

Surgery First Approach in Orthognathic Surgery

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Orthognathic surgery (OGS) is one of the most common surgeries performed in our Center. The indications for OGS are: congenital deformities (clefts, craniofacial syndromes), development dentofacial deformities (mandible protrusions, bimaxillary protrusions, facial asymmetry or maxillary deficiency), obstructive sleep apnea syndrome and for cosmetic purpose. In early 80's, we had cases of complete TMJ ankylosis patients with no pre-surgical orthodontics and achieved acceptable mandible advancement or even two jaw surgery with the surgical occlusal stent prepared in the OR. Presurgical orthodontics is considered to be crucial to the outcome of surgical-orthodontic treatment for dentofacial deformity, but the effect of presurgical orthodontics on the treatment outcome remains controversial. Epker and Fish proposed "surgery first approach" in 1977 with the comments that the patient's facial esthetic and dental function improved early in the treatment, orthodontic tooth movement proceeds at a much faster pace following surgery and stability of the result is as good as or, in some cases, better than when the more traditional orthodontic-first approach is used. Studies are designed to compare the postsurgical facial aesthetics, occlusion, stability (transverse, anterior-posterior and vertical) and efficiency with or without presurgical orthodontics.

Posteroanterior cephalograms (initial, before surgery, immediate after surgery and one year after surgery) were traced and analyzed on 36 skeletal class III patients (18 with presurgical orthodontic treatment; 18 without presurgical orthodontics) to study the transverse dimensional changes. Serial lateral cephalograms (before treatment, before OGS, 1 month after OGS and completion of treatment) were used to study the anterior-posterior changes on 53 patients with skeletal class III patients (18 without presurgical orthodontics and 35 with modified-conventional approach).

Cephalometric radiographs and study models were used to evaluate the outcome of 33 patients with skeletal class III open bite (13 with presurgical orthodontics and 20 without presurgical orthodontics) treated surgically.

The magnitude and trend of transverse dental changes, the amount of skeletal correction and postsurgical relapse in anterior-posterior dimension are similar in Class III OGS patients with or without presurgical orthodontic treatment. The vertical mandibular stability was worse in the no-presurgical orthodontics group than in the presurgical orthodontics group, the direction of instability was favorable for open bite correction. Longer treatment time was required in the presurgical orthodontics group compared with the no-presurgical orthodontics group.

We have reported the conclusion of these studies in 2010 (JOMS; PRS) and 2011 (JOMS): in surgical orthodontic correction of skeletal class III, presurgical orthodontics has no clinically significant effects on facial aesthetics, occlusion or stability, and had longer treatment time compared to those receiving no pre-surgical orthodontics.

Around 600 OGS cases were done each year in our center since 2010, and most of them were done "surgery-first", without pre-surgical orthodontics.

How to Prevent Surgical Complications in OGS

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Complications in orthognathic surgery include severe swelling of the lips, lip skin/mucosa abrasion, massive bleeding, inferior alveolar nerve injury, infection, facial nerve injury, velopharyngeal incompetence (in cleft OGS) and very rarely, optic nerve neuritis were observed in cleft OGS. Relapse or incomplete correction of facial asymmetry or facial profile may need secondary surgery.

Inferior alveolar nerve injury can be temporary (may be more than 60%) or permanent (around 5-10%) in sagittal split osteotomies of the mandible. Cone Beam CT can identify the location of inferior alveolar nerves before surgery, and surgeons can select different type of osteotomy technique in different patient category. Post-operative numbness or hypoesthesia should be stressed to the patients strongly before the surgery. Facial nerve injury during the sagittal split happened about 0.1%, but they all recover completely in our series of patients.

Lubrication and intermittent relax of traction of the lips during surgery can effectively reduce the edema and swelling of the post-operative lip swellings. Post-operative infection happens about 1-3% happened most often during one to three months after surgery at lower jaw plate and screw fixation part, and almost always related to sleep deprivation or low body weight (BMI less than 18).

Re-operation to correct the residual asymmetry or under/over correction of the pre-existing deformity happened about 1% in our series, including patients with body dysmorphic syndrome. Careful patient selection, patient education and patient participation with understanding of the operation risk, the reasonable expectation of the result, good physical fitness and proper sleep before OGS are crucial in preventing the surgical complications in OGS.

Long-Term Results of Surgery-First Approach in OGS: Class III and Bimaxillary Protrusion

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Every year we have about 600 OGS patients in our center since 2010, most of them are surgery first approach. I follow my patients at post op 1 week, 1 month, 3 month, 6 month and 1 year in my clinic. My orthodontists will see these patients every months, I will match the same time schedule as much as I can. We took photos whenever possible, and will take CBCT one week and one year post op (or when debonding). Most of the patients finished their orthodontic work during 18 months post operation (actually one orthodontist always finish his patients in 12 months). I do not have many patients followed up more than 3 or 5 years to have so called "long-term" follow ups, but do have some patients come back to our clinic years later and we did have their photos or cephalogram.

We are fortunate to have 8 patients followed up for more than 4 years with pre and post operative photo and CBCT. Their CBCT showed bony stability after surgery first approach and good aesthetic evaluation result.