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Original article

ERUPTION PATTERNS OF THIRD MOLARS AMONG UNIVERSITY STUDENTS IN NORTH 24 PARGANAS, WEST BENGAL

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ABSTRACT

Introduction: The eruption of third molars is a significant event in the dental development of individuals. However, the eruption age or status may vary significantly throughout various human populations. The study aims to reveal the eruption patterns of third molars among university students of North 24 Parganas.

Methods: This cross-sectional study was conducted among 295 post-graduate students of West Bengal State University, India aged 20-25 years. Structured questionnaire was used to collect the data and SPSS 25.0 was used to analyze the dataset.

Result: Regarding third molar eruption status, the total number of participants with erupted third molars was 59.32%, while 40.62% participants did not experience third molar eruption. Gender significantly showed difference in eruption status but couldn't show much difference in age at eruption. Significant association was found among third molar eruption status of children with both their parents.

Conclusion: Gender is an important attribute impacting eruption status. In addition, parental eruption patterns also impact eruption status of children.

KEY WORDS: M3, Third molar, Young adults

INTRODUCTION

Wisdom teeth, also known as third molars, are the last teeth to emerge in the mouth, located at the back of the upper and lower jaws. These teeth typically develop between the ages of 17 and 25 years, but in some cases, they can appear as late as the 40s or 50s. They are called "wisdom teeth" because they emerge during the "age of wisdom".

The eruption of third molars, is a significant event in the dental development of individuals, typically resulting in various dental complications due to limited space in the jaw. Prehistoric humans likely relied on their third molars for survival when their jaw sizes accommodated proper dental development. However, as human evolution has progressed, jaw sizes have gradually decreased. Consequently, third molars that do erupt are often misaligned in the arches, making them harder to clean and more susceptible to infection. Due to this reduction in jaw size, approximately 65% of the human population now has at least one impacted third molar (Ren & Kumar, 2014). Understanding the patterns of third molar eruption is crucial for anticipating and managing potential oral health issues. Particularly, the third molar has received the most attention in the dental literature for its various implications.

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Research indicates that the eruption patterns of third molars vary widely across different populations. For instance, studies have shown that in some populations, wisdom teeth erupt earlier or later than the typical age range, while in others, the prevalence of impaction and other issues is notably higher. Researches imply that variations in eruption patterns among different ethnic groups, providing insights into how genetic diversity contributes to these differences (Hattab & Alhaija, 1999). The global variability in third molar eruption underscores the importance of understanding regional differences and adapting dental care practices accordingly.

In India, the demographic and genetic diversity can lead to significant variations in dental eruption patterns. Studies have documented variations in eruption times, impaction rates, and associated complications among different Indian populations (Dube et al., 2001; Kumar et al., 2011; Gupta et al., 2012; Sharma et al. 2015). The diversity in eruption patterns across India underscores the need for localized research and customized dental care practices. Socio-economic disparities, varying access to dental care, lifestyle and dietary differences contribute to different regional distribution of eruption of third molars (Gupta et al., 2012; Sharma et al. 2015).

In addition, sex of individual significantly affects the eruption patterns of third molars, as evidenced by research conducted in India. Studies indicate that females typically experience the eruption of third molars earlier than males, with eruption often occurring between ages 17 and 21 for females, compared to 18 and 25 for males (Kumar et al., 2011). This difference is largely attributed to the earlier onset of puberty in females, which accelerates dental development. Additionally, research highlights that males have a higher prevalence of third molar impaction, potentially due to their generally larger jaw size, which may result in insufficient space for proper eruption. Complications associated with third molar eruption also vary by sex (Sharma et al. (2015). Sex differences in growth patterns and genetic factors impacting jaw size and tooth formation contribute to these variations (Dube et al., 2001). Understanding these sex-related differences is crucial for tailoring dental care and management strategies to effectively address the specific needs of both males and females in the Indian context.

This study concentrates on students in North 24 Parganas, a district in West Bengal characterized by its diverse population and distinct socio-cultural context. By investigating the eruption patterns of third molars with a focus on sex differences within this demographic, the research seeks to offer pioneering insights into this area of study. It aims to provide the first comprehensive documentation on this topic, contributing valuable data to the broader understanding of third molar development in this region.

OBJECTIVE

The objective of the study is to identify and investigate eruption patterns of third molars with a focus on sex differences among young adults (aged 20-25 years) among university students of North 24 Parganas, West Bengal, India.

METHODOLOGY

This cross-sectional study was undertaken in West Bengal State University. A healthy sample (free from any known and visible disorders, and without any diseases of teeth) of 295 post graduate students (145 female and 150 male) aged between 20-25 years were incorporated through the purposive sampling method. The participants' age was obtained from their University Identity Card. The data has been collected through a structured questionnaire method. Teeth were categorized as follows: no eruption, if the

third molar is not visible in any of the quadrants; incomplete eruption, if any of the third molars have visibly erupted but not all four; and complete eruption, if all four third molars have erupted.

The entire data was analyzed with the help of Microsoft Excel and Statistical Package for Social Science (SPSS) version 25.0 for statistical analysis. The significant differences among variables were tested using the chi-square test and Student's t-test, p value of <0.05 was considered as statistically significant for all inferential statistics.

Ethical Considerations

Prior to conducting the study, verbal consent was obtained from the participants. The participants were informed about the objective of the present study, and the researchers took care to ensure that their consent was fully informed.

RESULTS

The table 1 presents a detailed breakdown of the demographic and dental characteristics of the 295 participants in the study. Regarding third molar eruption status, the total number of participants with erupted third molars was 175 (59.32%), while 120 (40.62%) participants did not experience third molar eruption. Among the male participants, 22.00% had completely erupted third molars, compared to 13.10% of the female participants, showing a higher prevalence of third molar eruption among males. Additionally, the data reveals that 49.33% male as well as 33.79% female participants experienced incomplete third molar eruption. This suggests that while more males had erupted third molars, a substantial proportion of females also did not experience third molar eruption, emphasizing potential sex differences in third molar eruption patterns within this population. Statistical analysis showed that there were significant differences in the eruption status of third molars between male and female, with a p-valueless than 0.05, indicating that sex does significantly impact the eruption status of third molars in this study.

Table1:Sex-wise distribution of third molar eruption

Eruption Status	Male	Female	Combined	χ^2	*p* value
Complete	33 (22.0 %)	19 (13.10%)	52 (17.62 %)	18.0404	0.0001
Incomplete	74 (49.33%)	49 (33.79%)	123 (41.70 %)		
No eruption	43 (28.67%)	77 (53.11%)	120 (40.68 %)		

The sex-wise analysis revealed that the mean age of third molar eruption in male was 19.55 ± 0.187 years, while in female, it was slightly higher at 20.05 ± 0.181 years (table 2). Despite this difference in mean ages, the statistical analysis indicated that the difference between males and females was not significant, as the p-value was greater than 0.05.

Table2: Mean age at completion of the third molar eruption

Sex	Range (yrs)	Mean ± SE (yrs)	t value	*p* value
Male	18-22	19.55± 0.187	**1.780**	**0.078**
Female	18-24	20.05± 0.181		

The table 3 provides a detailed account of the distribution of third molar teeth

examined across different quadrants of the upper and lower jaws. In the present study, third molars were observed in 32.14% of the sample in the upper-left quadrant, 40.48% in the upper-right quadrant, 46.15% in the lower-left quadrant, and 21.98% in the lower-right quadrant. Third molars were observed in both upper quadrants in 27.38% of the sample, and in both lower quadrants in 31.87% of the sample.

Table3: Distribution of third molar eruption in the quadrants of the jaw

Side	No (%)	
	Upper jaw	**Lower jaw**
Left quadrants	27 (32.14%)	42 (46.15%)
Right quadrants	34 (40.48%)	20 (21.98%)
Both quadrants	23 (27.38%)	29 (31.87%)

An association between the third molar eruption of participants and their fathers has been identified (table 4). The data indicates that, there were 109 cases where both the child and the father had experienced third molar eruption, 66 cases where the child had a third molar eruption but the father did not, while 27 children had no third molar eruption though their father had and 93 cases where neither the child nor the father had a third molar eruption. Statistical analysis revealed a significant difference between the third molar eruption patterns of the children and their fathers, with a p-value of less than 0.05. However, the analysis indicates an association between the third molar eruption of participants and their mothers (table 5).

Table 4: Association between children's third molar eruption and father's third molar eruption

Eruptionstatus:Children	**Eruption status: Father**		**χ^2**	***p* value**
	Erupted	No eruption		
Erupted	109	66	**45.348**	**<0.000001**
No eruption	27	93		

Specifically, there were 118 cases where both the child and the mother experienced third molar eruption, 57 cases where the child had a third molar eruption but the mother did not, while 33 children had no third molar eruption though their mother had and 87 cases where neither the child nor the mother experienced third molar eruption. Statistical analysis showed a significant difference between the third molar eruption patterns of the children and their mothers, with a p-value of less than 0.05, suggesting a statistical difference of these variables.

Table 5: Association between children's third molar eruption and Mother's third molar eruption

Eruption status: Children	**Eruption status:Mother**		**χ^2**	***p* value**
	Erupted	No eruption		
Erupted	118	57	**45.422**	**<0.000001**
No eruption	33	87		

DISCUSSION

The objective of this study was to analyze third molar eruption among university students in North 24Parganas, considering their socio-demographic characteristics, eruption status, and eruption patterns. A total of 295 students were examined, revealing age range for third molar eruption was identified as 18 to 24 years. Alseagh et al. (2022), in a study conducted in Emati, found a presence rate of 23.5% for third molars, while Kruger et al. (2001), in a study in New Zealand, reported that 33.7% of impacted third molars had fully erupted by age 26, 31.4% had been extracted, and 13.1% remained unerupted. Another study by Pankaj et al. (2014), which focused on college students, found the eruption age of third molars to be 21 ± 2.58 years. On the other hand, Rai & Anand (2023) found the eruption age to range from 17 to 26 years, providing additional context to these findings.

Another aim of the study was to explore whether sex of individual influences eruption status. However, the low participation of students limited this analysis, yet significant difference in eruption status between male and female was observed. Hassan's (2010) study found no gender differences in eruption. Conversely, Gambier et al (2019) reported a lower incidence of eruption in girls (85%) compared to boys (98%), while Sandhu & Kaur (2005) noted a higher incidence of erosion in females. Li's (2023) research on tooth extraction trends over the Neolithic, Bronze, and Iron Ages indicated a decrease in erosion over time. Orhan et al (2007) found minimal difference between male and female third molars, and Otuyemi et al (2011) observed a slightly earlier eruption in girls. Ali (2016) noted that third molars were more common in girls and the urban population.

Regarding eruption sites, this study found that mandibular eruptions were more frequent than maxillary eruptions. Similarly, Mutebi et al. (2022) study reported 53% mandibular and 41% maxillary eruptions. Sandhu & Kaur (2005) noted 172 upper jaw eruptions and 182 lower jaw eruptions. Conversely, a study from New Zealand showed 20.4% mandibular and 39.3%maxillary eruptions. Otuyemi et al, (2011) and Pavlovic et al, (2017) did not find a significant difference in eruption sites in their studies. In this study, of the 295 participants, 17.62% exhibited complete eruptions, 41.70% had incomplete eruptions, and 40.68% had no eruptions. Pankaj et al (2014) study from Bikaner, India found 33.62% full eruption, 40.09% partial eruption, and26.29% no eruption. Sivaramakrishnan & Ramani's (2015) study of 600 expected molars from 150individuals revealed 317 fully erupted, 250 failed to erupt, and 33 were absent.

Overall, the findings align with other regional studies, suggesting consistent eruption trends across diverse populations.

CONCLUSION

The study provides a comprehensive overview of third molar eruption patterns among 295 post-graduate participants. The findings reveal a higher prevalence of third molar eruption among males compared to females. A substantial proportion of females also did not experience third molar eruption, indicating potential gender differences in eruption patterns. However, the mean age of third molar eruption was higher in females compared to males, although this difference was not statistically significant.

The distribution of third molar teeth examined across various quadrants of the jaws showed variation, with a notable percentage of examinations conducted on the upper-right and lower-left sides.

Significant differences were identified between third molar eruption patterns in children and their fathers and mothers. The statistical analysis demonstrated significant differences in eruption patterns.

Overall, while sex of individual significantly impacts eruption status, significant associations with parental eruption patterns were observed. This primary study highlights the need for further research to explore these findings in greater depth and to better understand the genetic and environmental factors influencing third molar eruption.

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