

Editorial

Artificial Intelligence and Orthodontics: A new era of precision care

Artificial Intelligence (AI) has emerged as one of the most transformative technologies in healthcare, and Orthodontics is no exception. By integrating machine learning algorithms, computer vision, and data analytics into clinical practice, AI is revolutionizing diagnosis, treatment planning, patient monitoring, and practice management. As orthodontics continues to embrace digital technologies, AI offers unprecedented opportunities to improve efficiency, accuracy, and patient outcomes.

One of the most significant applications of AI in orthodontics is diagnostic imaging. Advanced AI-powered software can analyze cephalometric radiographs, cone-beam computed tomography (CBCT) scans, and intraoral images with remarkable precision. Automated landmark identification and cephalometric analysis reduce the time required for manual measurements while minimizing human error. This enables clinicians to make more consistent and evidence-based decisions.

AI is also enhancing treatment planning. Machine learning models can process large datasets of previous orthodontic cases to predict treatment outcomes and recommend optimal therapeutic approaches. In clear aligner therapy, AI-driven platforms facilitate virtual tooth movement simulations, helping clinicians visualize treatment progression and improve predictability. Such technologies support personalized treatment strategies tailored to individual patient needs.

Remote patient monitoring represents another major advancement. AI-enabled applications can evaluate patient-submitted photographs, detect treatment deviations, and alert clinicians when intervention is necessary. This capability reduces unnecessary office visits while maintaining treatment quality and patient engagement. The integration of teleorthodontics and AI became particularly valuable during periods of restricted clinical access, highlighting its role in modern patient-centered care.

Beyond clinical applications, AI contributes to administrative efficiency. Automated appointment scheduling, patient communication systems, and predictive analytics for practice management can streamline workflows and optimize resource utilization.

Despite its promise, AI should not be viewed as a replacement for professional expertise. Ethical concerns regarding data privacy, algorithmic bias, transparency, and accountability must be carefully addressed. Clinical decisions ultimately require human judgment, empathy, and consideration of factors that may not be fully captured by algorithms. Therefore, AI should be regarded as a powerful adjunct that supports, rather than substitutes, the orthodontist's role.

References

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