

The Potential of AI-Based Clinical Decision Making in Dentistry

*Saeed Asgary

Iranian Center for Endodontic Research, Research Institute of Dental Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Corresponding Author: Saeed Asgary, The Potential of AI-Based Clinical Decision Making in Dentistry.

Received: 📅 2023 Aug 22

Accepted: 📅 2023 Sept 11

Published: 📅 2023 Sept 21

Dear Editor,

I am writing to emphasize the emerging role of Artificial Intelligence (AI) in dentistry and its potential impact on clinical decision making. As technological advancements continue to reshape various domains, AI presents an exciting opportunity to revolutionize the field of dentistry and improve patient care.

Evidence-based practice has long been advocated in dentistry, integrating the best available evidence, clinical expertise, and patient values to guide treatment decisions (1). However, the integration of AI in dentistry holds promise in augmenting and enhancing evidence-based clinical decision making.

AI-based clinical decision making in dentistry involves leveraging advanced algorithms and machine learning techniques to analyze large volumes of patient data, including radiographs, clinical records, and treatment outcomes. By harnessing AI, dental professionals can derive meaningful insights, identify patterns, and develop predictive models to support more accurate diagnoses, treatment planning, and prognoses (2).

One of the key advantages of AI lies in its ability to process complex datasets and identify subtle patterns that may elude human observation. For instance, AI algorithms have demonstrated the potential to aid in the early detection of oral lesions and assist in the diagnosis of conditions such as oral cancer (3). By integrating AI technologies into clinical practice, dental professionals can benefit from enhanced diagnostic accuracy and improved treatment outcomes.

It is important to note that AI-based clinical decision making in dentistry should not be perceived as a replacement for dental professionals but rather as a powerful tool to augment their expertise and support evidence-based practice. The integration of AI can assist dental professionals in making more informed treatment decisions, optimizing treatment plans, and improving patient outcomes (4).

However, the adoption of AI in dentistry necessitates careful

consideration of ethical, legal, and regulatory aspects. Ensuring patient privacy, data security, and transparency in algorithmic decision making are paramount (5). Furthermore, it is imperative to strike a balance between the advancements in AI and the preservation of the dentist-patient relationship, where human interaction and empathy remain pivotal in delivering patient-centered care.

As researchers and dental practitioners, we must collaborate to further explore the potential of AI in dentistry and validate its efficacy through rigorous clinical studies. Additionally, the development of guidelines and ethical frameworks specific to AI-based clinical decision making in dentistry is crucial to ensure responsible and safe implementation (6).

In conclusion, AI-based clinical decision making holds significant promise for the future of dentistry. By integrating AI technologies into evidence-based practice, dental professionals can enhance diagnostic accuracy, optimize treatment planning, and improve treatment outcomes. However, it is vital to address ethical considerations, ensure data privacy, and maintain a patient-centered approach while embracing the potential of AI in dentistry.

References

1. Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. *BMJ* 1996;312:71-2.
2. Ramezanzade, S., Laurentiu, T., Bakhshandah, A., Ibragimov, B., Kvist, T., EndoReCo, & Bjørndal, L. (2023). The efficiency of artificial intelligence methods for finding radiographic features in different endodontic treatments-a systematic review. *Acta Odontologica Scandinavica*, 1-14.
3. Jubair, F., Al-karadsheh, O., Malamos, D., Al Mahdi, S., Saad, Y., & Hassona, Y. (2022). A novel lightweight deep convolutional neural network for early detection of oral cancer. *Oral Diseases*, 28(4), 1123-1130.
4. Nguyen, T. T., Larrivée, N., Lee, A., Bilaniuk, O., & Durand, R. (2021). Use of artificial intelligence in dentistry: current clinical trends and research advances. *J Can Dent Assoc*, 87(17), 1488-2159.

5. Lepri, B., Oliver, N., & Pentland, A. (2021). Ethical machines: The human-centric use of artificial intelligence. *IScience*, 24(3).
6. Murdoch, A. I. K., Blum, J., Chen, J., Baziotis-Kalfas, D., Dao, A., Bai, K., ... & Cirillo, N. (2023). Determinants of clinical decision making under uncertainty in dentistry: a scoping review. *Diagnostics*, 13(6), 1076.