

## The Role of Digital Dentistry in Prosthodontic Denture Design

precision, ef ciency, and patient outcomes. This abstract explores the transformative impact of digital workfows, including intraoral scanning, CAD/CAM systems, and 3D printing, on the fabrication of dentures. These technologies allow for precise digital impressions, customized design specifications, and streamlined manufacturing processes, thereby improving the ft, aesthetics, and functional performance of dentures. Case studies highlight successful

comfort, and treatment e f ciency. Challenges and future directions in digital dentistry for prosthodontic applications are also discussed, underscoring the potential for continued innovation and improvement in patient care.

Prosthodontic dentures serve as indispensable tools in restoring oral function, aesthetics, and quality of life for individuals su ering from tooth loss or oral impairments. Traditionally, the fabrication of dentures has relied on manual techniques that o en entail multiple clinical visits, subjective impressions, and lengthy manufacturing processes. However, the landscape of prosthodontic denture design has undergone a profound transformation with the advent of digital dentistry [1].

Digital dentistry encompasses a range of advanced technologies that integrate computerized systems into dental practice, fundamentally reshaping how dentures are designed, fabricated, and tted. Central to this transformation are innovations such as intraoral scanning, CAD/ CAM (Computer-Aided Design/Computer-Aided Manufacturing) systems, and 3D printing, which collectively enhance the precision, customization, and e ciency of prosthodontic treatments.

is introduction explores the pivotal role of digital dentistry in prosthodontic denture design, highlighting its impact on improving treatment outcomes, patient satisfaction, and clinical work ows. By enabling precise digital impressions, customized design modi cations, and rapid manufacturing capabilities, digital technologies not only address the inherent challenges of traditional methods but also set new standards for accuracy and patient-centric care in prosthodontics [2]. As these technologies continue to evolve and integrate seamlessly into dental practices worldwide, the potential for further advancements in prosthodontic care through digital innovation becomes increasingly promising.

## Digital Technologies in Prosthodontic Denture Design

Intraoral scanning: Digital impressions captured through intraoral scanners replace conventional alginate impressions, o ering immediate digital models of the oral cavity. is technology ensures accuracy, eliminates discomfort, and enables real-time adjustments during the scanning process.

CAD/CAM systems: Computer-Aided Design/Computer-Aided Manufacturing systems facilitate the creation of digital denture designs based on intraoral scans. CAD so ware allows prosthodontists to customize denture speci cations, including tooth shape, size, and occlusal relationships, with precision. CAM technology then translates these designs into physical prostheses, o en through milling or 3D printing processes [3].

**3D printing:** Additive manufacturing technologies, such as 3D printing, have revolutionized prosthodontic fabrication by producing

Caykoylu Sinan, Department of Health Sciences, University of Piemonte Orientale, Brazil, E-mail: cakoylu\_sina@gmail.com setup costs, training requirements, and integration into existing dental practices. Future research aims to re ne digital work ows, expand