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Effect of computer-assisted design and manufacturing cutting and drilling guides accompanied with pre-bent titanium plates on the correction of skeletal class II malocclusion

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Abstract

Objective: This study was performed to assess the effect of correcting skeletal class II malocclusion based on the application of computer-assisted design and manufacturing (CAD/CAM) cutting and drilling guides accompanied with pre-bent titanium plates.

Materials and Methods: Fifty patients with skeletal class II malocclusion were recruited into this prospective randomized controlled clinical trial and assigned to two groups. Patients underwent bilateral sagittal split ramus osteotomy directed by CAD/CAM cutting and drilling guides accompanied with pre-bent titanium plates (group A) or CAD/CAM splints (group B). Postoperative assessments were performed. Differences between the virtually simulated and postoperative models were measured.

Results: Patients in both groups had a satisfactory occlusion and appearance. More accurate repositioning of the proximal segment was found in group A than in group B when comparing linear and angular differences to reference planes; however, no significant difference was revealed for the distal segment.

Conclusion: CAD/CAM cutting and drilling guides with pre-bent titanium plates can provide considerable surgical accuracy for the positional control of the proximal segments in bilateral sagittal split ramus osteotomy for the correction of skeletal class II deformities.

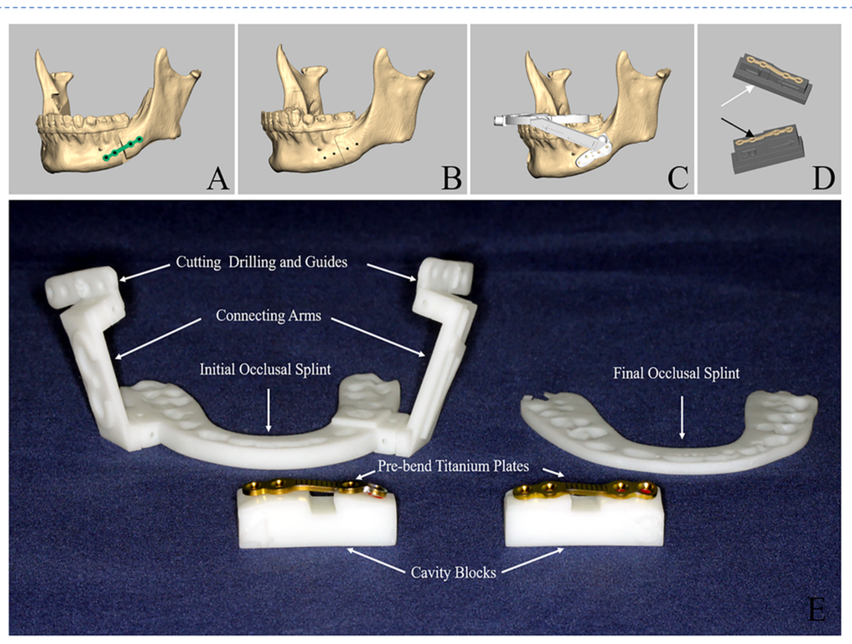

Fig 1. Design and manufacturing process of the guiding system.

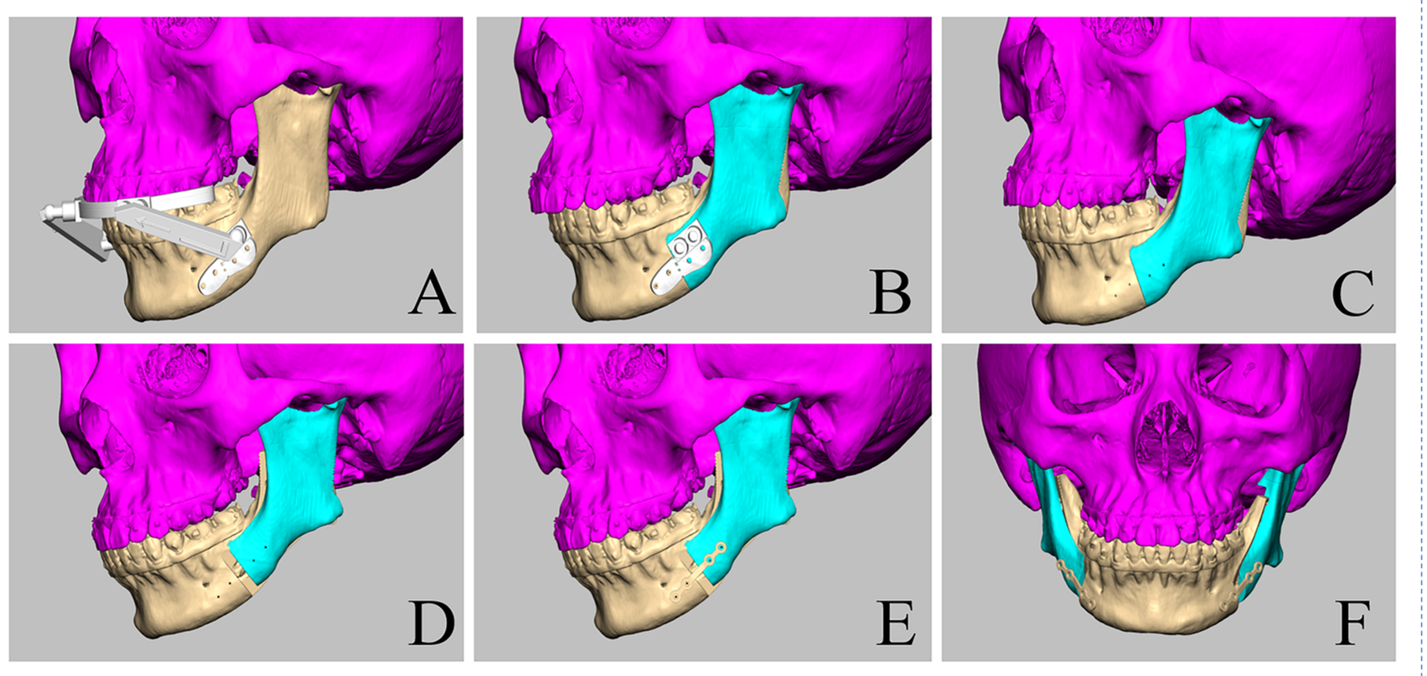

Fig 2. Procedures of the virtual surgery simulation.

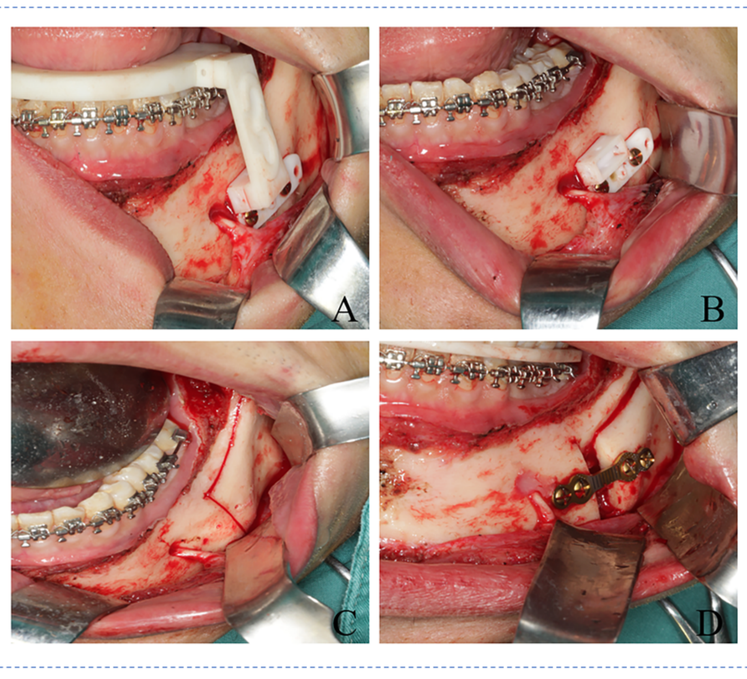

Fig 3. Intraoperative photographs of the operation process in a patient in group A.

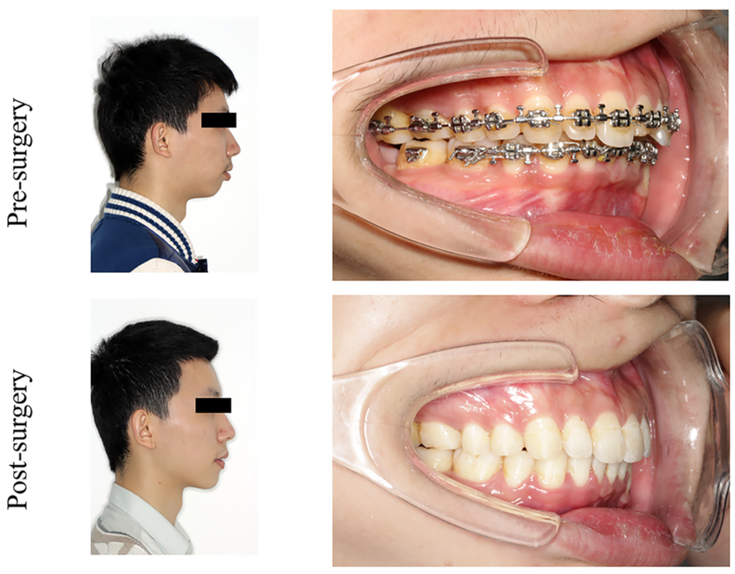

Fig 4. Preoperative and postoperative lateral facial profile and occlusion views of a patient in group A.

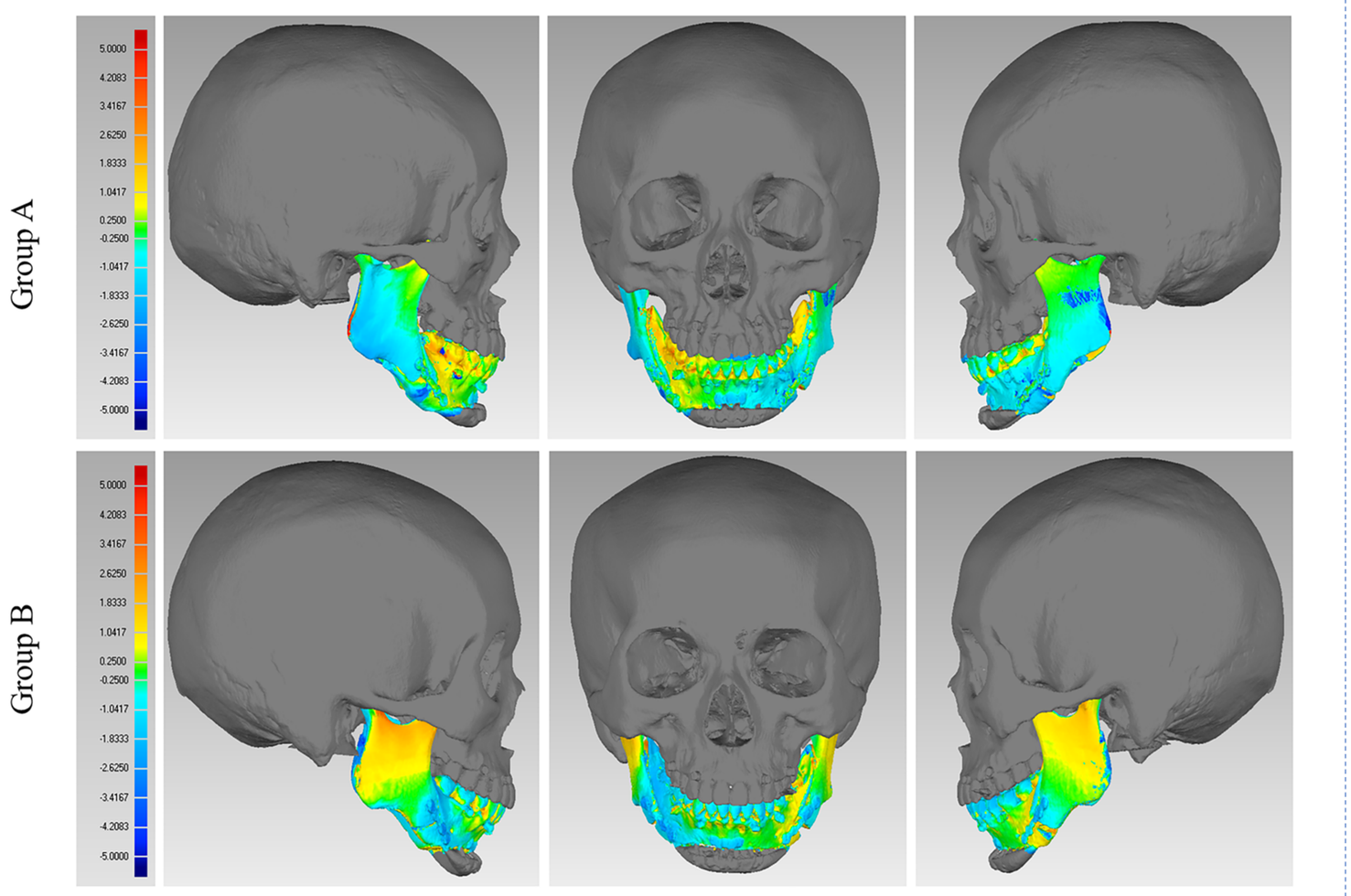

Fig 5. Superimposed images of the virtual surgical simulation and the postoperative outcome in group A and group B.