3 Late postoperative complications

Scar formation

Compromised soft-tissue healing can lead to excessive intraoral scar formation with restriction of soft-tissue motility as a very rare complication. If it occurs, it needs secondary intervention with scar excision and perhaps vestibuloplasty.

Problems with bone healing

Bone healing can be disturbed following insufficient fragment fixation. Nonunion is a complication that can be found both in the mandible and the maxilla. To treat this problem the osteotomy site should be explored and the osteosynthesis material replaced if loose or fractured. Sometimes bone grafts are indicated.

To prevent hardware overload, especially in patients suffering from bruxism, single tooth contacts should be avoided by using splints or occlusal stops during the healing period. Early removal of osteosynthesis material may be another reason for nonunion.

Temporomandibular disorders (TMD)

The effect of orthognathic surgery on the temporomandibular joint (TMJ) is controversial with little consensus among surgeons. It is known that both a bite deformity and orthognathic surgery may adversely influence TMJ morphology and function.

Prior to orthognathic surgery, TMJ function and morphology should be assessed and the patient should be asked about a history of TMJ pain or discomfort. If there is a preexisting dysfunction, a diagnosis regarding the TMJ needs to be established. Depending on the situation a TMJ specialist should be consulted. In some cases preoperative splint therapy is advisable. For evaluation it is helpful to classify the dysfunctions according to their origin into the subgroups myogenous, arthrogenous, or both.

It is very important not to justify the indication for surgery by telling the patient that existing or potential TMJ problems can only be solved through an orthognathic surgical procedure. Orthognathic surgery may sometimes be helpful to improve TMJ dysfunction, but in some instances it may worsen the situation.

Relapse

The outcome of orthognathic surgery, especially with regard to relapse, depends on various factors beginning with proper diagnosis, correct preoperative orthodontic treatment, precise planning and transfer to the clinical situation, correct surgical technique including fixation, the individual healing capacity and quality of bone, muscle tension, the cooperation of the patient, and many other factors.

The key to prevent or minimize relapse is to form an experienced interdisciplinary team which is able to control the majority of those factors, to document the course of patients, and to evaluate and improve the result over time.

From a surgical point of view, the amount and direction of the surgical movement, the type of fixation, and the surgical technique employed are of major concern. Rigid internal fixation techniques with metal implants have shown to improve long-term stability, especially after movements of the mandible.

Condylar resorption

An important but rare cause of late skeletal relapse in connection with progressive condylar resorption has recently attracted attention. The pathogenesis is still not well understood, but etiopathogenic hypotheses and predisposing factors, such as a posteriorly inclined condylar neck and a high-angle mandibular retrognathia, are widely discussed.

Hardware-related problems

In rare instances, the use of internal fixation devices may lead to local unpleasant sensations or discomfort in cold weather. In those cases, implant removal is indicated. Loose or fractured hardware should be removed as well.

Persistent nerve damage

After a 2-year period, neurosensory and motor deficiencies can be classified as permanent. Compared to other cranial nerves at risk in orthognathic surgery, the inferior alveolar nerve has the highest incidence rate of permanent damage. Up to now, most neurosensory deficiencies have to be accepted by the patient without any treatment. In the rare case of disturbing dysesthesia or hyperesthesia an additional medical or surgical treatment, such as neurolysis or even nerve replacement or nerve grafting, may be considered.

Nasal and sinus problems

Following maxillary osteotomies, restriction of the nasal airway may occur. Associated secondary problems such as maxillary sinusitis are rarely observed.

The reason for nasal obstruction may be an insufficient resection of the nasal septum when the maxilla is impacted, with the consequence of a septal deviation and related problems. If the impaction is such that the nasal cavity will be significantly smaller, a reduction of the inferior turbinates must be considered. Deviations of the cartilaginous nasal skeleton may also happen.

Persistant oro-antral fistulas after incomplete bone and soft-tissue healing can also lead to maxillary sinusitis. A careful examination including CT scans is needed to establish a diagnosis. Most cases require secondary surgery.

4 Rare complications

Today in elective surgery a patient needs to be informed about all relevant risks, even if they are extremely rare.

Eye complications

Potential complications after Le Fort type osteotomies include a decrease in visual acuity up to visual loss, extraocular muscle dysfunction with motility disorders and diplopia, neuroparalyitc keratitis, and nasolacrimal problems involving both a dry conjunctiva or epiphora. The pathomechanism for problems with visual acuity appears to be primarily mediated through indirect injuries to neurovascular orbital structures after traction, compression, or contrecoup injuries from forces transmitted during the pterygomaxillary dysjunction, or from fractures extending to the base of the skull or orbit associated with the pterygomaxillary dysjunction during maxillary down fracture. Surgical modifications of the maxillary osteotomy have been described to reduce the potential risks, eg, placing the posterior osteotomy more anteriorly into the maxillary tuberosity instead of dividing the pterygoid plates. In any case it is recommended to perform the pterygomaxillary dysjunction and down fracture with great care.

Aside from this, unilateral blindness has been reported as a result of compromised perfusion of the optic nerve after hypotensive anesthesia.

A decrease in visual acuity postoperatively may respond to aggressive treatment such as osmotic agents, steroids, lateral canthotomy, and optic nerve decompression. Even after therapy in most cases the visual loss is at least partially persistent, due to the extreme sensitivity of the optic nerve and the retina to hypoxemia, associated to injuries. CT scans are mandatory to document optic nerve pathology and to accurately exclude any intracranial lesion that could contribute to the altered visual acuity. Postoperative assessment of visual acuity should routinely be performed and documented.

Disturbed blood supply

Insufficient vascularity is mainly a problem following maxillary osteotomies, but there are also reports about aseptic necrosis following mandibular ostoeotomies, including those of the chin.

The sequelae can vary and include loss of tooth vitality, periodontal defects, tooth loss, necrosis of the mucosa and underlying bone, as well as loss of major bone segments. These complications are more likely to occur after Le Fort I osteotomies done in multiple segments together with superior positioning and transverse expansion.

If the problem is diagnosed at an early stage, medical treatment to improve perfusion and hyperbaric oxygen therapy can be considered.

Major vascular complications

False aneurysms and arteriovenous fistulas are rarely seen following orthognathic surgery. The vessel most commonly involved with false aneurysms is the internal maxillary artery and its branches, after both mandibular or maxillary osteotomies. Arteriovenous fistulas are more often related to injuries of large vessels, especially the internal carotid artery. Patients complain of a sound and sometimes of hearing loss, potentially associated with tinnitus. Embolization procedures are the treatment of choice.

The list of papers identifying complications in orthognathic surgery is long and needs to be routinely reviewed and updated. Relevant complications should be published and made known to every surgeon practicing orthognathic surgery.