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PREPARATION OF PATIENTS WITH OPEN BITE FOR ORTHOGNATHIC SURGERY

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Abstract. Open bite is a complex dentofacial deformity that may involve skeletal, dental, and functional components. In severe cases, especially when associated with vertical maxillary excess or mandibular discrepancies, orthognathic surgery is required for stable and esthetic correction. Proper pre-surgical orthodontic preparation is essential to ensure accurate surgical movements, stable occlusion, and long-term success. This article reviews the principles, diagnosis, treatment planning, and orthodontic preparation protocols for patients with open bite undergoing orthognathic surgery.

Keywords: anterior open bite, skeletal open bite, orthognathic surgery, pre-surgical orthodontics, maxillary impaction, dentofacial deformity, orthodontic decompensation, surgical orthodontics

Introduction. Anterior open bite is characterized by a lack of vertical overlap between the upper and lower anterior teeth when the posterior teeth are in occlusion. It may be dental, skeletal, or a combination of both. Skeletal open bite is commonly associated with increased lower facial height, steep mandibular plane angle, and vertical maxillary excess. In adults, growth modification is no longer possible, and orthognathic surgery combined with orthodontic treatment becomes the gold standard for correction.

Etiology of Open Bite

The causes of open bite are multifactorial and may include:

- Skeletal discrepancies such as vertical maxillary excess or mandibular clockwise rotation
- Oral habits (thumb sucking, tongue thrusting)
- Airway obstruction and mouth breathing
- Genetic predisposition
- Neuromuscular imbalances

Diagnosis and Treatment Planning

A comprehensive diagnosis is essential before planning orthognathic surgery. The following steps are recommended:

1. Clinical Examination

Evaluation of facial proportions, lip competence, smile line, incisor display, and vertical facial height.

2. Cephalometric Analysis

Assessment of skeletal relationships, mandibular plane angle, anterior facial height, and incisor inclination.

3. Dental Casts and Digital Models

Used to evaluate occlusion, arch coordination, and transverse discrepancies.

4. CBCT and 3D Planning

Modern orthognathic protocols utilize CBCT imaging and virtual surgical planning to improve accuracy and predictability.

Indications for Orthognathic Surgery in Open Bite

Orthognathic surgery is indicated when:

- The open bite is primarily skeletal in origin
- There is significant vertical maxillary excess

- Severe mandibular rotation is present
- Orthodontic camouflage would compromise facial esthetics or stability

Goals of Pre-Surgical Orthodontic Preparation

The main objectives of pre-surgical orthodontics include:

- Decompensation of dental inclinations
- Alignment and leveling of both arches
- Coordination of arch forms
- Elimination of dental compensations that mask skeletal discrepancies
- Establishment of a stable occlusal platform for surgery

Orthodontic Decompensation

In skeletal open bite, teeth often compensate for the underlying skeletal discrepancy. For example:

- Upper incisors may be retroclined
- Lower incisors may be proclined

Before surgery, these compensations must be reversed. This process may temporarily worsen the open bite but is essential for accurate surgical correction.

Leveling and Alignment

Both arches must be properly aligned using fixed appliances. Leveling should avoid excessive extrusion of posterior teeth, which may worsen the open bite. Instead, careful control of vertical dimension is required.

Arch Coordination

Transverse discrepancies should be corrected before surgery. In some cases, surgically assisted rapid palatal expansion (SARPE) may be required.

Extraction Decisions

Extraction protocols depend on crowding, incisor inclination, and facial profile. In many open bite cases, non-extraction treatment is preferred to maintain lip support and facial balance.

Surgical Planning

Common surgical procedures for open bite correction include:

- Le Fort I maxillary impaction
- Bilateral sagittal split osteotomy (BSSO)
- Combined maxillary and mandibular surgery

Maxillary impaction is considered the most stable procedure for skeletal open bite correction.

Timing of Surgery

Orthognathic surgery is typically performed after:

- Complete alignment and leveling
- Adequate decompensation
- Stabilization of archwires

Pre-surgical orthodontics usually lasts 12–18 months depending on case complexity.

Post-Surgical Orthodontics

After surgery, orthodontic treatment continues to:

- Refine occlusion
- Close minor spaces
- Achieve optimal intercuspation

This phase usually lasts 4–8 months.

Stability and Retention

Long-term stability depends on:

- Proper surgical technique
- Adequate orthodontic preparation
- Control of tongue posture and habits
- Retention protocols

Maxillary impaction has shown high stability rates compared to other open bite surgical corrections.

Conclusion

Successful correction of skeletal open bite requires a coordinated approach between orthodontist and maxillofacial surgeon. Accurate diagnosis, proper orthodontic decompensation, and precise surgical planning are critical for achieving functional, esthetic, and stable outcomes. Pre-surgical orthodontic preparation plays a key role in ensuring predictable results and long-term stability in open bite patients undergoing orthognathic surgery.

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