

Artificial Intelligence in Periodontics - Boon or a bane?

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AI (Artificial Intelligence) has been making a huge buzz around the world in recent times. We, in the digital world, are directly or indirectly using the AI facilities in our day-to-day lives. The simplest example would be the social media AI where we are shown with the video preferences we commonly would like to watch.

AI simply refers to the simulation of human intelligence in machines that are programmed to think and act like humans.¹ They are designed to perform various cognitive functions like problem-solving. Hence, they are used in a wide range of medical and dental fields for aiding in diagnosis, predicting prognosis, and treatment plans. The COVID-19 and post-COVID-19 era also made dental and medical professionals to use AI technology a lot than pre-COVID times.

Periodontal disease is one of the leading dental diseases affecting the supporting structures of the teeth commonly resulting in tooth loss, compromised esthetics, dentinal hypersensitivity, etc. which have caused a lot of social and economic impact globally. But periodontitis diagnosis is often challenging and has a wide inter- and intra-operator variation during periodontal probing, other clinical judgements,

and radiographic interpretation which is normally considered a routine tool for periodontal diagnosis.²⁻⁴

Though AI is still naïve in terms of use in periodontology and oral implantology, it has been tried in different ways. One of the significant works is the use of the convolutional neural network (CNN) algorithm for the diagnosis and prediction of compromised teeth with periodontitis by Lee et al. which had an accuracy of around 80% for diagnosing the teeth with poor periodontal health and necessity for extraction.⁵ But, the use of computer-based algorithms started as early as the 2000s when ultrasonographic periodontal probes were introduced at NASA Langley.¹ Other significant works in the field of periodontology include the use of AI based nanomaterial sensors for the detection of olfaction in halitosis,⁶ support vector machine (SVM) and artificial neural networks (ANNs) for differentiating aggressive and chronic periodontitis,⁷ and automated separation of gingival diseases from oral images.¹ If we talk specifically about oral implantology, guided surgery, real-time implant navigation surgery, diagnostic software and tools, robotic implant surgery, etc. all use the AI platforms.

What we all should acknowledge is that all new emerging techniques have their merits as well as demerits. Many people have predicted that the emergence of AI would bring clinicians and academicians in the medical and dental field career to an end since the early 1970s, but this didn't hold true in reality. No one can challenge the innovation and projection of the human brain. AI only can generate data on the basis of what information is provided to

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Citation

Lamichhane S, Rupakhety P. Artificial Intelligence in Periodontics-Boon or a bane? J Nepal Soc Perio Oral Implantol. 2023 Jan-Jun;7(13):42-3.

it and it will remain as an adjunct to decrease the human workload and increase their efficiency. The next thing to take into consideration is their adoption by the clinicians and accessibility to it. A recent study showed that only 68% of periodontists were aware of AI but only 24% were aware of its working

principle.⁸ So, AI has still a long way to go in the field of periodontology and oral implantology. However, the accuracy in diagnosis and treatment planning that AI brings can never be neglected and should be used whenever possible and feasible for the benefit of both periodontist and their patient.

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