



VARIATION IN IMPACTION TYPES OF MANDIBULAR THIRD MOLARS IN WESTERN CHHATTISGARH- A DESCRIPTIVE CROSS-SECTIONAL RETROSPECTIVE STUDY

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ABSTRACT **Background:** Impacted third molars are prevalent and may lead to varied complications in oral cavity. This descriptive cross-sectional study adopted retrospective examination of the presence of impacted lower third molars and its variations using digital panoramic radiographs (DPRs).

Objectives: To detect in the DPRs and to categorize the type of impactions in lower third molars.

Results: Most prevalent type of impaction (TOI) was Mesioangular (MA) Impaction (60.9%), followed by Vertical (V) Impaction (18%), Horizontal (H) Impaction (12.8%), Transverse (TV) Impaction (4.5 %) and Distoangular (DA) Impaction (2.3 %), respectively. The Inverted (IN) type of impaction was least prevalent type.

Conclusion: The high prevalence of MA may be related to the anatomical normal inclination of the third molars. The low prevalence of DA observed in the study sample on the other hand might be attributable to gender and demographic factors.

KEYWORDS : Digital Panoramic Radiographs; Types of impaction, Third molar, Prevalence

Introduction:

Culture, industrialization and changed food habits has allowed gene shifts that led to smaller jaw size and eventually to the impaction of tooth.¹ Impaction is the failure or delay of eruption of certain teeth that are lying in the jaw. Impaction prevalence is attributed to several factors such as; timing of dental eruption, inhibition of growth by adjacent tooth, mucosa thickness over growing tooth and genetic factors.^{1,2} Third molars or wisdom teeth are considered to be the most frequently impacted teeth followed by the maxillary canines and second premolars. Retained impacted teeth are associated with soft tissue inflammation, pain and pathologic conditions like cyst/ tumor development, fractures etc which lead to surgical intervention. Mandibular third molars are embedded in dense bone and hence treatment of impacted lower third molar makes it more sophisticated to surgeons and expensive to patients depending on the type of impaction. Impacted third molars have been a source of concern for surgeons for a long time because of their variations.³ Panoramic radiographs are widely used in the diagnosis of variations in impacted third molars. Assessment of type of variation in impacted tooth facilitates the treatment plan and surgical intervention when needed.

Chhattisgarh state has mostly the middle to low income population and there appeared to be a lack of studies related to the type of impactions in lower third molar teeth in this population. Hence this study was undertaken to determine the type of impaction in lower third molar in Western part of Chhattisgarh state, India.

Methodology:

A descriptive cross-sectional study was conducted constituting 1837 good quality radiographs as a sample from patient records in Dental clinics, Medical and Dental institutions in Durg-Bhilai, Western Chhattisgarh. Both left and right affected sides in mandible were selected and for the convenience the samples were divided into two age groups namely group A (16-29 years) and group B (≥ 30 years). Ethical clearance was obtained by institutional review board and necessary permissions were obtained by concerned authorities before start of the study. The investigator was standardized by making familiar six types of third molar impaction based on the long axis of the impacted tooth in relation to the long axis of the second molar are identified. These include: Mesioangular (MA), Vertical (V), Horizontal (H), Transverse (TV), Distoangular (DA) and Inverted (IN) type.⁴ The investigator was calibrated in a pilot study against an expert for the presence and type of impaction in a sample of 60 Good quality digital panoramic radiographs (DPRs) which were not part of main study. A total of 133 DPRs showed the presence of impacted mandibular third molars in the selected sample of DPRs in the main study.

Statistical analysis: The data were analyzed using SPSS version 19.0 (IBM Corporation, SPSS Inc., Chicago, IL, USA). Descriptive statistics was used to represent the data in frequencies and percentages.

Results:

Out of 1837 DPRs examined, a total of 133 (%) radiographs showed

impacted mandibular third molar. The Demographic characteristics are as shown in Fig. 1, Table 1 & 2.

All the six types of impaction were observed, among which Mesioangular type was the most prevalent type (n= 60.9%). Vertical impaction was found in 24 DPRs comprising of 18.1% of impacted teeth. The H, DA, and TV type were observed in 12.8%, 4.5% and 2.3% of impacted lower third molars respectively. The least prevalent type of impaction was IN type representing 0.5% of the impactions (Table 1 and 2).

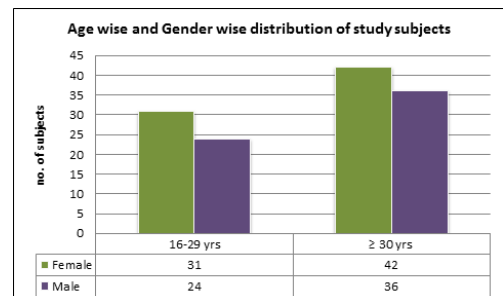


Fig. 1: Age wise and Gender wise distribution of study subjects

Table 1: Gender wise Distribution of type of Impaction in mandibular third molars

	Gender		Total N(%)
	Female (%)	Male (%)	
MA	45 (33.8)	36 (27.1)	81 (60.9)
V	13 (9.85)	11 (8.15)	24 (18.0)
H	10 (7.5)	7 (5.2.6)	17(12.8)
TV	2 (1.5)	4 (3)	6 (4.5)
DA	2 (1.5)	1 (0.75)	3 (2.3)
IN	1 (0.75)	1 (0.75)	2 (1.5)
Total	73 (54.9)	60 (45.1)	133 (100)

Table 2: Age wise Distribution of type of Impaction in mandibular third molars

	Age group		Total N (%)
	16-29 yrs n (%)	≥ 30 years n (%)	
MA	29 (21.8)	52 (39.0)	81 (60.9)
V	14 (10.5)	10 (7.5)	24 (18.0)
H	8 (6)	9 (6.75)	17(12.8)
TV	2 (1.5)	4 (3)	6 (4.5)
DA	2 (1.5)	1 (0.75)	3 (2.3)
IN	0 (0)	2 (1.5)	2 (1.5)
Total	55 (41.4)	78 (58.6)	133 (100)

DISCUSSION

Out of the 133 patients sampled for the study, there were 73 (54.9 %) females and 60 (45.1 %) males. Females were found to be more affected by impaction which was deduced in other studies in the literature.^{3,5} This could be due to the fact that the females' ratio was higher than males in the study or that females naturally have a smaller jaw size leading to lack of space for normal third molar eruption. Many studies in the literature have reported a higher female prevalence with third molar impaction.^{2,56}

Conversely, Ren and Kumar reported a high prevalence of impacted third molars associated with males (36%) compared to (24%) in females, while in other studies the authors found no significant gender association with the prevalence of impacted third molar.^{7,8,9} Unlike the rest of the dentition, the third molar develops after birth among all ethnic and racial groups; the third molar is the last tooth to erupt.⁷

The age range recorded for the 133 patients was from 16 to 64 years. The count in females was lower in the younger age group (23.3% below 29 years old) than in the older age group (31.6% \geq 30 years old). The male count was higher in the older age group (27.1% \geq 30 years old) than in the younger age group (18.0% below 29 years old). Females seek treatment at the onset of complication (sooner than men would) which could be the reason why the female count was higher in the younger age group.

The results of this study showed that MA is the most prevalent type of impaction while INV impaction is the least prevalent impacted third molar tooth. This finding is in agreement with previous findings by the likes of Mehdizadeh *et al and* Tsabedze.^{2,10} This is contradictory to findings of another study where it was observed that the V position predominated with a frequency of 33.6%, followed by the MA which represents 32.4%. The findings of Qirreish also reported that DA was the second least common type of impaction encountered (1.2%) which was contrary to this study's findings with V type being second most prevalent.⁶ The least common type was IN which was observed in our findings and reported in a other previous studies.^{2,10}

The third molar impaction is a multifactorial phenomenon in which local and environmental factors play a role e.g. bone density, ankylosis of deciduous or permanent dentition and retained teeth.^{11,12} The degree of difference between the distal and mesial root growth could affect an impaction. The malposition of the tooth bud in the initial phase of calcification and root development can lead to an unfavourable path of eruption.¹³ The regression in the human jaw size has been related to changes in civilization and nutritional habits which vary from one region to another.¹⁴ Over the past few centuries, based on the evolution concept, the use of powerful mastication force has been reduced consequently. Another study evaluated the prevalence of third molar impaction in countries with high living standards concluded that the change of nutritional habits might be a contributing factor for jaw/tooth discrepancy.¹⁵

CONCLUSION

Females were more affected with third molar impaction. MA impaction was shown to be the most prevalent type of impaction in lower third molars. The least common types were DA, TV and INV. TV was more common than DA and interestingly, IN, which is considered to be a rare phenomenon, 1.5% in our study was reported.

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