V22-Z

1. Indications and Guidelines for the Use of the 3 D Orthognathic Surgery Simulator

Haers, P. E.[1], *Krenkel, C.*[2], *Sailer, H. F.*[1]

[1]*Department of Cranio-Maxillofacial Surgery, University Hospital, Zurich, Switzerland,* [2]*Department of Maxillofacial Surgery, Salzburg State Hospital, Salzburg, Austria*

The 3-Dimensional Orthognathic Surgery Simulator (3D OSS) was developed by KRENKEL in order to obtain maximal precision when positioning the upper jaw during bimaxillary orthognathic surgery, and to assure optimal condylar positioning while keeping parallellity between the bone segments of the mandibular sagittal split in asymmetric cases.

The system is characterized by its possibility to precisely register the desired movements. Apart from the conventional face-bow registration in the upper jaw, an additional registration of gonion and the inferior mandibular border is performed. This permits a 3 D simulation of the mandibular angle and the ascending ramus. The individual condylar angle and the intercondylar distance are determined radiologically and the measurements are transferred to the articalutor, in which rotations and translations in 3 dimensions can be simulated. These movements are quantified in mm and degrees and give a precise view of the displacement in the simulated Le Fort I osteotomy plane and at the level of the sagittal split of the mandible. Any torsion or lateral change of the condylar position due to mandibular displacement becomes also apparent. If these occur, the condylar position is corrected by horizontal rotations of the posterior maxilla without affecting the position of the incisor point, thus correcting the parallellity between the mandibular segments as well as the condylar displacement.

The model surgery is transferred during the operation with a removable Face-O-Meter. Together with the intermediate splint, a three-dimensional precision of the skeletal repositioning is guaranteed.

This video shows how to handle the simulator and illustrates the precision obtained in asymmetric cases.

2. A Virtual Cast Model for Treatment Planning in Orthognathic Surgery

Okumura, H.[1], *Tsutsumi, S.*[1], *Chen, L.-H.*[2], *Iizuka, T.*[3]

[1]*Research Center for Biomedical Engineering, Kyoto University,* [2]*Department of Dentistry and Maxillofacial Surgery, Otsu Red Cross Hospital,* [3]*Department of Oral and Maxillofacial Surgery, Faculty of Medicine, Kyoto University, Japan*

It is desirable to obtain the coordinate positions of the maxilla and mandible to the cranium preoperatively before orthognathic surgery. Three-dimensional (3D) imaging based on computed tomography (CT) has been used for planning and evaluating maxillofacial and craniofacial surgery. Although the spatial information of hard tissue can be acquired, the problem of radiation exposure limits its clinical application.

The purpose of this study was to develop a 3D computer-aided-design (CAD) system including skeletal and occlusal images for orthognathic surgery which contrasts with the current paper and model surgery. In this system, a 3D imaging model of facial skeleton was reconstructed by using sets of anatomic landmarks, extracted from lateral and frontal cephalometric films. This image was then combined with the 3D dental cast image using a laser surface scanner to produce a computer-generated model. Moreover, this image model was then fed into an interactive editing program of the surgical plan, specific to different types of osteotomy.

This 3D computer-generated compound model, including the facial skeletal and dental morphology, would be useful in planning and simulating surgical procedures.

3. Mandibular Reconstruction with Pure Titanium-Nitride Ion-Injected Plate

Ohya, T., Fukuta, Y., Kudo, K.

Department of OMS, Iwate Medical Univ., Morioka, Japan

Reconstruction following mandibular resection is meaningless, unless the oral function is restored finally by the attachment of a well-fitting denture. For accomplishment of functional restoration, the choice of biologically stable material and recovery of the alveolus are important so that the preservation of the denture is rendered possible.

We developed an original pure titanium-nitride ion injected plate and screw system for reconstruction of the mandible. This titanium-nitride ion injected plate system affording increased protection of the oxidized coat, as compared to other existing products, has been rendered possible in our titanium plates and screws. Binding of plates or driving-in of screws were hitherto liable to injure the oxidized coat. However, the plate augmented protection of the oxidized coat surface. We will give a VTR presentation of two cases of mandibular defects by ameloblastic fibroma and ameloblastoma, clinical application of these reconstruction materials, and functional reconstruction techniques which allow smoothing and attachment of dentures following mandibular reconstruction.

4. Combined Le Fort II and Le Fort I Osteotomy for Correction of Midface Deformity

Kim, M. J., Kim, S. G., Yi, A. N., Jong, K. Y., Nam, I. W.

Department of Oral and Maxillofacial Surgery, College of Dentistry, Seoul National Univ., Seoul, Korea

The Le Fort II osteotomy is a useful method for correction of midface deformity, particularly for patients with midface