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Breakthroughs in Dental Implant Technology: A Detailed Review of Recent Advances

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ABSTRACT

Recent years have seen amazing breakthroughs in the field of dental implants, which have changed the face of oral healthcare and greatly improved patient results.This article delves into the latest innovations in dental implant technology, highlighting several key areas of progress. One notable advancement is the development of biomimetic materials that closely mimic natural bone, enhancing osseointegration and promoting faster, more reliable integration with the jawbone. Additionally, the advent of 3D printing technology has revolutionized implant design, allowing for highly customized implants tailored to individual patient anatomy, which improves fit and functionality. The integration of advanced digital imaging techniques, such as cone-beam computed tomography (CBCT) and computer-aided design/computer-aided manufacturing (CAD/CAM), has facilitated more precise implant placement, reducing the risk of complications and enhancing surgical outcomes. Surface modification techniques, including nano structuring and laser treatment, have also been instrumental in improving the bioactivity and longevity of dental implants, leading to greater stability and reduced incidence of peri-implantitis. Furthermore, innovations in minimally invasive surgical techniques and the development of immediate loading protocols significantly reduced recovery times and enhanced patient comfort. These technological breakthroughs not only improve the functionality and aesthetic outcomes of dental implants but also

contribute to overall patient satisfaction and quality of life. As the field continues to evolve, ongoing research and development promise even greater improvements, making dental implants an indispensable component of modern dental restoration and oral healthcare. This comprehensive review underscores the transformative impact of these advancements and anticipates future directions in the field of dental implantology.

KEYWORDS : 3D printing, Biomimetic materials, Dental implants, Digital imaging, Surface modification techniques

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