Emergence of Artificial Intelligence in Dentistry: Are Clinicians Replaceable?

The 21st century has emerged as a harbinger of hope in this era. We are amidst a time when technology rules in all aspects. It has empowered health care in a way that it becomes pertinent to address the question – are machines going to replace humans? As robots can perform work without fatigue and are programmed to overcome sociocultural biases, the question becomes ever more pressing.[1]

Artificial intelligence (AI) in health care is a broad term used to describe the use of machine learning (ML) algorithms and software, to mimic human cognition in the analysis, presentation, and comprehension of medical/health-care data. According to the “National Strategy on Artificial Intelligence,” 2018 released by Niti Aayog, health care remains the top priority where AI is being developed.[2]

Different facets of AI such as ML, robotics, and natural language processing can be used in clinical practice to assist in more efficient, precise, less time-consuming, and cost-effective experiences. There’s a plethora of areas in health care where AI is emerging to replace and reduce human effort; ranging from digital assistance, early detection/diagnosis, and outcome prediction in conditions such as cancer, robotic surgeries, drug design, and development.

In recent years, deep learning models have been successfully deployed in dentistry. More specifically, many scoping reviews in orthodontic literature have explored AI in cephalometric landmark identification, determining the need for orthodontic extractions, maturation status of cervical vertebra, predicting outcomes after orthognathic surgery, and orthodontic treatment planning.[3-5] Further, voice command-regulated dental chairs, water dispensing, and light controls have also been proposed. In the field of oral surgery, AI finds great applications in image-guided resections and bioprinting of soft/hard tissues. The role of AI in forensic odontology is promising and its incorporation in tutoring an intelligent dental education and training system also seems inevitable.

Entering this stage of digitalization is both a matter of pride and concern for dental practitioners. While, on the one hand, these tools heighten the entire audio-visual clinical scenario; on the other hand, concerns about its complexity, need for expert programmers, privacy invasion, and ethical dilemmas are becoming more intense.[6]

I have witnessed yesterday, am observing the changes today, and anticipate to be a part of a glorious tomorrow. I do see the supreme benefits AI will bring to students and masses in general; however, I am also skeptical about replacing the role of a clinician in dental practice since the technical prowess of AI is potentially limitless. In fact, to my surprise, dentistry has embraced this approach more quickly than the other fields of medicine. Yet, the premise behind this remains to assist in making high order, accurate, and unbiased decisions, thus increasing efficiency and decreasing human error.

As Einstein rightly quoted “The measure of intelligence is the ability to change,” I’m eager for the shift and filled with a lot of curiosity and excitement. Since change is the only constant, in the upcoming years, I sincerely hope that each of us can keep pace with this revolutionary technology and, at the same time, uphold the fundamentals of trust, compassion, and empathy toward our patients.

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