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AI-DRIVEN DECISION SUPPORT IN NONSURGICAL RETREATMENT

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ABSTRACT

Nonsurgical root canal retreatment continues to be a complicated clinical treatment that is influenced by anatomical variations, persistence of infection, and few conventional methods for diagnosis. With advancements in artificial intelligence (AI), new opportunities have emerged to develop decision support systems that can aid clinical judgment in such difficult situations. AI-enabled platforms can employ machine-learning and deep-learning algorithms to analyze clinical data consisting of radiographic images, patient history, and treatment outcomes to generate evidence-based recommendations. Systems also can provide value by identifying missed canals, predicting retreatment success, and distinguishing between cases deemed fit for nonsurgical management and those that must undergo surgical intervention or extraction. Retreatment planning also can be guided by AI-integrated prognostic models that help improve risk assessment and treatment strategies toward patient-tailored approaches that minimize complications and maximize long-term outcomes. Although promising, adoption of AI-based decision support for nonsurgical retreatment calls for rigorous validation, transparency in how the algorithms arrive at their recommendations, and smooth integration into clinical workflow. Patient privacy concerns and comprehensibility of automated recommendations still remain key ethical factors that must be addressed to ensure safe deployment. All in all, AI-facilitated decision-making stands to improve retreatment practices by providing greater diagnostic accuracy, enhanced treatment planning, and increased support toward clinicians embroiled in the complexity of endodontic cases.

KEYWORDS: *Artificial Intelligence, Decision Support, Nonsurgical Retreatment, Endodontics, Prognostic Models, CBCT Analysis, Clinical Decision-Making.*