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Gender Predilection Through Prevalence of Impacted Tooth: A Study based on Original Research in the Central India

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The data supporting the findings of this study are available upon request from the corresponding author.

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ABSTRACT:

Objective: Impacted teeth are those that remain unerupted, either completely or partially. Impacted tooth are commonly seen in routine dental practice and its prevalence is seen higher in third molars. This study aims to determine the frequency of impacted teeth in patients visiting a dental college in Central India. Only OPG data was collected and evaluated for prevalence and gender related frequency in 749 patients.

Material & Method: This study was an incidental finding which was OPG (orthopantomogram) based and the total number of 749 patients with OPGs were evaluated for the duration of 6 months out of which 345 were females and 404 were male patients.

Results: Impacted teeth are very commonly encountered in day-to-day dental practice. The prevalence of impacted teeth was 20.7%. Upper molar impaction was prevalent in females, which showed significant results.

Conclusion: Early detection of impacted teeth is very important to prevent any complications. Impacted teeth if left untreated for a prolonged period of time also leads to tooth ankylosis and thereby hinders adjacent tooth eruption.

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INTRODUCTION:

Impaction means when the tooth fails to erupt into the dental arch i.e it stays trapped in gums or jawbone. Impacted tooth generally remains unerupted due to multiple reasons and it is easily evident through radiographs. Because of all these reasons impacted tooth should be identified as soon as possible as it might affect the function and aesthetics. Except from the eruption process, the successful development of permanent dentition involves the synchronized forward and lateral growth of both the jaws, which compensates for the difference in size of the dentition in both arch.(1) The most common etiological factor of tooth impaction is lack of space into which the tooth can erupt.(2)There are various complications along with impaction such as crowding, caries, pericoronitis, facial pain, TMJ dislocation, dentigerous cyst etc.(3) Maxillary canines have been reported with a high prevalence rate followed by second premolars.(4)Thus a complete clinical and radiographical examination is required to diagnose impaction. As the eruption process is so complex, it is not surprising that problems may arise, which lead to complications including tooth retardation or failure of eruption. Failure of the eruption of permanent teeth is a common dental anomaly. When there is a clinical absence of one or several teeth, and the history indicates that they have not been extracted, then partial anodontia or tooth impaction should be considered. Radiographic examination may reveal impacted or supernumerary teeth. (5) This study aimed to reveal gender prevalence and also incidental finding of impacted tooth in maxilla and mandible in the oral cavity, among the population of Central India visiting a dental college of Madhya Pradesh during the period of 6 months from January 2025 to June 2025.

AIM: The aim of this study was to see gender prevalence and also incidental finding of impacted tooth in maxilla and mandible in the oral cavity, among the population of Central India visiting a dental college of Central India during the period of 6 months from January 2025 to June 2025.

MATERIALS AND METHODS:

Incidental findings of impacted tooth which were collected from a dental college in Madhya Pradesh, India over a duration of 6 months from the same institute with patients visiting our OPD in the Department of Oral Medicine and Radiology. Only OPG (orthopantomography) data was be collected excluding all other extra oral and intra oral radiograph. The OPG machine used in the study was Carestream 8100.The Carestream CS 8100 series (including the 3D versions) offers high-resolution imaging, with the standard CS 8100 achieving 161 lp/mm. The 3D versions (like the CS 8100 3D) can reach resolutions as fine as 75 µm, making them suitable for detailed imaging. Inclusion criteria were :a) Patient aged between 25-60 year. b) Both the genders [male and female]. c) Data was collected for the period of 6 months. Exclusion criteria were: a) Patient aged below 25 years and above 60 years. b) IOPA , RVG and other extra-oral radiographs expect OPG. c) Data [OPG] before January and after the month of June. The parameters assessed in the study were as followed: 1. Number and frequency of impacted teeth. 2. Impacted mandibular third molars. 3. Pattern of mandibular third molars as per Winter's classification.

RESULTS:

Results were expressed in numbers and percentages. Data were statistically analysed using Chi-squared test. $P<.05$ was considered as statistically significant. The study comprised 404 males (53.9%) and 345 females (46.1%), with an age range of 25 to 60 years, among a total of 749 patients evaluated. [Table:1] Within this cohort of 749 patients examined over a six-month period, a total of 155 individuals (21%) presented with impacted teeth. Among these, 107 patients (14.3%) exhibited one impacted tooth, 43 patients (5.7%) had two impacted teeth, and only 5 patients (0.7%) were found to have three impacted teeth, as revealed by our incidental findings from orthopantomograms (OPGs). [Table1] Out of the 404 male patients, 57 (14.1%) presented with one impacted tooth, 24 (5.9%) with two impacted teeth, and 1(0.2%) with three impacted teeth. Consequently, 332 male patients (79.8%) were identified as having no impacted teeth in their jaws. Conversely, among the 345 female patients, 50 (14.5%) exhibited one impacted tooth, 19 (5.5%) had two impacted teeth, and 4(1.2%) was found to have three impacted teeth, thus 272 (78.8%) showed no impacted teeth in females. [Table:1] Overall, the incidence of impacted teeth was most pronounced in the mandibular molars, with 72 cases (9.6%) involving a single tooth and 31 cases (4.1%) involving two impacted teeth. [Table: 2] This was followed by the maxillary canines, where 28 cases (3.7%) involved a single tooth

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and 1 case (0.1%) involved both maxillary canines (2 impacted canine teeth). [Table :2] In the maxillary molars, there were 25 cases (3.3%) of impacted teeth, with 3 cases (0.4%) involving two impacted teeth. [Table: 2] Only one maxillary incisor was identified among the total patient population. - Maxillary Premolars: 5 cases (0.7%) were noted in our findings. - Mandibular Canine: 3 cases (0.4%) were observed in one tooth, and 1 case (0.1%) in both canines. - Mandibular Premolars: only 2 cases (0.3%) were identified. [Table: 3] Lastly, there were no incidences of impacted mandibular incisors in our incidental findings. [Frequency Table-3] In the gender-wise analysis of impacted teeth: Canines, premolars, and maxillary incisors yielded no significant results [Table-3]. However, in the case of maxillary molars, among the male patients, 9 (2.2%) were found to have one impacted tooth (maxillary molar - impacted teeth). [Table:3] In the female population, 16(4.6%) (one impacted)and 3(0.9%) (2 impacted) were identified with impacted maxillary molars. Statistically the chi-square test results indicated a significant prevalence in females ($P<0.05$). [Table :3,4]

But other impacted teeth: mandibular incisors, canine, premolars did not show any significant difference between genders. [Table:3]

DISCUSSION:

Panoramic radiography which is also known as pantomography is a technique where a single image is produced of the facial structures, maxillary and mandibular arches and their supporting structures. It is usually used as an initial survey radiograph and assists in determining the need for other projections. It is indicated in the evaluation of trauma, third molars impaction, orthodontic assessment, fractures, TMJ disorders, periodontal diseases, and extensive or suspected large bone lesions, assessment of tooth eruption, edentulous patients, for inserting osseo-integrated implants and developmental anomalies.

Impaction is very common dental finding, and it may occur due to multiple reasons. The dental impacted tooth can be defined as a condition in which a tooth is prevented from erupting completely or partially in oral cavity, being positioned adjacent to another tooth below bone or soft tissue (6). Factors described in the literature are explained as genetic factor, gender predilection, developing tooth germ in an ectopic position and also the prevalence of supernumerary tooth (7). Impacted tooth can cause conditions such as infection like pericoronitis which also can be associated with pain, bleeding, resorption of adjacent tooth, bone resorption, any developmental cyst or tumour, malocclusion (8). The early detection of impacted or supernumerary teeth is essential for further prevention of any pathological lesion or malocclusion (9). The objective of this study was to evaluate the gender prevalence and also incidental finding of impacted tooth in both the jaws. Our findings showed that impacted maxillary molar had significantly higher prevalence in females and this is quite similar to Hashemi pour et al study where females showed predominance in impaction of molars.(10)

The present study has shown that the prevalence of single mandibular molar impaction in permanent single tooth is 4.6%, which is higher than other similar studies. Although the maxillary molars, the 3rd molar has a complicated eruption pattern and is one of the last teeth to erupt. As considered by Patil S. & Maheshwari S, (11)the prevalence for canine impaction was 16.8%, whereas in our study one impacted tooth was 4.37%, two impacted tooth was 5.7% and three impacted tooth was 0.7%.This was pretty evident that finding impacted teeth in day-to-day dental practice is very frequent.

Fardi et al. (12) reported a prevalence of impacted teeth at 8.8% within the Greek populations. In a comparable investigation involving 4,898 Saudi patients aged 13 years and older, a prevalence of 3.6% was observed for individuals with at least one impacted cuspid (13). Another analysis, which scrutinized 1,858 patients aged 11 to 18 seeking orthodontic intervention, revealed 101 instances of impacted canines, yielding a prevalence of 5.43% (14). Aydin et al. documented an incidence of 3.58%, which is comparatively lower than the aforementioned study's findings (15). These results suggest that the incidence of canine impaction may vary significantly among different populations. Such discrepancies may be attributed to racial variations and methodological differences across studies. The Japanese population has exhibited the lowest frequency of this anomaly, with reports indicating an occurrence of merely 0.27% with cohort study. Consistent with these findings, a comprehensive analysis of full-mouth dental radiographic data in the USA study on impacted teeth revealed a prevalence of 0.92% (15). Conversely, Brin et

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al., in their examination of an Israeli demographic, uncovered a prevalence of 1.5% (16).

Maxillary impactions are purported to occur 10 to 20 times more frequently than their mandibular counterparts (17). The incidence of mandibular canine impaction is remarkably low, with a dearth of studies elucidating its prevalence. Mandibular impacted canines are exceedingly uncommon. In the investigation conducted by Shah et al. (18), eight unerupted mandibular canines were identified among a cohort of 7,886 individuals, while another study revealed 11 impacted mandibular canines within a sample of 5,000 individuals, culminating in an incidence of 0.10% (19). Although our study discerned no significant difference in the sex distribution of impacted canines, we noted a female predominance in maxillary molar impaction. While there was no statistically significant difference observed between the types of impacted teeth and gender ($p<0.05$), these findings align with those of Fardi et al. (12).

Mandibular impacted canines are exceedingly rare. In the investigation conducted by Shah et al. (20), eight unerupted mandibular canines were identified among 7,886 individuals, while another study uncovered 11 impacted mandibular canines within a sample of 5,000 individuals, resulting in an incidence of 0.10% (21). Although our study observed no discernible difference in the sex distribution of impacted canines, the male-to-female prevalence. We found female prevalence in maxillary molar impaction. Although There was no statistically significant difference between the types of impacted teeth and gender ($p<0.05$), consistent with the findings of Fardi et al.

The present incidental OPG study for impacted teeth recorded shown an overall prevalence of impacted teeth at 20.7%. Other investigations have documented a wide variability in prevalence, ranging from 3% (22)) to 68.6% (23). Although robust evidence concerning the aetiologies of tooth impaction remains elusive, the broad spectrum of prevalence suggests that genetic factors may play a contributory role (24). This could elucidate the variations observed in impacted tooth prevalence among different populations. While some studies indicate hereditary components in tooth impaction (25), others propose that environmental factors, such as dietary influences, might exert a more significant impact than genetic predispositions (26). Certain studies comparing prevalence rates have indicated higher frequencies in urban populations, thereby corroborating the hypothesis that an ultra-processed diet may contribute to a deficiency in the development of maxillary bones (20).

CONCLUSION:

Based on the analyzed data we collected, which was the incidental finding of impacted teeth in males and females in a Central Indian population, and within the limitations of this study, the following conclusions were drawn: The prevalence of impacted teeth was 20.7%. The upper molar impaction was prevalent in females, which showed significant results. Although early detection of impacted teeth can be helpful in many ways.

REFERENCES:

1. F Anastasia, KS Athena, B Zaki, P Nikolaos, T Anastasios. Incidence of impacted and supernumerary teeth–a radiographic study in a North Greek population. Med Oral Patol Oral Cir Bucal. 2011 Jan 1;16 (1):e56-61. https://doi.org/10.4317/medoral.16.e56
2. Pranati T, M Madhulaxmi, H S Adimulapu. Gender variation in angulations of impacted third molars: a retrospective study. PalArch's J. Archaeol. Egypt/ Egyptol. 17(7):368-383. https://archives.palarch.nl/index.php/jae/article/view/1140
3. Hussain HS, T Gharaa Amer Mohammed, H Shahbaa Ahmed. Prevalence of Impacted Third Molars Among Iraqi Patients Attending Al Maghrib Specialized Dental Health Center in Relation to Age and Gender Using Panoramic Radiographs. Int. J. Pharm.Bio-Sci.2024 Mar 3 ;4(3):253-8. https://doi.org/10.47191/ijpbms/v4-i3-20
4. Santosh P. Impacted mandibular third molars: Review of literature and a proposal of a combined clinical and radiological classification. Ann Med Health Sci Res 2015;5: 229-34. https://doi.org/10.4103/2141-9248.160177
5. KU Karolina, Z Malgorzata, C Ewa. Impacted Teeth: An Interdisciplinary Perspective.Adv. Clin. Exp.Med. May-June 2016; 25(3):575-85. https://doi.org/10.17219/acem/37451
6. Davidson CL, Smit C, N Sulette. Supernumerary teeth: A pictorial review and revised classification.

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JCHR (2025) 15(6), 444-451 | ISSN:2251-6727

J. Oral Biol. Craniofac. Res.15(2025):454-62. https://doi.org/10.1016/j.jobcr.2025.03.005

7. Rokbah MQA, AM Yasser, AM Nauraldeen, AH Jamileh, KB Moemeneh. Effects of German chamomile on symptoms and healing after mandibular third molar surgeries: A triple-blind split-mouth randomised controlled trial. Int. J. Surg. Open.2023:1-6. https://doi.org/10.1016/j.ijso.2023.100639
8. D Domenico,P Simone, R Rachele, G Diletta, M Marco. Impacted and transmigrant mandibular canines incidence, aetiology, and treatment: a systematic review. Eur. J. Orthod.2016:1-9. https://doi.org/10.1093/ejo/cjw027
9. Yildirim D,Yilmaz HH, Aydin U. Multiple impacted permanent and deciduous teeth. Dentomaxillofac Radiol. 2004 (33):133–35. https://doi.org/10.1259/dmfr/12620936
10. Hashemipour MA, Tahmasbi-Arashlow M, Fahimi-Hanzaei F. Incidence of impacted mandibular and maxillary third molars: a radiographic study in a Southeast Iran population. Med Oral Patol Oral Cir Bucal. 2013 Jan 1;18 (1):e140-5. https://doi.org/10.4317/medoral.18028
11. Patil, S., & Maheshwari, S. (2014). Prevalence of impacted and supernumerary teeth in the North Indian population. Journal of Clinical and Experimental Dentistry, 6(2), e116–e120. https://doi.org/10.4317/jced.51284
12. Fardi A, Kondylidou-Sidira A, Bachour Z, Parisis N, Tsirlis A. Incidence of impacted and supernumerary teeth - a radiographic study in a North Greek population. Med Oral Patol Oral Cir Bucal. 2011;16:e56-61. https://doi.org/10.4317/medoral.16.e56
13. Zahrani AA. Impacted cuspids in a Saudi population: prevalence, aetiology and complications. Egypt Dent J. 1993;39:367-74.
14. Rozsa N, Fabian G, Szadeczky B, Kaan M, Gabris K, Tarjan I. Prevalence of impacted permanent upper canine and its treatment in 11-18-year-old orthodontic patients. Fogorv Sz. 2003;96:65-9.
15. Aydin U, Yilmaz HH, Yildirim D. Incidence of canine impaction and transmigration in a patient population. Dentomaxillofac Radiol. 2004;33:164-9. https://doi.org/10.1259/dmfr/15470658
16. Dachi SF, Howell FV. A survey of 3,874 routine full-mouth radiographs. II. A study of impacted teeth. Oral Surg Oral Med Oral Pathol. 1961;14:1165-9. https://doi.org/10.1016/0030-4220(61)90204-3
17. Brin I, Becker A, Zilberman Y. Resorbed lateral incisors adjacent to impacted canines have normal crown size. Am J Orthod Dentofacial Orthop. 1993;104:60-6. https://doi.org/10.1016/0889-5406(93)70028-m
18. Sharma G, Nagpal A. Transmigration of mandibular canines - Report of four cases and review of literature. Case Rep Dent. 2011;2011:381382. https://doi.org/10.1155/2011/381382
19. Shah RM, Boyd MA, Vakil TF. Studies of permanent tooth anomalies in 7,886 Canadian individuals. I: impacted teeth. Dent J. 1978;44:262-4.
20. Grover PS, Lorton L. The incidence of unerupted permanent teeth and related clinical cases. Oral Surg Oral Med Oral Pathol. 1985;59:420-5. https://doi.org/10.1016/0030-4220(85)90070-2
21. Jacobs SG. The impacted maxillary canine. Further observations on aetiology, radiographic localization, prevention/interception of impaction, and when to suspect impaction. Aust Dent J. 1996;41:310-6. https://doi.org/10.1111/j.1834-7819.1996.tb03139.x
22. Quek SL, Tay CK, Tay KH, Toh SL, Lim KC (2003) Pattern of third molar impaction in a Singapore Chinese population: a retrospective radiographic survey. Int J Oral Maxillofac Surg 32:548. https://doi.org/10.1016/S0901-5027(03)90413-9
23. Carter K, Worthington S (2015) Morphologic and demographic predictors of third molar agenesis: a systematic review and meta-analysis. J Dent Res 94:886. https://doi.org/10.1177/0022034515581644
24. Langowska-Adamczyk H, Karmańska B (2001) Similar locations of impacted and supernumerary teeth in monozygotic twins: a report of 2 cases. Am J Orthod Dentofacial Orthop 119:67. https://doi.org/10.1067/mod.2001.111225
25. Venu Gopal Reddy K (2012) Distribution of third molar impactions among rural and urban dwellers in the age group of 22–30 years in South India: a

Journal of Chemical Health Risks
www.jchr.org
JCHR (2025) 15(6), 444-451 | ISSN:2251-6727

comparative study. J Maxillofac Oral Surg 11:271. https://doi.org/10.1007/s12663-011-0320-z

26. Olasoji HO, Odusanya SA (2000) Comparative study of third molar impaction in rural and urban areas of South-Western Nigeria. Odontostomatol Trop 23:25

	NO. OF PATIENTS	TOTAL NO. OF IMPECTED TOOTH	ONE TOOTH IMPECTION	TWO TEETH IMPECTION	THREE TEETH IMPECTION
MALE	404 (53.9%)	82 (20.2%)	57 (14.1%)	24 (5.9%)	1 (0.2%)
FEMALE	345 (46.1%)	73 (21.2%)	50 (14.5%)	19 (5.5%)	4 (1.2%)
TOTAL	749	155 (21%)	107 (14.3)	43 (5.7%)	5 (0.7%)

TABLE 1 : NUMBER OF PATIENTS, GENDER AND NUMBER OF IMPECTED TOOTH

	INCISOR	CANINE	PREMOLAR	MOLAR
MAXILLARY ONE TOOTH IMPACTED	1 (0.1%)	28 (3.7%)	5 (0.7%)	25 (3.3%)
MAXILLARY TWO TOOTH IMPACTED	0 (0%)	1 (0.1%)	0 (0%)	3 (0.4%)
MANDIBULAR ONE TOOTH IMPACTED	0 (0%)	3 (0.4%)	2 (0.2%)	72 (9.6%)
MANDIBULAR TWO TOOTH IMPACTED	0 (0%)	1 (0.1%)	0 (0%)	31 (4.1%)
TOTAL	1 (0.1%)	33 (4.3%)	7 (0.9%)	131 (17.4%)

TABLE 2: TYPES OF TEETH IMPECTION

		INCISOR	CANINE	PREMOLAR	MOLAR
MAXILLARY IMPACTED TOOTH	MALE	1	14	1	9
	FEMALE	0	14	4	16
MANDIBULAR IMPACTED TOOTH	MALE	0	1	1	41
	FEMALE	0	2	1	31
TOTAL		1	33	7	131

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TABLE 3 : TYPES OF TEETH IMPECTION WITH GENDER PREDILECTION

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.959[a]	2	.031
Likelihood Ratio	8.106	2	.017
Linear-by-Linear Association	6.709	1	.010
N of Valid Cases	749		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 1.38.

TABLE 4: CHI-SQUARE TEST OF MAXILLARY MOLARS

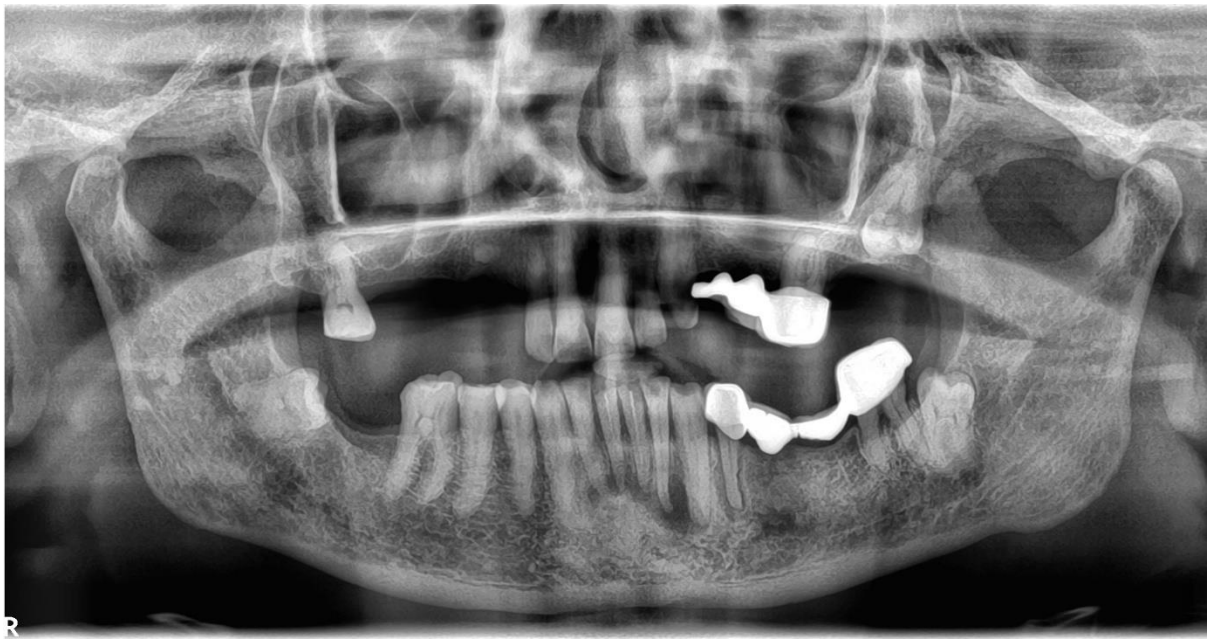

FIGURE 1 THREE TEETH IMPECTION

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FIGURE 2 BILATERAL MAXILLARY IMPECTED CANINE

FIGURE 3 SINGLE MAXILLARY IMPECTED CANINE