Original Article

Pattern of Mandibular Impacted Third Molar: A Radiographic Analysis

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Abstract

Objectives: *Impaction may be defined as a failure of complete eruption into the normal functional position of one tooth within normal time due to a lack of space in the dental arch. The aim of this study is to evaluate the position of mandibular impacted 3rd molars based on the classification of Pale & Gregory in a sample of patients in the Mark's Medical College Hospital & Dental Unit.*

Study design: *In this retrospective study, 128 orthopantomogram patients were reported to the maxillofacial department of the Mark's Medical College Hospital & Dental Unit from September 2021 to September 2022 and were evaluated.*

Results: *Among 128 patients 66 were male & 62 were female. Among 128 impacted mandibular 3rd molar the most common angulation of impaction was in mesioangular (57.81%) followed by horizontal (32.03%) and distoangular (7.03%), vertical (3.13%)*

Conclusion: *The pattern of 3rd molar impaction is characterized by the high prevalence of mesioangular impaction of the mandible & less prevalence was vertical impaction. There was no significant difference between the right & left side jaw.*

Key words: *Impaction, Radiographic analysis, Third molar.*

Introduction

Impaction may be defined as a failure of complete eruption into the normal functional position of one tooth within normal time due to a lack of space in the dental arch caused by another tooth or development in an abnormal position.[1] Third molars are the most frequently impacted teeth because of their particular topography, phylogeny & ontogeny. They are directly or indirectly associated with numerous disorders in the mouth jaw & facial regions. Therefore, the extraction of 3rd molar is one of the most common surgical procedures for oral & maxillofacial surgeons.

Development of mandibular third molars starts in the ramus of the mandible at about the age of seven years.[2] The third molars are the last teeth to erupt in all races despite racial variations in the eruption sequence. Racial variation in facial growth, jaw and teeth size, nature of the diet, the extent of generalized tooth attrition, degree of use of masticatory apparatus and genetic inheritance are the crucial factors which determines the eruption pattern, impaction status and the incidence of agenesis of third molars.[3]

Impacted teeth were seldom a problem for Neolithic man. Their highly abrasive diet caused attrition of teeth resulting in a reduction of mesiodistal distance of the dentition. This allows the mesial migration of teeth and adequate space was available for the eruption of the third molars. But with the arrival of refined food and consequential reduction in the masticatory functional load, today, the rate of impaction of third molars shows a significant increase (John Hunter theory of nature and nurture). Mead believed that delay in eruption causes impaction of teeth.[4]

Clinically impacted teeth may give various presentation including pain, food impaction, cheek bite etc. In order to examine impacted third molars, radiographs are still the gold standard for investigation. Radiographs like intraoral periapical, and orthopantomograms (OPG) are used to evaluate the type of impaction, any anatomical impediments that are preventing its eruption; whether it is completely or partially embedded in bone, marginal bone height, condition of adjacent second molars and relation of third molars to inferior alveolar canal; so that a proper management can be planned.[5]

This study aimed to determine, the status of mandibular third molars in patients of the Marks Medical College & Dental Unit by evaluating the following factors Prevalence, Incidence of angulations, age variation, gender, site and available space of eruption and mesio-distal diameter of impacted third molars.

Materials and Methods

128 patients with impacted mandibular 3rd molars who reported to the maxillofacial surgery department of marks medical college hospital dental unit from September 2021 to September 2022, among them 66 were male and 62 were female. They were aged between 18 to 59 years. Subjects below the age of 18 years were excluded as the eventual outcome of the third molar eruption is still uncertain. Exclusion criteria were any pathosis or trauma to the jaw that may disrupt its alignment.

Orthopantomograms were taken for all subjects in order to assess the angulations of the impacted 3rd molar.

Angulation: The mesioangular position of the third molar was determined by its sagital relationship to the adjacent second

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molar obtained from a tracing of the panoramic radiographs. A line was drawn through the midpoint of the occlusal surface and bifurcation of the second molars and third molars. These lines represent the long axis of the teeth. The angle formed between the intersected long axis gave the degree of the third molars inclination relative to the second molars. The inclination angle was then read from a compass grid drawn on transparent film with the use of a radiographic view box. The inclination angle was read in increments of 5 to a maximum of 65, above which the third molar was considered to be horizontally impacted.

Results

Among 128 patients with impacted mandibular 3rd molars who reported to the maxillofacial surgery department of Mark's medical college hospital and dental unit from September 2021 to September 2022. Seventy-four patients are mesioangular, 9 patients are distoangular, 4 patients are vertical & 41 patient's are horizontal. The angular position of impacted 3rd molars shows a higher frequency of mesioangular position (57.81%) followed by horizontal (32.03%), distoangular (7.03%), vertical (3.12%).

Figure 1: Distribution of Age group of impacted mandibular 3rd molar

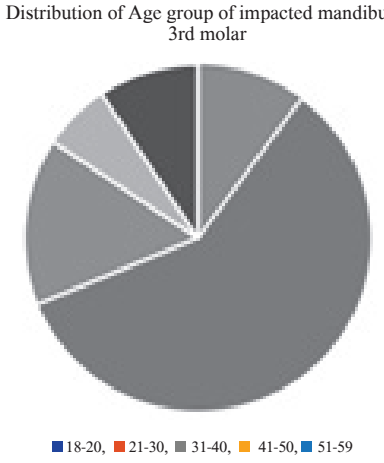
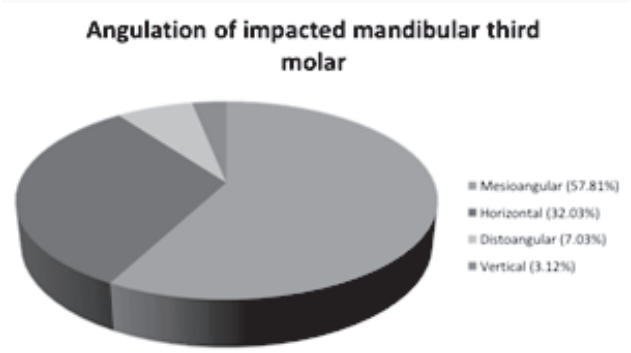


Table1: Angulation of impacted third molars in mandible

Angulation					
	Mesioangular	Horizontal	Distoangular	Vertical	Total
Mandible	74	41	9	4	128
	57.81%	32.03%	7.03%	3.12 %	100 %

Figure 2: Angulation of impacted mandibular third molar Mesioangular (57.81%) Horizontal (32.03%) Distoangular (7.03%) Vertical (3.12%)



Discussion

The incidence of mandibular 3rd molar impaction is a common problem among patients who reported to hospitals & clinics with dental problems. Removal of the impacted tooth is the most controversial surgical procedure of oral & maxillofacial surgery. This study was undertaken to see the incidence of angulation of impacted mandibular 3rd molar among patients reported in the oral & maxillofacial department of marks medical college & dental unit. Patients included in their consecutive individuals in the age group of 18 to 59 years. As the normal time of eruption of 3rd molars are variable starting at the age of 16 years. The subjects were clinically examined & their orthopantomogram was taken. The evaluation was done as per the guidelines mentioned in the materials & methods. The parameter sought were angulations age, male female ratio.

The prevalence & pattern of impacted 3rd molars have been studied by different authors in different parts of the world. The prevalence and pattern of impacted third molars have been studied by different authors in different parts of the world like, Odusanya et al (1991)[3] Kramer (1970)[4] in Harlen Hospital, N.Y, Haidar et al (1986)[6] in Saudi community, Schersten et al (1989)[7] in Sweden, in Nigerians, Hattab (1995)[8] in Jordanian students, and Quek et al (2003)[9] in Singapore Chinese population (BHOPAL).

Studies in Nigeria showed that the mesioangular type of impaction was the most frequently seen.[10] Likewise, it was also the most common type among Chinese(80%) and Korean populations (46.5%).[11] A study in Thailand revealed that out of 680 impacted molar extractions, 402 teeth were mesioangularly impacted.[12] One Spanish[13] study done by showed similar results where mesioangular was most common(71.5%) while another study in Barcelona documented that vertical angulation type of impaction was predominant (47.9%) and mesioangular was about 20.5%[14] also concluded that mesioangular impaction was the most frequently seen (52.3%) followed by horizontal (26.4%), vertical (12.2%) and distoangular impaction (9.1%). Hasan[15] also concluded that the most common angulation of

impaction in the mandible was the mesioangular type (33.4%), followed by the horizontal (27.5%). However, a study among Jordanians found that vertical impaction was the most common type (61.4%) and mesioangular type was only 18.1%.[8] Sasano, et al. in their studies had observed mandibular third molars with vertical (46%), horizontal (34%), mesial (19.5%) and distal (0.5%). (ISRAEL).[1]

In this study out of 128 mandibular 3rd molar greater frequency were found to be in mesio angular position 74(51.81%) followed by horizontal 41(32.03%), Distoangular 9(7.03%), vertical 4(3.1%). Our study found that 75 of 128 patients with impacted mandibular third teeth were between the ages of 21 and 30 which are notable.

Conclusion

The study was conducted over a period of one year probably a longer period would give a better picture of the problem of impacted 3rd molar teeth. The prevalence of mesioangular impacted 3rd molar teeth in a population of patients from marks medical college & dental unit is 57.81%. This study demonstrated that the female to male ratio is 1:1.1, more males were likely to present with impacted mandibular third molars than females. The prevalence of third molar impactions was high at the age of 21 to 30 years which was 59%. Mesio-angular impactions were the most prevalent type of impaction, followed by horizontal, vertical, distal, transverse, and inverted angulations.

On comparing this study with other regional studies it was evident that there was no universal consensus on incidence or patterns of impactions. These differences may be attributed to inadequate International standardization of evaluation criteria and to the difference in evaluation tools. There are plenty of scopes to do standardized global multicentric studies with uniform guidelines and larger number of subjects. This may help us to understand similarities and differences in the patterns of impaction on a global level.

Reference

1. Abu-Hussein Muhamad, Watted Nezar. Prevalence of Impacted Mandibular Third Molar in Population of Arab Israeli: A Retrospective Study. IOSR J Dental and medical science. 2016; 15: e-ISSN: 2279-0853, pISSN: 2279-0861

2. Kumar Pillai A, Thomas S, Paul G, Singh SK, Moghe S. Incidence of impacted third molars: A radiographic study in People's Hospital, Bhopal, India. J Oral Biol Craniofacial Res [Internet]. 2014;4(2):76–81. Available from: http://dx.doi.org/10.1016/j.jobcr.2014.04.001

3. Odusanya SA, Abayomi IO. Third molar eruption among rural Nigerians. Oral Surgery, Oral Med Oral Pathol. 1991;71(2):151–4.

4. Kramer RM, Williams AC. The incidence of impacted teeth. A survey at Harlem Hospital. Oral Surgery, Oral Med Oral Pathol, 1970;29(2):237–41.

5. Molander B, Ahlqwist M, Gröndahl HG, Hollender L. Agreement between panoramic and intra-oral radiography in the assessment of marginal bone height. Dentomaxillofacial Radiol. 1991;20(3):155–60.

6. Haidar Z, Shalhoub SY. The incidence of impacted wisdom teeth in a Saudi community. Int J Oral Maxillofac Surg [Internet]. 1986;15(5):569–71. Available from: http://dx.doi.org/10.1016/S0300-9785(86)80060-6

7. Scherstén E, Lysell L, Rohlin M. Prevalence of impacted third molars in dental students. Swed Dent J. 1989;13(1–2):7–13.

8. Hattab FN, Rawashdeh MA, Fahmy MS. Impaction status of third molars in Jordanian students. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1995 Jan;79(1):24–9.

9. Quek SL, Tay CK, Tay KH, Toh SL, Lim KC. Pattern of third molar impaction in a Singapore Chinese population: a retrospective radiographic survey. Int J Oral Maxillofac Surg [Internet]. 2003;32(5):548–52. Available from: http://dx.doi.org/10.1016/S0901-5027(03)90413-9

10. Mwaniki D GS. Incidence of impacted mandibular third molars among dental patients in Nairobi, Kenya. Trop Dent J. 1996;19(74):17–1

11. Ma, Jasser K.. "IMPACTED THIRD MOLARS AND ASSOCIATED PATHOLOGY IN JORDANIAN PATIENTS." (2000) - Search [Internet]. [cited 2023 Mar 7]. Available from: https://www.bing.com/search?q=Ma%2C+Jasser+K..+"IMPACTED+THIRD+MOLARS+AND+ASSOCIATED+PATHOLOGY+IN+JORDANIAN+PATIENTS."+(2000)&cvid=505ff974885f4140acf7bb3c98258353&aqs=edge..69i57.6410j0j1&pglt=43&FORM=ANNTA1&PC=HCTS

12. Chaparro-Avendaño AV, Pérez-García S, Valmaseda-Castellón E, Berini-Aytés L, Gay-Escoda C. Morbidity of third molar extraction in patients between 12 and 18 years of age. Med Oral Patol Oral Cir Bucal. 2005;10(5):422–31.

13. Almendros-Marqués N, Berini-Aytés L, Gay-Escoda C. Influence of lower third molar position on the incidence of preoperative complications. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2006 Dec;102(6):725–32.

14. Bataineh AB, Albashaireh ZS, Hazza'a AM. The surgical removal of mandibular third molars: a study in decision making. Quintessence Int. 2002 Sep;33(8):613–7.

15. Syed KB, Zaheer KB, Ibrahim M, Bagi MA, Assiri MA. Prevalence of Impacted Molar Teeth among Saudi Population in Asir Region, Saudi Arabia - A Retrospective Study of 3 Years. J Int oral Heal JIOH. 2013 Feb;5(1):43–7.

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