RESEARCH PAPER

Epidemiology Of Third Molar Agenesis In South India: A Clinical And Radiographic Study Aligned With Sdg 3 (Good Health And Well-Being)

Saravana Kumar S[1*], Gayatri Devi[2], Karthikeyan Murthykumar[3], Vijayabanu U[4], Binu Sahayam[5], Jagadeesh Dhamodharan[6]

[1] Deputy Dean And Associate Professor Of Anatomy, Faculty Of Medicine, Segi University.
[2] Assistant Professor Of Physiology, Indira Medical College And Hospitals.
[3] Associate Professor Of Periodontology, Saveetha Dental College And Hospitals.
[4] Assistant Professor (Sr) Of Psychology, Vit Chennai.
[5] Assistant Professor (Sr), School Of Social Sciences And Language, Vit Chennai.
[6] Unit Head And Associate Professor Of Anatomy, Aimst University.

Corresponding Author: Assoc. Prof. Dr. Saravana Kumar, Deputy Dean And Associate Professor Of Anatomy, Faculty Of Medicine, Nursing And Health Sciences, Segi University, Malaysia. Email: dr.sharan_anatomist@yahoo.com

Received: *20th Feb, 2026;* ***Revised:*** *4th Mar, 2026;* ***Accepted:*** *25th Mar, 2026;* ***Available Online:*** *10th Apr, 2026*

Abstract

Teeth play a crucial role in mastication, speech articulation, and facial aesthetics, significantly influencing overall quality of life. Third molar agenesis, one of the most common developmental dental anomalies, has gained increasing attention due to its clinical and evolutionary implications. This study aimed to evaluate the prevalence, pattern, and probable etiological factors associated with third molar agenesis in a south indian population using clinical and radiographic assessment.

A descriptive retrospective study was conducted on 200 subjects (100 males and 100 females) aged 18–22 years, selected through random sampling. This age group was chosen as it corresponds to the typical eruption period of third molars, enabling accurate clinical evaluation. Individuals with a history of tooth extraction were excluded. Clinical examination was supplemented with panoramic radiographic analysis to confirm agenesis.

The overall tooth-based prevalence of third molar agenesis was 5% (40/800 teeth). On a subject basis, 30% of individuals exhibited agenesis, of which 23% demonstrated complete agenesis (absence of all four third molars) and 7% showed partial agenesis (absence of one to three third molars). A higher prevalence was observed among females compared to males.

The findings suggest that both genetic predisposition and environmental factors, such as dietary transitions toward softer food in modern lifestyles, may contribute to the increasing prevalence of third molar agenesis. These trends may have future implications for dental education, clinical practice, and understanding of human evolutionary biology.

Keywords: Third Molar, Impaction, Agenesis, Oral Health Equity, Epidemiology.

How To Cite This Article: Saravana Kumar S, Gayatri Devi, Karthikeyan Murthykumar, Vijayabanu U, Binu Sahayam, Jagadeesh Dhamodharan. Epidemiology Of Third Molar Agenesis In South India: A Clinical And Radiographic Study Aligned With Sdg 3 (Good Health And Well-Being). Int J Drug Deliv Technol. 2026;16(27s):290-293. Doi: 10.25258/ijddt.16.27s.35

Introduction:

The third molars, commonly referred to as wisdom teeth, are the last permanent teeth to erupt in humans, typically emerging between 18 and 23 years of age. While most adults develop four third molars, variations such as hypodontia (congenital absence) or the presence of supernumerary teeth may occur (1,3,5). Due to their late eruption, third molars are the most frequently impacted teeth, often requiring clinical intervention.

Craniofacial growth patterns, jaw size, and tooth dimensions vary among different populations and are influenced by genetic and environmental factors. These variations significantly affect the eruption pattern, impact status, and incidence of third molar agenesis (2,4,5). Additionally, evolving dietary habits and lifestyle changes may contribute to these developmental variations.

Despite the clinical importance of third molars, there is limited documented evidence regarding their prevalence, eruption status, and agenesis in the South Indian

population (6,8). Therefore, the present study aims to evaluate the prevalence, pattern of agenesis, and possible etiological factors associated with third molar development in this population using clinical and radiographic methods.

Materials and methods:

A descriptive retrospective study was conducted over a period of three months in the Department of Oral and Maxillofacial Surgery. A total of 200 subjects (100 males and 100 females), aged between 18 and 23 years (mean age: 20 ± 2.9 years), were randomly selected.

All participants were undergraduate students from diverse rural and urban backgrounds, representing middle socioeconomic strata with varied dietary habits (vegetarian and non-vegetarian). Written informed consent was obtained from all participants prior to inclusion in the study.

Inclusion criteria comprised individuals with a complete set of 28 permanent teeth and no history of extraction due to impaction, orthodontic treatment, or dental caries. Subjects with any history of tooth extraction or those unwilling to participate were excluded.

To minimize observer bias, all clinical examinations were performed independently by two trained dentists. Each subject underwent a thorough clinical examination of the third molar region and was categorized based on eruption status as completely erupted, partially erupted, or unerupted.

Radiographic evaluation was performed using panoramic radiography (Orthopantomogram) for all subjects, employing a standard OPG machine (PANARAY PC-1000; 70–90 kVp, 6–100 mA). The following parameters were assessed: number of third molars present, eruption status, number of impacted teeth per individual, and available space for eruption.

Results:

Statistical analysis was performed using the Chi-square test, independent *t*-test, and analysis of variance (ANOVA), with the level of significance set at $p < 0.05$.

The mean age of the study population was 20 ± 2.9 years. Out of a total of 800 possible third molars, 40 teeth were congenitally absent, indicating a tooth-based agenesis prevalence of 5%. On an individual basis, 70% of subjects had all four third molars present, while 30% exhibited agenesis. Among these, 23% showed complete agenesis (absence of all four third molars), and 7% demonstrated partial agenesis (one to three missing third molars). Gender-wise analysis revealed that complete agenesis was more prevalent in females (32%) compared to males (14%), indicating a possible gender predilection.

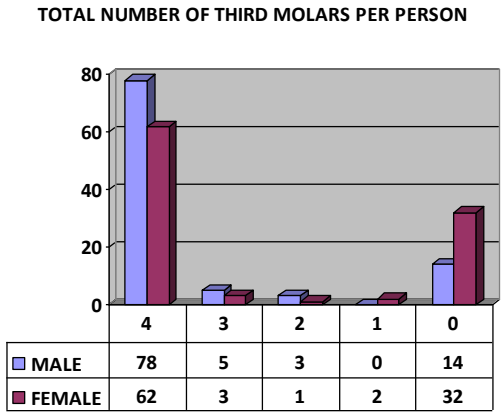
With respect to distribution, 70% of subjects had all four third molars present. Variations were observed in the remaining population: 4% had three third molars, 2% had two, and 1% had only one third molar. Notably, complete agenesis of all four third molars was observed in 23% of the study population. Table 1 demonstrates the distribution of third molars per individual stratified by gender. The majority of subjects (70%) exhibited all four third molars. A gradual decline was observed with decreasing number of third molars per individual. Complete agenesis (absence of all four third molars) was notably higher in females (32%) compared to males (14%), indicating a possible gender predilection.

Gender-wise distribution, Graph 1, revealed that 78% of males and 62% of females had all four third molars present. In contrast, complete agenesis was more prevalent among females (32%) compared to males (14%). Partial agenesis (one to three third molars) was observed at relatively low frequencies across both genders.

Table 1: Total number of molars per person

GENDER	NUMBER OF THIRD MOLARS PER PERSON					TOTAL
	4	3	2	1	0	
MALE	78	5	3	0	14	100
FEMALE	62	3	1	2	32	100
TOTAL (%)	140(70)	8 (4)	4(2)	2(1)	46(23)	200

Graph 1



Discussion:

Third molar agenesis is a common developmental variation influenced by a combination of genetic, environmental, and evolutionary factors. Variations in craniofacial morphology, dietary habits, and functional demands on the masticatory system are known to contribute to differences in eruption patterns and agenesis rates across populations (7,9).

In the present study, 70% of subjects exhibited all four third molars, while 23% demonstrated complete agenesis. The remaining 7% showed partial agenesis, with one to three third molars present. These findings suggest a relatively high prevalence of third molar absence in the studied South Indian population, consistent with global trends indicating a gradual evolutionary reduction in third molar occurrence (8,14).

The higher prevalence of agenesis observed among females aligns with previous studies, suggesting a possible genetic or hormonal influence. (10,12) Additionally, modern dietary patterns characterized by softer food intake may reduce masticatory functional demands, potentially contributing to reduced jaw size and insufficient space for third molar development. (16,19)

The findings of the present study can be contextualized within the framework of Sustainable Development Goal 3, which emphasizes ensuring healthy lives and promoting well-being for all at all ages. Oral health is an integral component of overall health, and developmental anomalies such as third molar agenesis may have implications for masticatory efficiency, occlusion, and long-term dental health planning.

The relatively high prevalence of agenesis observed in this study highlights the need for early diagnosis and preventive dental care strategies, particularly among young adults (17,18). Integrating routine radiographic screening and awareness programs into primary healthcare systems can contribute to improved oral health outcomes and reduce the burden of untreated dental conditions.

Furthermore, understanding population-specific variations in third molar development can assist clinicians in treatment planning and resource allocation, thereby supporting equitable access to oral healthcare services. In this context, the present study contributes to the broader goal of strengthening preventive and promotive health strategies in alignment with SDG 3 targets, particularly those related to universal health coverage and access to essential healthcare services.

Comparative data indicate variation in eruption timing across populations. Previous studies have reported a mean eruption age of approximately 20.5 years in Americans (Hellman), 19.8 years in males and 20.4 years in females in Boston populations (Fanning), and 13–20 years among African populations (13,15,17). The findings of the present study (mean age: 20 years) are consistent with these observations. The findings reinforce the multifactorial etiology of third molar agenesis, involving both genetic determinants and environmental influences such as dietary transitions and reduced masticatory demands.

Conclusion:

The present study demonstrates that third molar agenesis is relatively common in the South Indian population, with a notable prevalence of complete agenesis (23%). A higher predilection was observed among females. Both genetic predisposition and environmental factors, particularly dietary habits, appear to play a significant role in the occurrence of agenesis.

These findings are particularly relevant to SDG 3.8, which emphasizes universal health coverage, including access to essential oral healthcare services and early diagnostic interventions. These findings have important implications for clinical practice, dental education, and understanding evolutionary trends in human dentition. Further large-scale and longitudinal studies are recommended to explore the underlying genetic mechanisms and their association with craniofacial development.

Limitations:

The present study has certain limitations. The sample size was relatively small and restricted to a specific age group and geographic region, which may limit the generalizability of the findings. Additionally, the retrospective design and reliance on panoramic radiographs may not capture early developmental stages of third molar formation. Future multicentric and longitudinal studies are recommended.

References:

1. Alqahtani, N. A., Khaleel, S. M., & Alzahrani, A. A. (2021). Prevalence and pattern of third molar impaction: A retrospective radiographic study. *Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology, 33*(2), 156–161.
2. Carter, K., Worthington, S., & O'Neill, R. (2020). Predictors of third molar impaction: A systematic review and meta-analysis. *International Journal of Oral and Maxillofacial Surgery, 49*(10), 1347–1357.

3. Kumar, S., Rahman, F., & Krishnan, R. (2022). Prevalence of third molar agenesis and its association with craniofacial morphology: A panoramic radiographic study. *Clinical Oral Investigations, 26*(5), 4123–4130.
4. López-García, R., Peñarrocha-Diago, M., & Peñarrocha-Oltra, D. (2023). Third molar agenesis: A review of genetic and environmental factors. *Journal of Clinical Medicine, 12*(4), 1452.
5. Patil, S., Doni, B., & Kaswan, S. (2021). Evaluation of third molar eruption and agenesis patterns in young adults using orthopantomograms. *Journal of International Society of Preventive & Community Dentistry, 11*(3), 305–311.
6. Singh, P., Sharma, A., & Kumar, D. (2024). Third molar agenesis and its correlation with jaw size and dietary habits: A cross-sectional study. *BMC Oral Health, 24*(1), 112.
7. Tiwari, V., & Shukla, P. (2022). Radiographic assessment of third molar development and agenesis in Indian population. *Journal of Oral Biology and Craniofacial Research, 12*(4), 512–517.
8. Yadav, R., Verma, P., & Yadav, S. (2020). Prevalence of impacted and congenitally missing third molars: A radiographic study. *National Journal of Maxillofacial Surgery, 11*(2), 210–215.
9. Yasa, Y., Altynbekov, K., Kalafatoğlu, B. S., Meiramkul, S., Alhusain, M., & Altynbekov, C. (2025). Prevalence and radiographic patterns of third molar impaction and agenesis in the Kazakh population. *International Dental Journal, 75*(5), 100897.
10. Wadia, R. (2023). Third molar agenesis. *British Dental Journal, 235*, 807.
11. Alamoudi, R., Kanavakis, G., Oeschger, E. S., & Gkantidis, N. (2024). Occlusal characteristics in modern humans with tooth agenesis. *Scientific Reports, 14*, 5840
12. Adhikari, S., Bhattarai, B., Shrestha, S., & Bali, H. (2025). Prevalence of third molar agenesis among patients visiting a tertiary health centre in Nepal: A radiographic study. *Journal of Nepalese Society of Periodontology and Oral Implantology, 8*(2).
13. Sharma, N., Choudhary, S., & Prasad, G. (2021). Radiographic evaluation of third molar agenesis in an Indian population. *International Journal of Oral-Medical Sciences, 20*(3), 169–174.
14. Pamukcu, U., Ispir, N. G., Toraman Alkurt, M., Altunkaynak, B., & Peker, I. (2021). Evaluation of the frequency of third molar agenesis according to different age groups. *American Journal of Human Biology, 33*(3), e23487.
15. Eliacik, B. K., Atas, C., & Polat, G. G. (2021). Prevalence and patterns of tooth agenesis among patients aged 12–22 years: A retrospective study. *Korean Journal of Orthodontics, 51*(5), 355–362.
16. Caldwell, D. (2021). Third molar agenesis in post-medieval populations: Evolutionary perspectives. *Dental Anthropology Journal, 34*(2).
17. Rai, S. C., & Kumar, S. (2015). Gender-based comparison of intercanine distance of mandibular permanent canine among South Indian population. *Research Journal of Pharmacy and Technology,* 8(8).
18. Sagar, S., Kumar, S., & Moses, S. (2015). Variation in anatomy and position of mandibular third molar in South Indian population. *Journal of Pharmaceutical Sciences and Research,* 7(6), 385–386.