

## Planning Sequence for Orthognathic Surgery

The success of craniomaxillofacial (CMF) surgery depends not only on the surgical techniques, but also upon an accurate surgical plan. The adoption of computer-aided surgical simulation (CASS) has created a paradigm shift in surgical planning. However, planning an orthognathic operation in CASS fundamentally differs from planning using traditional methods. The purpose of this presentation is to present an algorithm specifically designed for virtually planning a double-jaw orthognathic surgery. The sequence of planning will serve as an operation manual for surgeons wanting to incorporate CASS into their clinical practice.

## Surgical Treatment for Correcting 3D Facial Asymmetry

Facial asymmetry persistently posts challenges to surgeons. Correctly analyzing symmetry is a key in the surgical correction for the patients with facial asymmetry. The purpose of this presentation is to introduce a new concept of symmetry analysis. It encompasses measurements for both object symmetry and symmetrical alignment. In human anatomy, object symmetry refers to the intrinsic local mirror symmetry of each facial unit. The object symmetry of a facial unit is analyzed by triangular technique and standard or more advanced mathematical approach. Symmetrical alignment refers to the alignment of each facial unit with respect to the midsagittal plane of the head, in the global reference frame. This measurement requires an object reference frame for the facial unit to be measured. The object reference frame is established using triangular technique, principal component analysis based adaptive minimum Euclidean distances (PAMED), or standard principal component analysis (PCA). The degree of symmetrical alignment of a facial unit is then quantified by comparing the object reference frame to the global reference frame.

## Three-Dimensional Cephalometric Analysis

Three-dimensional cephalometry is not as simple as just adding a “third” dimension into a traditional two-dimensional cephalometric analysis. There are more complex issues in three-dimensional analysis. They include: how reference frames are created; how size, position, orientation and shape are measured; and how symmetry is assessed. Therefore, the purpose of this presentation is to present the geometric principles of 3D cephalometry, and the *Gateno-Xia Cephalometric Analysis* - the first 3D cephalometric analysis that observes these principles.