CTMAX
Connecticut Maxillofacial Surgeons, LLC

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Orthognathic Surgical Treatment—Part II

Our previous newsletter described what orthognathic surgery comprises. This second edition of a two part series will seek to explain the actual procedures and their application.

Most dental professionals will think of a teenage patient with a topic such as this. By contrast, the procedures available through orthognathic surgery can correct not only developmental skeletal deformities but also acquired deformities due to trauma and tooth loss. Additionally, it is not uncommon for orthognathic surgery to be a part of pre-prosthetic procedures as well as a comprehensive treatment plan assisting in the relief of patients with obstructive sleep apnea.

At their most basic level, the procedures in orthognathic surgery allow us to move the 'denture bases' into the desired position to allow for proper function and form. Think of the orthodontic patient whose deformity exceeds the limits of orthodontic treatment and the edentulous patient with an acquired prognathism due to the natural pattern of maxillary and mandibular bone resorption. In either case the treating dentist is limited by the position of the 'denture bases' to adequately treat the problem. So while our discussion will mainly address the orthodontic patient, remember that orthognathic procedures have wider application across different patient groups.

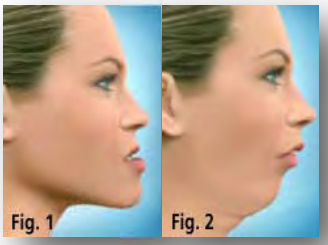


Fig. 1

Fig. 2

Consultation and Planning for Surgery

Ideally a patient is referred prior to development of a final treatment plan to discuss options related to surgery. The consultation is valuable to establish the proper diagnosis and provide the patient and family necessary information related to the treatment. Typically the initial visit includes clinical and radiographic examinations followed by a lengthy discussion. After a subsequent discussion with the treating orthodontist and/or restorative dentist, the planning phase of treatment ensues.

At approximately 6 months prior to surgery, when patient's pre-operative orthodontic preparation approaches completion, a formal evaluation is performed including clinical exam and radiographs with dental models and a cephalometric analysis. These data allow for formation of a final treatment plan which is submitted for insurance pre-authorization.

Just prior to surgery, a final set of records is obtained and a mock surgery is performed with articulated dental models. From the model surgery acrylic splints are made, which allow for the transfer of the plan to the patient. The patient returns again for a final case presentation the day before surgery. The pre-surgical phase is typically 1-2 years, depending on the complexity of the plan.

Special points of interest:

- *What makes the CTMAX approach different than the others?*
- *What techniques are employed in orthognathic surgery?*
- *What variety of deformities can orthognathic surgery correct?*
- *What factors are considered in deciding who is a candidate?*

Inside this issue:

EVALUATING FACIAL BALANCE

Clinical evaluation of facial balance involves examination from frontal and profile views.

The frontal exam focuses on skeletal and dental symmetry, vertical proportions and smile esthetics both in repose and full animation. During this exam we can identify treatable conditions such as dental midline asymmetries, occlusal cants and also vertical issues such as excessive gingival show or lack of incisor show with smile.

The profile examination allows for identification of a general anterior-posterior facial configuration, vertical proportions, lip competence and the chin-neck-throat form. Findings in the profile examination (i.e. prognathism or retrognathism) are what many providers are reminded of when they think of orthognathic surgery. This view is least seen by the patient and illustrative photos and radiographs greatly aid in explaining the nature of a patient's deformity.

This evaluation should focus on the patient's own concerns as sometimes the most obvious deformity to the provider is nothing the patient ever noticed.

The primary goal of orthognathic surgery is to correct a functional malocclusion. The role of facial balance in orthognathic treatment is to ensure that esthetics are also addressed and thus provide a better physical appearance and perceived outcome for the patient.

OCCLUSAL EXAMINATION

The standard occlusal evaluation is evaluated using clinical exam, photos and facebow-mounted dental models in centric relation on a semi-adjustable articulator.

In an anterior-posterior dimension, we look for incisor overjet and the canine and molar relationships.

The vertical occlusal evaluation identifies an open or deep bite relationship.

The transverse relationship of the arches is subdivided into dental vs skeletal and also absolute vs relative. Dental tranverse problems are corrected orthodontically while skeletal problems are addressed orthodontically usually with surgical assistance. Hand-articulated dental models are used to determine whether establishment of a Class I skeletal relationship will eliminate the crossbite.

With facial and occlusal examination data, most of the patient's treatment can be planned.

RADIOGRAPHIC EXAMINATION

The standard radiographic examination for dentofacial deformities includes panorex and lateral cephalometric films. Posterior-anterior cephalometric films provide information for asymmetry cases but are not routine for most patients.

Analysis of a digital cephalometric film tracing provides radiographic support for the clinical examination and assists in planning surgical movements. Clinical photos are superimposed on the radiographs and provide a general sense of the soft tissue changes that will occur with surgical movements.

Our office also uses a Cone Beam CT scanner for patient imaging. A recent upgrade to our software allows for both 3-D analysis and virtual treatment planning.

Patients have initial evaluation films as well as preoperative and post-operative films taken during their treatment.

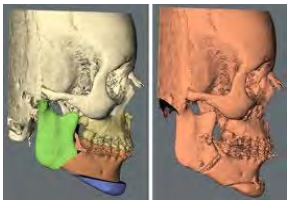
Analysis of the post-operative films allow for evaluation of the accuracy of the movements and documentation of hardware. At left are examples of pre– and post-operative films from a recent case performed by the practice.

Model Surgery: Transfer of the Plan to the Patient

The critical step in the transfer of a treatment plan to the patient is the performance of the model surgery and fabrication of acrylic surgical splints. This step in planning is always performed by the doctors at CTMAX. In most regions, including central Connecticut, this task is usually delegated to resident physicians who have often not had the chance to discuss the plan with the orthodontist or examine the patient. Our experience with this has shown that the performance of model surgery and splint fabrication, out of the context of interaction with the patient and treating orthodontist, creates an opportunity for error.

After completing the model surgery, potential issues related to the final occlusion or stability of movements can be identified prior to the surgery. By performing this crucial step, the doctors at CTMAX have the ability to communicate possible changes with the orthodontist prior to surgery.

Meetings to evaluate the model surgery preoperatively are often very productive. The orthodontist can verify that they can work with the post-surgical occlusion and the surgeon can be comfortable with the feasibility of the movements that the orthodontist requires to complete the case.



Current technology seeks to streamline model surgery with virtual planning and splint fabrication.

Le Fort Osteotomy of the Maxilla

The most common maxillary orthognathic procedure is the Le Fort I level osteotomy. This procedure allows for movement of the maxilla in any direction to accommodate the treatment plan. When combined with an expansion appliance, large transverse jaw discrepancies can be corrected. When combined with bone graft procedures, the maxilla can be moved inferiorly, a great technique for the patient with poor incisor show. Conversely, in the patient with the gummy smile, impaction of the maxilla is the most consistent and reproducible procedure to provide an ideal outcome.

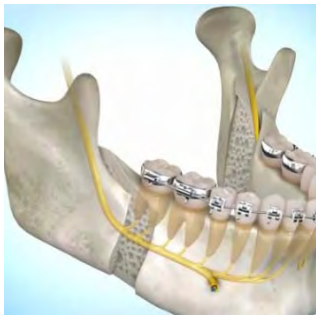
The bony cuts are made at the level of the nasal floor, above the root apices and back to the pterygoid plates. The maxilla can be segmented between the teeth if needed and after the planned cuts are made, rigid fixation with titanium screws and miniplates holds the maxilla in the new position while bone heals.

The location of the actual osteotomy can be seen in the image to the right.

Sagittal Split Osteotomy and Genioplasty

For most orthognathic surgery treatment plans, the sagittal split osteotomy is the procedure of choice. Conceptually the location of the osteotomies can be confusing. The image to the right illustrates that the surgery is performed between the buccal and lingual cortices of bone, behind the molar teeth. Titanium screws are most commonly used to hold the new position of the mandible thus eliminating the need to have the teeth wired together during healing.

A valuable adjunct to the sagittal split osteotomy is the genioplasty. Remember the discussion of the facial thirds and overall facial configuration? Genioplasty allows for modification of the horizontal and vertical position of the chin and in an effort to optimize the esthetic outcome of the treatment. The position of the chin osteotomy can be seen at bottom right, below the incisors and the mental foramen. Internal rigid fixation is applied to the chin to hold the new position during healing.



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Our Mission Statement

All of us at **Connecticut Maxillofacial Surgeons, LLC**, are dedicated to the highest quality of care in the specialty of Oral and Maxillofacial Surgery. We take pride in providing contemporary clinical care in a full scope of the specialty as well as serving in a leadership capacity for the future of our specialty on both a local and national level. CMS,LLC can truly be described as a unique group of service-oriented professionals whose aim is to provide the highest level of patient care in combination with a maximum of comfort, sensitivity, and compassion for each and every individual.

Through our presence on the Internet we hope to move beyond the realm of merely providing clinical care in the classic sense. First and foremost, we would like to further close the information gap between us and our patients. A more ambitious intent would be to not only fulfill a regional endeavor but also provide a broader understanding of our specialty on a global level. Through a depth of experience and resources that we possess as a group, we hope to provide an ever increasing knowledge base accessible by all of those with any interest.

Definition of Oral & Maxillofacial Surgery:

Oral and Maxillofacial Surgery *is a medical and dental specialty of surgery which involves the diagnosis, surgery and adjunctive treatment of diseases and defects involving both the functional and aesthetic aspects of the hard and soft tissues of the oral and maxillofacial region.* (American Dental Association) More simply put in layman's terms, the oral and maxillofacial surgeon is the orthopedic surgeon of the facial region. He or she is an individual who addresses problems ranging from the removal of impacted teeth to the repair of facial trauma. He or she may be a doctor you would visit to:

- Have a **tooth extraction**.
- Have teeth replaced by having **dental implants** inserted.
- Have oral surgical procedures performed in the office under outpatient **ambulatory anesthesia**.
- Have a **jaw cyst or tumor** diagnosed, removed and reconstructed.
- Have your jaw aligned with **orthognathic surgery**.
- Have you jaw joint repaired with **TMJ surgery**.
- Have **jaw reconstruction** following cancer surgery.
- Have your facial bones realigned after **facial trauma**.

WHAT MAKES OUR APPROACH TO YOUR PATIENT'S ORTHOGNATHIC SURGICAL CARE DIFFERENT THAN OTHER PRACTICES?

SAINT FRANCIS Hospital and Medical Center

Along with performing the model surgery and splint fabrication, our practice brings two non-resident doctors to the operating room to perform the surgery. With greater experience and years of working together, CTMAX surgeons can perform the operation more efficiently and accurately. Shorter surgical procedures translate into reduced anesthesia time, decreased blood loss and a more rapid recovery.

Our doctors perform most orthognathic surgical procedures at the St. Francis Hospital and Medical Center in Hartford, CT, where members of our group have chaired our department and practiced for over thirty-five years. In that time they have created an environment where the anesthesia and hospital staff understand the needs particular to this type of operation.

Our personal hands-on approach to planning, performing the surgery and communication with all members of the patient care team is an ongoing drive to assure safety and quality of outcome. We look forward to the next opportunity to work together with you and for your patients.