

## Clinical Applications of 3D Printing in Dental Practice

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3D printing refers to a manufacturing method in which a three-dimensional model, designed using a 3D scanner or CAD software, is converted into layered data and fabricated by depositing or stacking material layer by layer. First introduced in 1980 by Dr. Hideo Kodama under the term "rapid prototyping," the technology was further advanced in 1986 when Charles (Chuck) Hull registered the first patent for stereolithography apparatus (SLA). While 3D printers have since evolved in terms of accuracy, speed, and material versatility, leading to applications across various industries such as aerospace, mechanical engineering, and jewelry, widespread adoption was initially hindered by high costs and limited efficiency.

In recent years, however, technological advancements have significantly reduced the cost barriers, enabling the proliferation of office-use 3D printers. Enhanced precision, faster printing speeds, and expanded material options have positioned 3D printing as a key manufacturing process in broader industrial contexts. The medical field has increasingly adopted 3D printing for a variety of purposes, and in dentistry—where patient-specific and highly customized devices are essential—it has become a vital component in digital workflows. This lecture will review various types of dental 3D printers and share insights from real-world clinical implementation. Key considerations for clinical usage and effective maintenance strategies will be discussed. Additionally, we will explore how recently developed AI-powered CAD software can be integrated to design and fabricate crowns, CR splints, dentures, and clear aligners directly within the dental clinic.

### Profile

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