



AI In Dentistry

Written By: Dr. Adel Rizkalla, Head of Risk Management for Dentists Choice

Today, there is considerable public debate about Artificial Intelligence (AI) and how this new technology will alter our lives

in the future. As dentists, we need to consider, analyze, and thoughtfully guide the development of AI as it relates to the practice of dental medicine.

The term AI describes the ability of machines to perform tasks that traditionally have required human

intelligence. This technology is evolving at a lightning-fast speed. ChatGPT, a free program that allows amateurs to use AI to produce an intelligent-appearing product, was launched only a little over

a year ago. Since then, we have been experiencing the AI frenzy surrounding us as we consume products from companies like Google, Meta, and Anthropic. This technology is present in our everyday lives and is not tech hype. Investors are pouring money into its development.

According to an article in The Economist magazine, Microsoft, a tech giant, is partnering with OpenAI to build a \$100 billion data center (Economist.com, 2024).

Many hope that the results of AI will be both significant and beneficial. In oral medicine, lesions may be detected and diagnosed earlier. In oral and maxillofacial surgery, robotic surgery may provide more accuracy and safety. In oral pathology, more accurate predictability of oral cancer may be possible. Histological analysis may be faster and completed with more precision. (Chakravorty,

2024) Periodontics, prosthodontics, orthodontics, pediatric dentistry, and endodontics may all benefit from AI as well. Other benefits may include smoother practice management, improved scheduling, coordinating insurance benefits, streamlining reimbursement, and minimizing insurance fraud.

As this or any technology develops and is implemented, we must ask ourselves who may be involved, benefit, or be affected by it. Solo clinicians, clinicians employed by large organizations, investors, insurance companies, Medicare/Medicaid and other federal or state organizations, leaders in organized dentistry, educators, dental students, and patients could all benefit. But will they all be positively affected, or might some experience negative effects?

At this point, it is prudent to thoughtfully recognize the vulnerability of this technology to be exploited for pure profit, or, in essence, greed. Profitability can be enhanced by those programming the technology and later by the technicians to skew the weight of the technology in decision-making by overstating the importance of the AI's conclusions.

As dental practitioners, we have an ethical obligation to ensure that our profession upholds the highest standards of honesty and integrity. We must not embrace AI or any other new technology without prioritizing the patient's care in the most patient-centered way. This potentially wonderful progress must be approached with a deliberate desire to benefit the patient.

As we think about the future of dentistry in a world where AI becomes pervasive, we need to consider some questions that come to mind:

- Who is going to influence these algorithms? What are their values?
- These days, we know that many patients “fact check” the diagnoses and proposed treatments presented by their clinicians on the internet. Will AI be used as a tool that our patients trust more than they trust their human clinician?
- Will we, as clinicians, use AI to justify our treatment recommendations?
- Just as we adjust the contrast of a digital radiograph, can we adjust the opinion of the AI program based on which software we use and who financed or developed it?

- Will AI continue to gain experience as it collects data and can apply this experience accurately and justly without human input or supervision?
- Who will own, guard, or profit from collecting the patient's data?

Receiving training datasets for dentistry is another moral issue because it involves someone's private information. Even if they freely give up their dental data, their identity is still compromised. When used in training AI systems, it's crucial that these datasets are anonymized to protect patient identities. Perfect anonymization will always be challenging; small details in the data might still lead to re-identification of the individuals, especially when combined with other data sources.

The following is a quote from an article in the Journal of Law and Ethics:

"It is crucial for developers of AI/ ML-driven tools to recognize the shortcomings of HIPAA to gain a better understanding about the challenges related to compliance and be mindful about developing appropriate solutions. To achieve this, AI developers and vendors should be familiar with very common scenarios where HIPAA does not extend its coverage to sensitive health data of patients or consumers. This understanding has a critical role in paving the way for addressing these scenarios in a manner that aligns with the policy objectives and the spirit of HIPAA"
(Rezaeikhonakdar, 2023)

Will the clinician be able to make independent treatment decisions based on the patient's individual situation and the clinician's experience and training without being criticized for disregarding the AI recommendations?

How much will AI influence the standard of care? Will every carious lesion have to be surgically treated or will the use of evidence-based approach like CMBRA be included in the algorithms?

As we are moving very rapidly into the future, we must acknowledge that AI is here. It will significantly impact us sooner than any of us could have expected just five or ten years ago.

A human clinician knows that there are situations where a procedure may appear to be called for, yet doing so would not provide an improvement for the patient and would just incur added

expense and discomfort. While AI may identify more potential clinical needs, we must not let a computer program be used to generate a costly procedure that might better be handled with a “monitor and wait” approach. We must be prepared to embrace those aspects of AI that are good, and we must not accept those aspects that cause negative results for our patients.

The predominant question that we, as dentists, must consider is whether we will passively allow AI to take control of our practices or affirmatively maintain control.

References:

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