

# Technological Advancements in Modern Dentistry

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## Short Communication

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## DESCRIPTION

In dentistry, new technologies are constantly being developed aiming to improve diagnostic accuracy, treatment precision, and patient satisfaction. These innovations enable dentists to identify dental problems with greater precision, leading to diagnoses that are more accurate. With advanced tools and techniques, dentists can perform treatments with enhanced precision, resulting in better outcomes for patients. Additionally, these technologies contribute to making dental procedures more comfortable and efficient, ultimately improving the overall patient experience. The present article deals with some of the advancements in modern dentistry.

### Digital imaging approach

Digital radiography and Cone Beam Computed Tomography (CBCT) represent foundational elements of modern dental imaging, offering unparalleled insights into dental anatomy and pathology. Digital radiography replaces conventional film-based X-rays with digital sensors, facilitating immediate image capture, enhanced resolution, and reduced radiation exposure. Conversely, CBCT generates three-dimensional reconstructions of oral structures, offering precise diagnosis and treatment planning for complex cases such as implant placement and orthodontic treatment .

### Laser dentistry

Laser technology has emerged as a great transformation in various dental procedures, offering precise tissue interaction, hemostasis, and sterilization with minimal thermal damage and accelerated tissue healing. Laser applications consists of range of procedures including soft tissue surgeries, periodontal therapy, endodontic procedures, and minimally invasive cavity preparation. The selective tissue ablation capabilities of lasers contribute to conservative treatment approaches, optimized patient outcomes, and improved postoperative recovery.

**CAD/CAM systems**

Computer-Aided Design and Computer-Aided Manufacturing (CAD/CAM) systems have transformed the manufacturing of dental restorations, offering digital impressions, virtual restoration design, and automated milling of restorations from diverse materials. These systems enable precise restoration fit, superior aesthetics, and expedited chairside delivery, reforming treatment workflows and enhancing patient satisfaction. CAD/CAM technology shows the best of digital dentistry, making it easy to use digital information in dental work.

**Intraoral scanners**

Intraoral scanners demonstrate the transition to digital impressions by capturing detailed digital representations of the oral cavity with high precision and efficiency. Utilizing optical scanning technology, these handheld devices eliminate the need for traditional impression materials and trays, simplifying treatment procedures and enhancing patient comfort. Intraoral scanners facilitate improved communication between clinicians and dental laboratories, optimize treatment planning, and enhance the quality of care in restorative dentistry <sup>[1-5]</sup>.

**3D printing**

Additive manufacturing or 3D printing has emerged as a new technology in dentistry, offering on-demand production of dental appliances, surgical guides, and anatomical models with unusual precision and customization. Dental applications of 3D printing consists of the fabrication of custom trays (specialized tools used by dentists to precisely position dental implants during surgery), surgical guides for implant placement (specialized tools used by dentists to precisely position dental implants during surgery). These guides are designed based on digital imaging of the patient's mouth and jaw to ensure accurate placement of the implants), orthodontic appliances that refers to devices like braces or clear aligners used to straighten teeth and correct bite issues, and temporary restorations. Temporary restorations are provisional dental treatments used to protect a tooth while a permanent restoration is being done. Examples include temporary crowns or fillings placed after a tooth preparation procedure until the final restoration are placed. 3D printing simplifies production processes, reduces material wastage, and expands treatment options, enabling clinicians to deliver personalized, patient-centric solutions with unparalleled efficiency.

**CONCLUSION**

Advanced technologies epitomize the pinnacle of modern dentistry, catalyzing innovation, efficiency, and patient-centered care. From digital imaging modalities to laser dentistry, CAD/CAM systems, intraoral scanners, and 3D printing, these technological advancements redefine the boundaries of diagnostic and therapeutic capabilities in dental practice. As we navigate the ever-evolving landscape of dental technology, let us continue to harness these innovations to optimize patient outcomes, advance scientific understanding, and shape the future of dentistry in a manner that is both evidence-based and patient-centric.

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