

Artificial Intelligence (AI) Driven Digital Dentistry

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ABSTRACT

The COVID-19 pandemic has brought significant changes to the way healthcare is delivered, including in the field of dentistry. Teledentistry, the practice of providing dental care remotely using digital technology, has become increasingly popular, and the use of Artificial Intelligence (AI) in teledentistry has emerged as an important tool for dental care, education, and research. AI algorithms are being utilized to assist in the diagnosis, treatment planning, and prediction of treatment outcomes in various dental branches, including operative dentistry, periodontics, prosthodontics, and orthodontics. With the ability to simulate treatment outcomes and identify abnormal spots in radiographs, AI is transforming dentistry from a curative to a personalized predictive and preventive paradigm.

KEYWORDS: artificial intelligence, teledentistry, digital dentistry, oral health

INTRODUCTION:

With the onset of (COVID-19) epidemic, globally, numerous dental offices and hospitals promoted and experimented teledentistry. Since then, using Artificial Intelligence (AI) in Teledentistry has become an important tool for dental care, dental education, research, and subsequent innovations that can happen remotely¹. In the era of digital disruption, AI is helping in the diagnosis, treatment planning, and prediction of treatment outcomes for the different dental branches².

DISCUSSION:

Using AI algorithms in operative dentistry can learn the pattern and give predictions to segment the tooth, detect caries, etc³. It has been utilized to diagnose periodontitis and classify plausible periodontal disease types⁴. CAD/CAM or 3D/4D printing in prosthodontics branch can be used with AI to provide a more efficient and desirable workflow⁵.

AI has the capability to simulate the variations in the appearance of pre- and post-treatment facial images and predict treatment outcomes. By utilizing AI algorithms, orthodontic treatment's impact, skeletal patterns, and anatomic landmarks in lateral cephalograms can be accurately identified, significantly enhancing communication between dentists and patients.⁶

Radiographic, microscopic, and ultrasonographic pictures have mostly been used in AI research for tumor and cancer identification. In addition, aberrant spots on radiographs, such as salivary and parotid glands and nerves in the oral cavity, can be found by AI⁷⁻⁸. Notably, AI also contributes to the management of cleft lip and palate in terms of risk assessment, diagnosis, pre-surgical orthopedics, speech evaluation, and surgery⁹. Artificial intelligence has the power to change the current trend from a curative to a personalized predictive and preventive paradigm. In all areas of dentistry, AI will help researchers, academics, and practitioners. The inclusion of digital literacy in the dentistry education curriculum and workforce could make this transition possible. The field of AI-

assisted teledentistry is rapidly evolving, and it is predicted that in the coming digital era, every dental-related field will be intelligent¹⁰.

CONCLUSION:

The integration of AI in teledentistry is revolutionizing the field of dentistry. With its ability to improve diagnosis, treatment planning, and outcome prediction, AI is becoming an essential tool for dental practitioners, researchers, and educators. Digital literacy in dentistry education and the workforce will be critical in facilitating this transition to a personalized, predictive, and preventive paradigm. As the field of AI-assisted teledentistry continues to evolve, it is expected that every dental-related field will become intelligent in the coming digital era.

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