacted mandibular third molar is the first line of treatment due to eruption in an abnormal position(9). Although it is a common minor surgical procedure there are certain complications which are associated with it like pain, swelling, trismus, alveolar osteitis and paresthesia of the inferior alveolar nerve(10). In order to minimize the complications preoperative orthopantomograph radiographic assessment is necessary (11). MacGregor, first made an attempt to establish a model for assessing surgical difficulty of the impacted tooth by placing three imaginary lines to determine the depth of the bone(12). Pell and Gregory gave an alternative method to determine surgical difficulty radiologically(13). Farish *et al* advocated the use of radiographs to determine the difficulty associated with a surgical removal of an impacted third molar(14). Use of intra oral periapical radiographs have been used for many years to assess impacted teeth. Later on, due to the difficulty in assessment of nerve canal in relation to the impacted tooth, the use of panoramic radiograph was advocated(14). It is a standard imaging technique used for the imaging of evaluation of third molars(4)(15).

We have evaluated age, gender, angulation, root shape, root formation, root laceration, root tip relation to the inferior alveolar canal and measurement of the depth in relation to occlusal plane and gonial plane retrospectively with 300 digital radiographs. The age group of all the patients whose radiographs were included in this study was between 21 – 31 years (mean age of 25.5 years). Studies conducted by Sandhu and Kapila *et al*, Chiapasco *et al* and Hazza *et al* had subjects in the same age group as well (16–18). Among the total study population of 300, 142 (47.4%) are males and 158 (52.6%) are females. 60.66 % of impacted teeth were mesioangular, 33.67 % were horizontal, 4.5 % were vertical and 1 % was distoangular. These results were comparable with Stanley *et al* and Knutson *et al* who concluded that the most common impaction according to winter's classification was mesioangular impaction (19,20).

In our study the average distance from the mesial part of alveolar crest (D1) and distal part of alveolar crest (D2) to the point Gonion (G), the average distance from the point of furcation to the occlusal plane(R) was valuated and it shows that horizontal impactions have more depth in relation to gonion and mesioangular type has highest depth in relation to the occlusal plane. Reitzik *et al* showed that unerupted third molars requires 40% less force to fracture mandible when compare to fully erupted third molar which is due to the fact the tooth occupies more osseous space(21). Regarding the relation to the inferior alveolar nerve canal to the root apex, the horizontal type of impaction has the closest proximity (2.06 mm) which was similar to the study conducted by Heinz-Theo

Lubbers *et al* in which he concluded that 69.7% of the 493 teeth had a direct contact to the inferior alveolar nerve and root apex(22).

CONCLUSION

1. The mesioangular type of impaction is the common type of impaction in our study.
2. Female predilection were more common than males.
3. Alveolar bone coverage is more in horizontal type of impaction in relation to gonion and mesioangular has more depth in relation to the occlusal plane.
4. All the impacted third molars had complete root development.
5. The relationship between the root tip and nerve canal, horizontal type of impaction has close proximity.

Acknowledgements

We are grateful to every member of the department of Oral Medicine & Dentofacial Radiology to avail the use of data and radiographs to complete this study.

References

1. Ma'aita J, Alwrikat A. Is the mandibular third molar a risk factor for mandibular angle fracture? *Oral Surgery, Oral Med Oral Pathol Oral Radiol Endodontology* [Internet]. 2000;89(2):143-6. Available from: <http://www.sciencedirect.com/science/article/pii/S1079210400568450>
2. Queral-Godoy E., Figueiredo R., Valmaseda-Castellón E. b, Berini-Aytés L. c, Gay-Escoda C. c d e. Frequency and evolution of lingual nerve lesions following lower third molar extraction. *J Oral Maxillofac Surg* [Internet]. 2006;64(3):402–7. Available from: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-32944455092&partnerID=40&md5=45281a7f3d1b5233a7d788f7dc9ab44d>
3. Pons-Vicente O, Valmaseda-Castellón E, Berini-Aytés L, Gay-Escoda C. Effect on pocket depth and attachment level of manual versus ultrasonic scaling of lower second molars following lower third molar extraction: a randomized controlled trial. *Oral Surgery, Oral Med Oral Pathol Oral Radiol Endodontology* [Internet]. 2009;107(3):e11–9. Available from: <http://www.sciencedirect.com/science/article/pii/S1079210408008792>
4. Juodzbalys G, Daugela P. Mandibular Third Molar Impaction: Review of Literature and a Proposal of a Classification. Vol. 4, *Journal of Oral & Maxillofacial Research*. Kaunas, Lithuania; 2013.
5. Kruger E, Thomson WM, Konthasinghe P. Third molar outcomes from age 18 to 26: Findings from a population-based New Zealand longitudinal study. *Oral Surgery, Oral Med Oral Pathol Oral Radiol Endodontology* [Internet]. 2001;92(2):150–5. Available from: <http://www.sciencedirect.com/science/article/pii/S1079210401885814>
6. Odusanya SA, Abayomi IO. Third molar eruption among rural Nigerians. *Oral Surgery, Oral Med Oral Pathol*. 1991;71(2):151-4.
7. Miloro M, DaBell J. Radiographic proximity of the mandibular third molar to the inferior alveolar canal. *Oral Surgery, Oral Med Oral Pathol Oral Radiol*

- Endodontology*. 2005;100(5):545-9.
8. Bell GW. Use of dental panoramic tomographs to predict the relation between mandibular third molar teeth and the inferior alveolar nerve. Radiological and surgical findings, and clinical outcome. *Br J Oral Maxillofac Surg*. 2004;42(1):21-7.
 9. Dunne CM, Goodall CA, Leitch JA, Russell DI. Removal of third molars in Scottish oral and maxillofacial surgery units: A review of practice in 1995 and 2002. *Br J Oral Maxillofac Surg*. 2006;44(4):313-6.
 10. Latt MM, Chewpreecha P, Wongsirichat N. Prediction of difficulty in impacted lower third molars extraction; review literature. *Mahidol Dent J*. 2015;35(3):281-90.
 11. Roy I, Baliga SD, Louis A, Rao S. Importance of clinical and radiological parameters in assessment of surgical difficulty in removal of impacted mandibular 3rd molars: A new index. *J Oral Maxillofac Surg*. 2014;14(3):745-9.
 12. MacGregor AJ. The radiological assessment of ectopic lower third molars. Vol. 61, *Annals of The Royal College of Surgeons of England*. 1979. p. 107-13.
 13. Renton T, McGurk M. Evaluation of factors predictive of lingual nerve injury in third molar surgery. *Br J Oral Maxillofac Surg*. 2001;39(6):423-8.
 14. Farish SE, Bouloux GF. General Technique of Third Molar Removal. Vol. 19, *Oral and Maxillofacial Surgery Clinics of North America*. 2007. p. 23-43.
 15. Selvi F, Dodson TB, Nattestad A, Robertson K, Tolstunov L. Factors that are associated with injury to the inferior alveolar nerve in high-risk patients after removal of third molars. *Br J Oral Maxillofac Surg*. 2013;51(8):868-73.
 16. Sandhu SS, Kapila BK. Incidence of impacted third molars. *J Indian Dent Assoc*. 1982 Dec;54(12):441-4.
 17. Chiapasco M, Cicco L De, Marrone G. Side effects and complications associated with third molar surgery. *Oral Surgery, Oral Med Oral Pathol* [Internet]. 1993;76(4):412-20. Available from: <http://www.science-direct.com/science/article/pii/0030422093900050>
 18. Hazza'a AM, Albashaireh ZSM, Bataineh A. The relationship of the inferior dental canal to the roots of impacted mandibular third molars in a Jordanian population. *J Contemp Dent Pract*. 2006 May;7(2):71-8.
 19. Stanley HR, Alattar M, Collett WK, Stringfellow HR, Spiegel EH. Pathological sequelae of ??neglected?? impacted third molars. *J Oral Pathol Med*. 1988;17(3):113-7.
 20. Knutsson K, Brehmer B, Lysell L, Rohlin M. Pathoses associated with mandibular third molars subjected to removal. *Oral Surgery, Oral Med Oral Pathol Oral Radiol Endodontology* [Internet]. 1996;82(1):10-7. Available from: <http://www.sciencedirect.com/science/article/pii/S1079210496803714>
 21. Reitzik M. Discussion: Are mandibular third molars a risk factor for angle fractures? A retrospective cohort study. *J Oral Maxillofac Surg* [Internet]. 1995; 53(6): 649-50. Available from: <http://www.sciencedirect.com/science/article/pii/0278239195901612>
 22. Lübbers HT, Matthews F, Damerau G, Kruse AL, Obwegeser JA, Grätz KW, et al. Anatomy of impacted lower third molars evaluated by computerized tomography: Is there an indication for 3-dimensional imaging? *Oral Surgery, Oral Med Oral Pathol Oral Radiol Endodontology*. 2011;111(5):547-50.

How to cite this article:

Vinod Krishna.2017, Digital Panoramic Radiograph to Predict Difficulty Factors In Impacted Mandibular Third Molars in Melmaruvathur-A Retrospective Study. *Int J Recent Sci Res*. 8(3), pp. 16103-16106.
DOI: <http://dx.doi.org/10.24327/ijrsr.2017.0803.0075>
