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Dental Implant Positioning Accuracy Using a Key or Keyless Static Fully Guided Surgical System: A Prospective Systematic Review and Meta-analysis

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Abstract

Purpose: To realize a systematic review with prospective meta-analysis aiming to compare the accuracy of static fully guided implant placement depending on the drill key modality (conventional drill key surgery systems vs newer keyless systems) and evaluate the impact of deviation factors. **Materials and Methods:** An electronic systematic search was conducted to identify prospective clinical trials matching inclusion criteria. The variables of interest were coronal global, apical, vertical, and angular deviations. The types of edentulism and surgical guide support were investigated as deviation factors. Meta-regression (mixed-effect model) was performed. Heterogeneity was assessed using Cochrane's I² test and interpretation thresholds. **Results:** A total of 1,233 implants in 475 patients were analyzed (18 studies included). Coronal global deviation was significantly lower in the keyless group than in the key group (-0.36 mm; 95% CI -0.62, -0.09; P = .008). Angulation control of the keyless system was superior to that of the key system (-0.36 degrees; 95% CI -0.75, 0.02; P = .063). Nonsignificant differences were found between both groups in apical (P = .684) and vertical deviations (P = .958). Significant influence of the type of edentulism (single, partial, total) and surgical guide support (tooth, mucosa, bone) on the overall amount of coronal global, apical, and angular deviations was found (P < .001). The lowest deviations were found in partial edentulism and tooth-supported surgical guide groups. (P < .001). **Conclusions:** Keyless static fully guided surgical systems allowed significantly better control of coronal and angular deviations than conventional systems. The types of edentulism and surgical guide support seemed to influence the positioning accuracy © 2024 by Quintessence Publishing Co Inc. All Rights Reserved.

Index Keywords

computer aided design, computer assisted surgery, cone beam computed tomography, human, meta analysis, prospective study, three-dimensional imaging, tooth, tooth implantation; Computer-Aided Design, Cone-Beam Computed Tomography, Dental Implantation, Endosseous, Dental Implants, Humans, Imaging, Three-Dimensional, Prospective Studies, Surgery, Computer-Assisted, Tooth

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