AI FOR ASSESSING CANAL TRANSPORTATION DURING INSTRUMENTATION

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ABSTRACT

Root canal instrumentation is aimed at cleaning and shaping canals, maintaining the original root's anatomy. Canal transportation is an alteration of the canal shape during preparation, leading to undesired deviation from the tooth's natural course. Such alterations can produce untoward results in root canal treatment as they can weaken the tooth structure and increase the chances of procedural errors. Conventional methods of assessing canal transportation involve the use of radiographs or micro-CT, time-consuming analyses, dependent on operator skills, and subjective in nature. Artificial intelligence (AI) techniques specifically of machine learning (ML) and deep learning (DL) are proposed to automate and improve diagnostic and evaluative procedures in endodontics. This study investigates the use of AI in canal transportation assessment during root canal instrumentation with a focus on providing accurate, objective, and reproducible measurements. By merging recent imaging technologies and AI algorithms, canal deviations can be detected and measured in a very efficient manner on the procedural level, enhancing procedural accuracy and patient outcomes. The study's findings offer support for AI-based assessment as a promising adjunctive technique for contemporary endodontic practice.

KEYWORDS: *Artificial Intelligence, Canal Transportation, Root Canal Instrumentation, Machine Learning, Deep Learning, Endodontics, Procedural Accuracy.*