



# Artificial Intelligence in Dentistry: Balancing the Precision of Dr. Jekyll and Variability of Mr. Hyde in Transformative Era

**Dr. Omkar Balsaraf (BDS, MDS, CCFMJ, Ph.D)**

*Sinhgad Dental College and Hospital affiliated to Maharashtra University of Health Sciences, Nashik., India*

**Corresponding Author:** Dr. Omkar Balsaraf, Sinhgad Dental College and Hospital affiliated to Maharashtra University of Health Sciences, Nashik, India.

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Artificial intelligence has led to a transition in the field of medicine by enhancing the horizons of diagnosis, personalized patient care and treatment. Artificial intelligence is an integral part in the field of dentistry which is considered to be constantly evolving branch. The pace of advancement has pushed our profession to the brink of one of its greatest transformations, redefining not just our armamentarium, but our entire approach to holistic oral healthcare.

Dentistry has always been anchored in clinical skill, diagnostic acumen, and practitioner insight. Yet today, intelligent systems are elevating these foundations with capabilities once unimaginable. AI can interpret radiographs with speed and consistency, process vast datasets in seconds, predict disease trends long before symptoms emerge, and support clinicians with unprecedented diagnostic precision.<sup>1</sup> Its influence spans every corner of the profession—from Pediatric and Orthodontic care to Oral surgery, Radiology, Prosthodontics, Endodontics, Periodontics, and even the niche domain of Forensic Odontology.

AI has firmly established itself as a critical partner in our clinical decision-making and treatment planning. Modern algorithms have enhanced the accuracy of human performance in detecting caries, periapical infections, vertical root fractures, soft-tissue abnormalities, and craniofacial landmarks. They streamline implant planning, sharpen orthodontic predictions, automate endodontic evaluations, and elevate the design and fabrication of prostheses. Beyond the clinic, AI is revolutionizing patient triage, digital patient management, administrative workflows, predictive analytics, and overall practice efficiency.<sup>2</sup>

The future that lies ahead is one of precision dentistry—a model of healthcare that is preventive rather than reactive, personalized rather than generalized, and supported by robust evidence. Reaching this future requires deliberate action. Dental institutions must strengthen research initiatives, modernize curricula, expand training in digital competencies, and cultivate collaborations with engineers, data scientists, and ethicists. With the advent of cutting edge technologies and availability of variety of superior biomaterials, a very inclusive approach is required by the clinician.<sup>3</sup>

As rightly said ‘With great power comes great responsibility’. As AI becomes intertwined with clinical practice, we must confront vital ethical issues—patient data protection, algorithmic transparency, bias mitigation, informed consent, and the degree to which automated systems can influence clinical judgment. Innovation must never outpace accountability. Dentistry must uphold the ethical principles and moral values that define us: patient safety, clinical accuracy, and ethical integrity. AI should extend our capabilities, not overshadow or dilute the autonomy that safeguards patient care.<sup>4</sup>

AI systems rely heavily on the data sets they are trained on, implying that even small biases, gaps, or inaccuracies in that data can lead to inconsistent or unexpected outcomes. Algorithms that perform with impressive precision in controlled research settings may behave differently in real-world clinical environments where patient presentations may be diverse and complex. Moreover, AI models can sometimes generate opaque or non-explainable decisions, making it difficult for clinicians to understand why a particular prediction or recommendation was made. AI models are also proven to hallucinate and create fake facts without authentic evidences. This inherent variability—rooted in data limitations, contextual differences, and algorithmic opacity—creates an element of uncertainty that requires careful oversight, continuous validation, and responsible integration into healthcare practice.<sup>5</sup>

As Editor-in-Chief, I view this moment as a pivotal turning point and the beginning of a new era. The integration of AI compels us to rethink our roles, reinvest in innovation, and reimagine the possibilities within oral healthcare. All of this needs to be managed by ethical usage and human monitoring.<sup>6</sup> It challenges clinicians, educators, and researchers to lead with vision, curiosity, and courage. With thoughtful stewardship, dentistry can set a global benchmark for how human expertise and artificial intelligence work in harmony—enhancing patient outcomes, elevating professional excellence, and shaping a future in which technology and compassion coexist to redefine the essence of care as AI is a double-edged sword that needs to be handled with utmost care.<sup>7</sup> AI is, and will continue to be, an indispensable part of dental practice, and it must be embraced with ethical integrity to ensure better outcomes for every patient.

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