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AI IN CLINICAL TRIAL STANDARDIZATION FOR ENDODONTICS

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ABSTRACT

The integration of artificial intelligence (AI) into clinical research has transformed the design, conduct, and interpretation of studies across medical and dental fields. In endodontics, where treatment outcomes are often influenced by complex biological, technical, and patient-specific variables, clinical trials remain the gold standard for evidence generation. However, challenges such as variability in trial protocols, inconsistent outcome measures, limited sample diversity, and subjective assessments frequently compromise standardization and comparability across studies. AI technologies including machine learning, natural language processing, and predictive modelling offer promising solutions to address these limitations. By enabling automated data extraction, harmonization of outcome measures, and real-time quality monitoring, AI has the potential to enhance trial reproducibility, minimize bias, and improve statistical power. Furthermore, AI-driven patient recruitment strategies and predictive analytics can optimize case selection, ensuring greater relevance of trial outcomes to clinical practice. This paper explores the emerging role of AI in standardizing clinical trials within endodontics, highlighting its potential to improve methodological rigor, promote transparency, and accelerate the translation of research findings into patient-centered care.

KEYWORDS: *Artificial Intelligence; Clinical Trial Standardization; Endodontics; Machine Learning; Data Harmonization; Predictive Analytics; Evidence-Based Dentistry; Outcome Measures; Patient Recruitment; Research Reproducibility*

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