Embracing the Unprecedented Pace of Change: Artificial Intelligence’s Impact on Dentistry and Beyond

Hakan Turkkahraman¹

１Department of Orthodontics and Oral Facial Genetics, School of Dentistry, Indiana University, Indianapolis, Indiana, United States

Introduction

Human beings have long exhibited a natural fear of the unknown. We tend to initially ignore novel changes, only to gradually adapt to them as they become familiar. However, the recent emergence of generative artificial intelligence (AI) applications has propelled us into an era of technological advancement comparable to the invention of electricity. The remarkable speed of these developments has caught many off guard, surpassing our expectations. It is not the change itself that instills fear but rather the breathtaking pace at which it unfolds. The challenge lies in ensuring that regulations keep pace with technological advancements to guide the responsible use of AI. In this guest editorial, we explore the transformative potential of AI in dentistry and emphasize the need to embrace change while maintaining ethical frameworks.

A Paradigm Shift in Diagnosis and Treatment

AI’s impact on dentistry is profound, particularly in the realm of diagnosis and treatment. The ability of AI algorithms to analyze vast amounts of patient data, such as medical records, radiographs, and clinical images, holds tremendous promise. AI-powered image recognition systems can now detect and classify dental pathologies with unprecedented accuracy.¹⁻⁴ By augmenting the diagnostic process, AI empowers dentists to make informed decisions and devise personalized treatment plans, ultimately enhancing patient outcomes.⁵⁻⁹ However, as we embark on this transformative journey, we must address concerns surrounding patient privacy, data security, and the responsible use of AI-generated insights.

Empowering Education and Research

The integration of AI in dentistry also extends to education and research. Educational institutions must adapt their curricula to equip future dental professionals with the necessary skills to leverage AI technologies effectively. Al-based platforms and virtual simulations offer immersive learning experiences and facilitate knowledge acquisition.¹⁰⁻¹² Furthermore, researchers can harness AI’s capabilities to analyze vast datasets, uncover patterns, and accelerate the pace of discovery. However, as we leverage AI’s potential, we must ensure that ethical considerations and human oversight remain integral to the research process. Transparency, accountability, and avoiding biases in algorithm design are vital aspects that warrant attention.

Address for correspondence
Hakan Turkkahraman, DDS, PhD, Department of Orthodontics and Oral Facial Genetics, Indiana University School of Dentistry, 1121 W Michigan St., Room DS249, Indianapolis, IN 46202-5186, United States (e-mail: haturk@iu.edu).

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Regulatory Challenges and Ethical Imperatives

The remarkable speed of AI’s advancement has outpaced the development of regulatory frameworks. It is imperative that we address this imbalance to prevent potential misuse and protect patient welfare. Striking the right balance between innovation and responsible deployment of AI requires the formulation of clear guidelines and robust ethical standards. Data protection, privacy, and informed consent are paramount considerations. Transparent and explainable AI algorithms should be developed to facilitate trust and ensure accountability. Collaboration between regulatory bodies, health care professionals, and technology experts is vital in navigating the complex landscape of AI in dentistry.

Embracing Change for Optimal Patient Care

As dentists, researchers, educators, and health care professionals, we must proactively embrace change rather than resist it. AI presents a unique opportunity to enhance patient care, improve treatment outcomes, and streamline dental practice. By embracing AI’s potential and actively contributing to the development of ethical frameworks, we can harness its transformative power for the benefit of both practitioners and patients. As we navigate this uncharted territory, we should strive to strike a balance between AI-driven innovation and maintaining the fundamental principles of human expertise, empathy, and patient-centered care.

Conclusion

The unparalleled pace of change brought about by AI requires us to adapt swiftly to ensure its responsible integration into dentistry and health care. Embracing AI’s potential in diagnosis, treatment planning, education, and research will revolutionize dental practice. However, it is crucial to address regulatory challenges, develop ethical frameworks, and safeguard patient privacy and welfare. The European Journal of Dentistry encourages ongoing research, dialogue, and collaboration to shape the future of AI in dentistry, ultimately fostering innovation while upholding the highest ethical standards.