

Real-time navigation assisted orthognathic surgery

Ho Seong Shin*, M.D., Ph.D., Min Sung Tak, MD, PhD

Abstract

Background: One limitation of orthognathic surgery is the narrow surgical field, which makes it difficult to view the operative site directly. Thus, many perioperative complications can occur. In this study, we evaluated the usefulness of computer-aided navigation techniques in orthognathic surgery.

Methods: We enrolled ten patients (three men, seven women) with facial deformities treated between July 2010 and February 2011. The surgical simulation was mapped in all patients with the eNlite Navigation System by Stryker (Freiburg, Germany), using the iNtellect Cranial Navigation platform in each operation. Immediately before surgery, we obtained CT images with 1-mm slices of the entire face. The CT images were loaded into the navigation software. A marker or head rest was attached. Given its mobile nature, markers cannot be fixed at the mandible reliably, which compromises the accuracy of navigation. As a promising solution for accurate repositioning, extraoral reference points were fixed. This method orients the patient according to the CT images using identifiable points on the face and relating them to the virtual patient image shown on the navigator screen. The conventional osteotomy techniques were performed with guided navigation.

Results: All ten patients were treated successfully using the computer-assisted navigation surgery. Using the navigation system, instruments were visualized on a monitor in real time, and all maneuvers were performed safely.

Conclusions: Orthognathic surgery, such as a Le Fort I osteotomy, SSRO, and reduction malarplasty, can be performed safely under the guidance of a surgical navigation system. Navigation systems enable surgeons to carry out preoperative plans accurately without injuring important anatomical structures, because the positions of the instruments can be visualized on site in real time.

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