Clinical accuracy of modified computer-aided oral implant surgery in fully edentulous arches

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**Background:** Computer-aided implant placement offers several advantages over the traditional approach, but deviations from the planned implant placement may pose significant risks, especially in the edentulous arch.

**Aim/Hypothesis:** This study evaluated the in vivo accuracy of implant placement in fully edentulous cases by using fully prosthetic tooth contour computer-aided surgical stent.

**Material and Methods:** Twenty implants were placed in edentulous arches with stereolithographic surgical guides in 8 patients. A well-fitting complete denture or optimized prosthetic tooth arrangement was used and converted to a radiographic template. Prior to scanning, esthetics and functional aspects were checked clinically. The implant positions were virtually determined by the implant planning software relative to the bone structure and prospective tooth position. A stereolithographic surgical stent fabricated with fully prosthetic tooth contour. After implant placement, a second CT scan was obtained after surgery. Preoperative and postoperative CT images were compared (planned versus actual implant positions), and the accuracy of this type of image-guided therapy was assessed.

**Results:** Damage due to implant placement was not observed in any critical anatomical structure. Compared to the planned implants, the placed implants showed 1.12 and 1.28 mm mean lateral deviations at the coronal and apical ends of the implants. Mean depth deviation was 1.75 mm and mean angular deviation was 5.83 degrees.

**Conclusions and Clinical Implications:** Based upon this clinical study, deviations from planned implant positions existed in the coronal and apical portions of the implants as well as with implant angulation. Mean deviations were less than 1.5 mm in any direction and less than 6 degrees.