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Reverse Engineering Based Implant Dentistry Versus Traditional Implant Dentistry: A Narrative Review

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Abstract

Conventional implant dentistry is based on analogue impressions, two-dimensional diagnostic methods, and surgeon-driven implant placement, with prosthetic rehabilitation planned after implant insertion. This approach may result in limited control over implant positioning and prosthetic parameters. Reverse engineering-based implant dentistry applies a prosthetically driven digital workflow in which implant positioning is derived from the planned definitive restoration through the integration of cone-beam computed tomography, intraoral scanning, virtual prosthetic design, and computer-aided manufacturing. The purpose of this narrative review is to compare reverse engineering-based implant dentistry with conventional implant dentistry in terms of treatment philosophy, diagnostic and planning protocols, surgical accuracy, prosthetic outcomes, and clinical predictability. Reverse-engineering-based workflows demonstrate improved positional accuracy, prosthetic fit, aesthetic predictability, and occlusal control. In contrast, conventional workflows show greater operator dependence and a greater need for post-placement prosthetic modification. Despite higher technological demands and associated costs, reverse engineering-based implant dentistry represents a digitally driven, prosthetically guided approach with increasing clinical relevance.

Keywords:

Reverse engineering; Implant dentistry; Digital workflow; Prosthetically driven planning; CAD/CAM; Guided implant surgery

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