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Short Communication

3D Printing in Dentistry: Transforming Customized Patient Care

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INTRODUCTION

The integration of three-dimensional (3D) printing technology in dentistry has revolutionized patient-specific treatment strategies. With its ability to fabricate precise models, prostheses, and surgical guides, 3D printing bridges the gap between innovation and clinical efficiency.This communication highlights the growing applications, advantages, and future directions of 3D printing in dental sciences.

Abbreviations:

CAD – Computer-Aided Design

CAM – Computer-Aided Manufacturing

SLA – Stereolithography

DESCRIPTION

Digital Workflow in Dentistry

The digital workflow begins with intraoral scanning, which captures highly accurate patient impressions. Using CAD software, digital models are designed and subsequently manufactured using CAM-driven 3D printers. This approach significantly reduces the errors associated with traditional impression-taking and fabrication.

Applications of 3D Printing in Dentistry

Prosthodontics: Custom crowns, bridges, and dentures can be produced with precision, ensuring optimal fit and esthetics.

Implantology: 3D-printed surgical guides enhance the accuracy of implant placement, reducing operative risks and improving long-term outcomes.

Orthodontics: Aligners and retainers manufactured through 3D printing enable faster turnaround times and patient-specific customization.

Maxillofacial Surgery: Anatomical models printed from patient scans assist surgeons in preoperative planning and simulation.

Advantages Over Conventional Methods

3D printing eliminates manual variability, ensures reproducibility, and reduces clinical chair time. Furthermore, material advancements including biocompatible resins and metals — have expanded its clinical utility. The cost-effectiveness of chairside 3D printers also makes them increasingly accessible in routine practice [1-5].

CONCLUSION

3D printing is rapidly becoming an integral part of modern dentistry. As material science advances, bio-printing of dental tissues such as bone and gingiva may become feasible in the near future. The integration of artificial intelligence with digital design software could further enhance treatment predictability. With these developments, dentistry is moving toward a future of personalized, efficient, and patient-centered care.

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