

AI FOR CHAIRSIDE PATIENT-SPECIFIC ENDODONTIC PLANNING

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ABSTRACT

Artificial intelligence (AI) has emerged as a transformative tool in endodontics, offering new possibilities for chairside, patient-specific treatment planning. Traditional approaches to endodontic decision-making rely heavily on clinician expertise, imaging interpretation, and empirical guidelines, which may be subject to variability and human error. By integrating machine learning (ML) and deep learning (DL) algorithms with diagnostic imaging modalities such as cone-beam computed tomography (CBCT) and periapical radiographs, AI enables rapid, data-driven analyses to guide treatment strategies. Chairside applications of AI can assist clinicians in real-time by evaluating tooth morphology, predicting treatment outcomes, identifying risks such as instrument separation or canal transportation, and optimizing individualized treatment plans. This personalized approach not only improves accuracy and efficiency but also enhances patient trust and communication. Despite promising advances, challenges remain in clinical integration, data standardization, and validation of AI models in diverse populations. This paper explores the role of AI in chairside patient-specific endodontic planning, its benefits, limitations, and future implications for precision dentistry.

KEYWORDS: *Artificial intelligence; Endodontics; Chairside Planning; Patient-Specific Treatment; Cone-Beam Computed Tomography (CBCT); Machine Learning; Deep Learning; Precision Dentistry.*

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