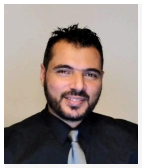
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EDITORIAL

Artificial Intelligence revolution era: Shaping the current and future of maxillofacial prosthodontics



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Artificial Intelligence (AI) is rapidly advancing the field of maxillofacial prosthodontics and prepare it for a new era of innovation. It is increasingly being integrated to reshape and improve education, research, and clinical practice of maxillofacial prosthodontics. It is widely acknowledged that AI primarily relies on the rapid development of digital technologies.[1] A comprehensive understanding of these technologies and transforming the role of passive end users are essential steps for advancing AI in maxillofacial prosthetics. A recently published discussion document[1] concluded that without the active engagement of knowledgeable professionals, maxillofacial prosthodontists may face challenges in integrating into the advanced digital technologies-AI-driven future.

Education in maxillofacial prosthodontics is also undergoing a transformation due to AI. Virtual reality (VR) and augmented reality (AR) technologies, powered by AI, are providing immersive training environments where students can practice procedures without risk to patients. These advanced simulations offer a hands-on learning experience, helping students to develop their skills and confidence before they perform on actual patients.[2] In clinical practice, AI is streamlining the design and fabrication of prosthetic devices. AI-integrated CAD/CAM systems enable the creation of highly customized prosthetics that fit patients' unique anatomical structures with remarkable precision, enhancing both comfort and functionality.[3] AI algorithms also assist in treatment planning by simulating surgical outcomes and optimizing procedural steps, thereby reducing the risk of complications and improving patient outcomes.[4] In addition, robotic systems powered by AI are being developed to assist in complex surgical procedures, offering enhanced precision and consistency compared to traditional methods.

It is crucial for maxillofacial prosthodontists to engage actively with AI technologies and not remain passive clinical end users. By understanding and participating in the development and implementation of AI tools, clinicians can ensure that these technologies are tailored to meet the specific needs of their practice and patients. Active engagement allows prosthodontists to provide valuable clinical insights that can guide the refinement of AI algorithms, ensuring they are practical, ethical, and beneficial in real-world settings. Furthermore, by staying informed about AI advancements and their implications, practitioners can better supporter for their patients and contribute to the ethical and responsible use of AI in healthcare.

Looking to the future, AI's role in maxillofacial prosthodontics is set to expand even further. Predictive models based on AI could soon enable personalized medicine on a new level, tailoring treatments to patients' genetic, environmental, and lifestyle factors. Furthermore, advancements in AI and robotics hold the potential for fully autonomous surgical systems, capable of performing intricate procedures with minimal human intervention. Ethical considerations, such as patient privacy, data security, and the reduction of biases in AI algorithms, will be critical in navigating this future. Interdisciplinary collaboration will be essential to address these challenges and fully realize AI's transformative potential in maxillofacial prosthodontics.

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