

Artificial Intelligence in Clinical Dentistry: Hype, Help, or Hazard?

Type: Mini-Review

Received: February 18, 2026

Published: May 30, 2026

Citation:

Rohit Kumar Singh. "Artificial Intelligence in Clinical Dentistry: Hype, Help, or Hazard?". PriMera Scientific Surgical Research and Practice 7.6 (2026): 21-22.

Copyright:

© 2026 Rohit Kumar Singh. This is an open-access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Rohit Kumar Singh*

Associate Professor, ESIC Dental College & Hospital, Rohini, Delhi, India

***Corresponding Author:** Rohit Kumar Singh, Associate Professor, ESIC Dental College & Hospital, Rohini, Delhi, India.

Abstract

Artificial Intelligence (AI) is progressively incorporated into clinical dentistry, providing instruments for diagnosis, treatment planning, and predictive analytics. Current evidence demonstrates the benefits of AI across dentistry, improving accuracy, efficiency and decision-making. However, ethical and professional oversight and the generalizability and clinical validation of AI are crucial. This editorial aims to present an overview of the benefits, limitations and misunderstandings of using AI in dentistry based on recent systematic reviewed and critical analyses. We present an alternative viewpoints, after reviewing the relevant literature, that replacement, to the dental professionals.

Introduction

Artificial intelligence has evolved from an abstract concept to a clearly visible technology in clinical dentistry. From detection of caries on radiographs to sophisticated decision support for orthodontic treatment, AI software is certainly changing the way dentists diagnose and manage disease. Systematic reviews demonstrate the benefits of AI in improving diagnostic accuracy and patient management across many specialties. However, while some hail AI as the future of dentistry, are we seeing a transformation in practice or is this just wishful thinking?

The Case for Help: Advantages of AI in Dentistry

AI systems, particularly those based on machine learning and deep learning, excel at identifying patterns in large datasets. In dentistry, this capability translates into improved image analysis, disease prediction, and treatment outcome forecasting. A systematic review by Ahmed et al. concluded that AI provides accurate diagnosis, decision-making support, and prediction capabilities across specialties including radiology, orthodontics, prosthodontics, and periodontics.

Similarly, Chen et al. describe AI's ability to analyze "big data" to improve clinical decision-making and patient care outcomes, highlighting its growing role in caries detection and digital dentistry (Chen et al., 2020). Shan et al. emphasize AI's potential to simulate treatment outcomes and project disease progression, supporting precision dentistry (Shan et al., 2021). Schwendicke et al. further suggest that AI may streamline workflows, reduce routine workload, and expand access to care if

implemented responsibly (Schwendicke et al., 2020).

These findings suggest that AI's strength lies not in replacing clinicians but in augmenting them—enhancing diagnostic consistency, improving efficiency, and supporting evidence-based decisions.

The Case for Caution: Risks and Challenges

Despite promising results, AI in dentistry remains under development. Nordblom et al. (2024) note that many AI systems are trained on limited, single-center datasets, raising concerns about bias and limited generalizability. Without diverse, high-quality data, algorithmic performance may not translate across populations or practice settings.

Data governance and privacy are equally pressing issues. Shan et al. highlight challenges in data curation, interpretability, and ethical design of AI frameworks. The “black box” nature of some algorithms complicates transparency, potentially undermining clinician trust and patient confidence.

Bonny et al. (2023) also stress that AI cannot replace dental personnel and should be regarded as a complementary tool rather than a substitute. Overreliance on automated outputs could risk diminishing clinical judgment or fostering complacency.

Furthermore, many AI applications lack long-term clinical validation and regulatory maturity. Demonstrating tangible improvements in patient outcomes—not merely statistical accuracy—remains essential before widespread adoption.

Conclusion

Artificial intelligence in clinical dentistry is neither mere hype nor an imminent hazard. It represents a powerful technological advancement with demonstrated potential to enhance diagnostic accuracy, streamline workflows, and support predictive, personalized care. However, its successful integration depends on rigorous validation, transparent algorithms, ethical safeguards, and sustained professional education.

The future of AI in dentistry will likely be collaborative. Rather than replacing dentists, AI is poised to function as augmented intelligence—amplifying human expertise while preserving professional responsibility. Whether AI becomes a transformative help or a problematic hazard will ultimately depend on how thoughtfully the profession governs its development and application.

References

1. Ahmed N., et al. “Artificial Intelligence Techniques: Analysis, Application, and Outcome in Dentistry—A Systematic Review”. *Biomed Res Int* (2021).
2. Chen YW, Stanley K and Att W. “Artificial intelligence in dentistry: current applications and future perspectives”. *Quintessence Int* (2020).
3. Shan T, Tay FR and Gu L. “Application of Artificial Intelligence in Dentistry”. *J Dent Res* (2021).
4. Schwendicke F, Samek W and Krois J. “Artificial Intelligence in Dentistry: Chances and Challenges”. *J Dent Res* (2020).
5. Bonny T, et al. “Contemporary Role and Applications of Artificial Intelligence in Dentistry”. *F1000Res* (2023).
6. Nordblom NF, Büttner M and Schwendicke F. “Artificial Intelligence in Orthodontics: Critical Review”. *J Dent Res* (2024).