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Computer-aided freehand maxillary repositioning: A proof of concept

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Statement of the Problem: The authors aimed to test the hypothesis that in orthognathic surgery the maxilla could be repositioned using spatial distances from Glabella to 3 maxillary dental landmarks as references.

Methodology & Theoretical Orientation: An asymmetric skeletal Class 3 malocclusion patient was involved and bi-maxillary orthognathic surgery was planned. Virtual surgery was simulated and spatial distances from Glabella to midpoint of the upper dentition (U0) and bilateral medial-buccal cusp of the first molar (6L and 6R) were measured. These distances were used as the repositioning references and were imported intraoperatively into a digital caliper after the maxilla was mobilized; the repositioning of maxilla was manipulated till all the true spatial distances reached the references. Postoperative computed tomography head model was superimposed onto the planned head model, the maxillary repositioning error was assessed using spatial distances between the pre- and postoperative dental landmarks.

Findings: The asymmetric skeletal Class 3 malocclusion was corrected through bi-maxillary surgery and the errors at U0, 6R and 6L was 1.37, 1.79 and 1.45 mm.

Conclusion & Significance: The maxilla could be repositioned using spatial distances from Glabella to 3 maxillary dental landmarks as references.

Biography

Xiaozhen Lin has completed his Dental and Medical Education and received the Degree of Doctor of Dental Surgery (DDS) at the Fourth Military Medical University, China. During his Doctoral training program, he has received a national support from the Chinese government to do research work at the University of Michigan, School of Dentistry. After returning in 2012, he has joined the Chinese People's Liberation Army General Hospital (PLAGH), China, to work as an official Attending Surgeon in Oral and Maxillofacial Surgery (OMS). From 2013 to 2015, he has completed his Post-Doctoral Fellowship at the Ninth People's Hospital affiliated to the Shanghai Jiaotong University School of Medicine, where the OMS have a world-renowned academic reputation. In 2017, he was promoted to Clinical Associate Professor.

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