



Bulletin of the International Association for Paleodontology

Volume 20, Issue 1, 2026

Established: 2007

CONTENT

Ragni et al. / Mandibular gracilization through time: a 3D comparison of ancient and contemporary populations	1
Swastirani et al. / Dental age estimation using the tooth coronal index (TCI) method in an Indonesian adult population	12
Marini et al. / Diagnostic performance of the Third Molar Maturity Index (I3M) for forensic age estimation at the 18-year threshold in a Surabaya population, Indonesia	19
Erbil Kaya et al. / Dental anthropological analysis of the Byzantine Necropolis of Samantaş (Muğla, Türkiye)	28
Agitha et al. / Accuracy of dental age estimation using the Demirjian, Al Qahtani, and Blenkin-Evans methods in children from Surabaya, Indonesia	41
Mulla et al. / Forensic odontology in pediatric dentistry: a detailed exploration	50
Mehta et al. / Bilateral shovel shaped maxillary central incisors in a non-syndromic adult: a distinct morphological presentation	64
Mulla et al. / Redesignating third molars as vestigial organs	70

Reviewers of this issue:

Anita Adamić, Salem Altalie, Julie Arnaud, Aspalilah Alias, Erin Blankenship-Sefczek, Inês Morais Caldas, Samarika Dahal, Eddy de Valck, Manal Gupte, Zerina Hadzic, Paavan Kapadia, Desai Karishma, Ferhat Kaya, Darko Kero, Moe Kosaka, Nicole Niklisch, Luz Andrea Velandia Palacio, Ana Rodrigues, Nurtami Soedarsono, Fatemeh Sohrabniya, Sheshanna Huchanahalli Sreeshyla, Giulia Vitale, Mingfu Ye, Muhammad Zaid Zainuddin, Ksenija Zelic.

We thank all the reviewers for their effort and time invested to improve the papers published in this journal.

Redesignating third molars as vestigial organs? *

• Sayem A. Mulla, Viraj Kharkar, Harjit Singh Kalsi •

Department of Oral & Maxillofacial Surgery, Bharati Vidyapeeth (Deemed to be University) Dental College and Hospital, Navi Mumbai – 400614, Maharashtra, India

Address for correspondence:

Viraj Kharkar

Department of Oral & Maxillofacial Surgery, Bharati Vidyapeeth (Deemed to be University) Dental College and Hospital, Navi Mumbai – 400614, Maharashtra, India.

E-mail: virajkharkar@gmail.com

Bull Int Assoc Paleodont. 2026;20(1):70-73.

Abstract

In evolutionary biology and dentistry, third molars which are also referred to as wisdom teeth, have long been a topic of discussion. Due to nutritional and structural changes in humans, they are no longer as functionally necessary as they formerly were for digesting tough, raw meals. The topic of whether these teeth should be categorized as vestigial organs is raised by the fact that many people suffer from impaction, infections, and other issues as a result of their smaller jaw. Even while some contend that third molars are still only marginally useful, rising agenesis and extraction rates point to a continuing evolutionary deterioration. The evolutionary history, practical significance, and categorization of third molars as vestigial features in contemporary humans are all examined in this article.

Keywords: impacted wisdom teeth; wisdom teeth; agenesis of wisdom teeth

** Bulletin of the International Association for Paleontology is a journal powered by enthusiasm of individuals. We do not charge readers, we do not charge authors for publications, and there are no fees of any kind. We support the idea of free science for everyone. Support the journal by submitting your papers. Authors are responsible for language correctness and content.*

Introduction

In the domains of evolutionary biology and dentistry, third molars which are also referred to as wisdom teeth are frequently debated. These teeth have long been thought of as relics from our evolutionary history, usually appearing in late adolescence or early adulthood (1). The question of whether third molars should be reclassified as vestigial organs has come up in recent years (2). Anatomical features that have lost their original purpose over time as a result of evolutionary changes are known as vestigial organs (3). The nature of third molars, their evolutionary background, and whether they should be referred to as vestigial organs in contemporary humans are all examined in this article.

Vestigial Organs: A Brief Overview

The phrase "vestigial organ" describes a bodily portion or structure that has evolved out of use with time. The human appendix, the coccyx (tailbone), and the tiny ear muscles that enable other animals to move their ears are well-known examples of vestigial organs. The body still contains these components, but they no longer perform the same tasks as in our evolutionary forebears (4).

In the past, a lot of scientists felt that the human appendix was a vestigial structure, a copy of an organ that our herbivorous ancestors utilized to break down difficult plant materials. In a similar vein, the coccyx was formerly believed to represent the remains of a tail, signifying that humans have evolved from tailed creatures (5).

Evolutionary, Functional and Vestigial Significance of Third Molars

The most distal teeth to emerge are the third molars, sometimes known as wisdom teeth, which usually appear after puberty. These teeth were essential for digesting raw and fibrous plant material in early human ancestors and other primates. Third molars were very effective in crushing and grinding hard foods like seeds, roots, and leaves because of their large occlusal surfaces and robust roots. In early diets that were mostly made up of coarse and gritty plants, this adaption was essential for survival. But when human diets changed over evolution to include cooked and softer foods, the practical requirement for these strong crushing teeth drastically decreased (6).

Anthropological research has shown that human jaw size has gradually decreased over time in tandem with nutritional change. Because of this evolutionary shift, there is less room in the dental

arches, which makes third molar impaction, crowding, and infections more common. In reality, modern populations frequently experience such issues because to the lack of sufficient area for eruption (7,8). These results provide credence to the theory that modern humans' third molars are vestiges of a once-essential masticatory system. Because of our smaller jaws and different diets, modern humans no longer need these teeth as much as our predecessors did for effective food processing (9).

The necessity for wide jaws and extensive masticatory function has been further diminished by cultural and technical developments, such as the introduction of cooking and the use of utensils for food preparation (10). These advancements contributed to the evolutionary tendency of jaw reduction by making food simpler to chew and absorb (11). As a result, many people nowadays do not have enough room for their third molars to emerge, and extractions are frequently done surgically to treat discomfort, control infection, or avoid future dental issues (12). Furthermore, new genetic data indicates that some people never produce third molars at all, suggesting that evolutionary forces may be gradually reducing the genetic tendency for their production.

In a study done in 1964, the overall rate of third molar agenesis was 25% (12). In addition to this, global third molar agenesis rate was determined to be 22.63% in the year 2016 (13). Furthermore, a study done in 2017 reported the overall rate to be 46.7% (14). A recent study done in 2020, the rate of third molar agenesis was found to be 50.8% (15). This suggests that as we evolve more and more cases of third molar agenesis have been increasing.

The progressive loss of third molars, along with the rise in impaction and other dental problems, indicates that they are no longer adaptively significant from an evolutionary perspective (6,7,16). This is consistent with vestigial organ features.

Counter Arguments: Are Third Molars Truly Vestigial?

Although it is conceivable, the theory that third molars are vestigial is not without its difficulties. The classification of third molars as vestigial is questioned because they may not be completely useless in contemporary humans.

Some people have wisdom teeth that erupt without any issues and continue to be used for chewing. Furthermore, third molars seem to be more required and useful in some communities

worldwide, indicating that the development of wisdom teeth may not have followed a consistent path in all human cultures.

Furthermore, it's not always easy to determine if a structure qualifies as vestigial. For instance, the appendix was traditionally believed to be totally worthless, but new research indicates it may have some significance for immunological and digestive health (17). Therefore, it is still unclear if third molars serve any purpose that we are now unaware of or if they are merely relics from our evolutionary history (Figure 1).

Conclusion

Third molars are obviously less important in today's diets and frequently result in dental issues because of the shrinkage of the jaw, but there is still disagreement among scientists on whether or not they can be officially classified as vestigial organs. The hypothesis that third molars have become vestigial throughout time is supported by their decreasing relevance in human survival as well as rising rates of extraction and impaction, even though they may still have some slight functional usefulness in certain situations.

In the end, the idea that third molars are vestigial organs emphasizes the intriguing path of human

development, where the requirements of our ancestors continue to shape our bodies to this day, even in the absence of those demands. It's unclear if third molars will eventually vanish completely or if they will eventually have an as-yet-undiscovered purpose. Nonetheless, it is clear that they serve as evidence of the human race' resilience and continuous evolution.

Author Contributions

All authors contributed equally towards the conceptualization, designing, literature search, data acquisition, analysis, initial and final preparation and approval of manuscript. All authors reviewed and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

Statement on the use of artificial intelligence in manuscript preparation

The authors confirm that no use of artificial intelligence was done in the formatting of this manuscript.

SHOULD WE CALL THIRD MOLAR AS VESTIGIAL?

YES, WHY?

- Evolutionary redundancy.
- Reduced jaw size.
- Frequently impacted.
- Often missing.
- No significant role in mastication.



NO, WHY?

- Useful in chewing hard diet.
- Used in cases of transposition.
- Can be used as anchorage in orthodontics.

THUS, IT IS DEBATABLE IF THIRD MOLARS CAN BE REDESIGNED AS VESTIGIAL OR NOT!

Figure 1. Agreements and counter-agreements regarding redesignating third molar as vestigial organ.

References

1. Wu RX, Tian BM, Gao R, Chen FM. Non-Impacted Third Molars: Angels or Devils? *J Clin Med*. 2023;12(13). doi: 10.3390/jcm12134455
2. Gkantidis N, Tacchi M, Oeschger ES, Halazonetis D, Kanavakis G. Third molar agenesis is associated with facial size. *Biology (Basel)*. 2021;10(7). doi: 10.3390/biology10070650
3. McKay CJ, Luckett WP, Sánchez-Villagra MR. Vestigial structures and variation in the evolution of the marsupial mammal dental development—a study of the woolly opossum *Caluromys philander*. *J Mamm Evol*. 2023;30(1):21–31. doi: 10.1007/s10914-022-09638-0
4. Solt I. [Vestigial structures are important to the development of the human embryo]. *Harefuah*. 2011;150(7):596–9, 616.
5. Sarkar A, Saha A, Roy S, Pathak S, Mandal S. A glimpse towards the vestigiality and fate of human vermiform appendix—a histomorphometric study. *J Clin Diagn Res*. 2015;9(2):AC11–5. doi: 10.7860/JCDR/2015/11178.5581
6. Sifuentes-Cervantes JS, Carrillo-Morales F, Castro-Núñez J, Cunningham LL, Van Sickels JE. Third molar surgery: Past, present, and the future. *Oral Surg Oral Med Oral Pathol Oral Radiol*. 2021;132(5):523–31. doi: 10.1016/j.oooo.2021.03.004
7. Alfadil L, Almajed E. Prevalence of impacted third molars and the reason for extraction in Saudi Arabia. *Saudi Dent J*. 2020;32(5):262–8. doi: 10.1016/j.sdentj.2020.01.002
8. Thevissen P, Waltimo-Sirén J, Saarimaa H-M, Lähdesmäki R, Evälahti M, Metsäniitty M. Comparing tooth development timing between ethnic groups, excluding nutritional and environmental influences. *Int J Legal Med*. 2024;138(6):2441–57. doi: 10.1007/s00414-024-03279-z
9. Jheon AH, Seidel K, Biehs B, Klein OD. From molecules to mastication: The development and evolution of teeth. *Wiley Interdiscip Rev Dev Biol*. 2013;2(2):165–82. doi: 10.1002/wdev.63
10. Fujita Y, Maki K. Association of feeding behavior with jaw bone metabolism and tongue pressure. *Jpn Dent Sci Rev*. 2018;54(4):174–82. doi: 10.1016/j.jdsr.2018.05.001
11. Kahn S, Ehrlich P, Feldman M, Sapolsky R, Wong S. The Jaw Epidemic: Recognition, Origins, Cures, and Prevention. *Bioscience*. 2020;70(9):759–71. doi: 10.1093/biosci/biaa073
12. Keene HJ. Third molar agenesis, spacing and crowding of teeth, and tooth size in caries-resistant naval recruits. *Am J Orthod*. 1964;50(6):445–51. doi: 10.1016/0002-9416(64)90207-6
13. Carter K. *The Evolution of Third Molar Agensis and Impaction*. Harvard University, Graduate School of Arts & Sciences; 2016.
14. Singh N, Chaudhari S, Chaudhari R, Nagare S, Kulkarni A, Parkarwar P. A radiographic survey of agenesis of the third molar: A panoramic study. *J Forensic Dent Sci*. 2017;9(3):130–4. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/29657489>
15. Scheiwiller M, Oeschger ES, Gkantidis N. Third molar agenesis in modern humans with and without agenesis of other teeth. *PeerJ*. 2020;8:e10367. doi: 10.7717/peerj.10367
16. Shaari R Bin, Nawi MAA, Khaleel AK, AlRifai AS. Prevalence and pattern of third molars impaction: A retrospective radiographic study. *J Adv Pharm Technol Res*. 2023;14(1):46–50. doi: 10.4103/japtr.japtr_489_22
17. Kooij IA, Sahami S, Meijer SL, Buskens CJ, te Velde AA. The immunology of the vermiform appendix: a review of the literature. *Clin Exp Immunol*. 2016;186(1):1–9. doi: 10.1111/cei.12821