

## READER'S FORUM

Chen C, Sun N, Jiang C, Liu Y, Sun J

### Accurate transfer of bimaxillary orthognathic surgical plans using computer-aided intraoperative navigation.

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I appreciate the authors' efforts to implement the latest 3-dimensional technology to the field of orthognathic surgery. The article titled "Accurate transfer of bimaxillary orthognathic surgical plans using computer-aided intraoperative navigation" would definitely impress a lot of readers of the orthodontists and surgeons. For better understanding of the article, I would like to ask some questions.

**Q1. Could you please explain more about the mandibular position in taking computed tomogram (CT)? Was it centric occlusion, centric relation, or the other specific position?**

**Q2. The guide plate or template for Le Fort I osteotomy was fabricated and fixed to the anterior wall of the maxilla. Was there any difficulty placing the template at the exact position planned during the operation? I guess there would have been some difficulty in doing it because the anterior wall of the maxilla was smooth with no apparent prominent structure.**

**Q3. Could you please compare the total procedures for preparing and planning the operation and the time spent between traditional method and Ci-Navi method? For example, those in traditional way of preparation were paper surgery, model surgery,**

**intermediate and final wafer fabrication, and so on.**

*Questioned by*  
Yoonkyo Oh

*Department of Orthodontics, School of Dentistry, Seoul National University, Seoul, Korea*

**A1.** When taking CT, the patient is in the natural head position. The patient's head is centered while looking straight ahead. It is most important that the patient's maxillary and mandibular arches are in the most maximum contacted intercuspal position. Because the most maximum contacted intercuspal position is a stable position. Postoperative CT also adopts such a occlusal relationship, which is convenient for comparison before and after surgery.

**A2.** Thank you for your question. In the initial clinical exploration phase, we also found that the anterior wall of the maxilla was smooth, which made it difficult to place the template at the exact position planned during the operation. After our exploration, when designing the osteotomy guide plate, we extended the inner side of the osteotomy guide plate to the piriform aperture so that medial border will fits the lateral border of the piriform aperture (Figure 2A). In this way, the osteotomy guide can be easily placed on the anterior wall of the maxilla.

**A3.** The preoperative preparation procedures for traditional orthognathic surgery include: cephalometric analysis, paper surgery, transfer of dental cast to the articulator, model surgery, fabrication of intermediate and final occlusal plates, grinding, polishing, and disinfection of occlusal plates. The total procedures take about five working days, including the time required for

the dental cast to dry after pouring. The drying of the dental cast is time-consuming and is related to the season, temperature, and air humidity. Generally, it takes about 2–3 working days. The actual operation time of the doctor is about 12–16 hours, that is 2–3 working days. In fact, it takes about 12–16 hours for doctors' operation, that is, 2–3 working days.

The total procedures of computer-aided surgical design was carried out on computer, including cephalometric measurement, osteotomy simulation, bone block rotation and movement, osteotomy guide plates and occlusal splints designing. Since all operations are performed on the computer, it is more accurate and time-saving. Preoperative surgical plan takes about 3–4 hours, including surgical simulation and designing of plates/splints. After the data of the plates/splints imported into the 3 dimensional printer, it takes about 2 hours to complete the printing. Therefore, the total procedure

takes about 6–7 hours, and 1 working day is sufficient. Intraoperative Ci-Navi takes about 30 minutes longer than traditional surgery, including installation of navigation reference frame, data registration, and intraoperative validation. Therefore, digital design and intraoperative navigation greatly improve the efficiency of preoperative design and preparation and surgical accuracy. Therefore, computer-aided surgical plan and Ci-Navi improved the efficiency of preoperative preparation and the accuracy of surgery greatly.

*Replied by*

**Jian Sun**

*Department of Oral and Maxillofacial Surgery, The Affiliated Hospital of Qingdao University, Qingdao, Shandong, China*

*Dental Digital Medicine & 3D Printing Engineering Laboratory of Qingdao University, Qingdao, Shandong, China*

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