Orthognathic surgery

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Orthognathic surgery

- is the art and science of diagnosis, and treatment of facial disproportion.

- These disproportion may be congenital or acquired
Basic Therapeutic Goals for Orthognathic Surgery

• Function: obtain normal mastication, speech, ocular function and respiratory function.

• Aesthetic: facial harmony and balance.

• Other possible benefit:
  • TMJ dysfunction
  • Sleep apnoea
  • Traumatic occlusion and dental health
Patient Evaluation

- History
- Clinical examination
- Investigations
- Initial diagnosis
- Treatment plane
- Presurgical orthodontic
- Post-surgical orthodontic
Chief Complaints

• Understanding what patient concern, motivation, expectation. That provide insight to psychological health of the patient
• Patient who maintain unrealistic expectations are best not treated

History

The purpose of history is to identify the patient’s orofacial problems and their causes.
• Congenital deformity
• Trauma
• Medical history: bleeding disorder, autoimmune disease, any pathological condition.

• Dental history: previous restorative, orthodontic, periodontal, facial pain treatment.
Clinical evaluation

- Patient seated comfortably.
- Frankfort line parallel to the floor.
- Teeth in centric occlusion and lips relaxed.
Frontal Assessment
Facial proportion

The full face is divided into three equal parts

Upper part from hair line to the glabella (or eyebrow)

Middle part from glabella to the base of the nose

The lower part from the base of the nose to the chin which is subdivided into two parts, the upper lip forms one-third of it and the lower lip and the chin two-thirds of it
Incisal lengths (incisal edge positions)

- Is the most important determinant in smile creation because it serves as a reference point to decide the proper tooth proportion and gingival levels.

- **Degree of tooth display:**
  a. 2 mm of incisor edge show at rest
  b. about 2 mm of gingival show when smiling
vertical evaluation

- **Symmetry**:
  
  1. **Bizygomatic**: between zygion points the most lateral point of the zygomatic arch.
  
  2. **Bigonial**: width of lower third

- High to width proportion are 1:3:1 for female and 1:3.5:1 for males

- Bigonial width should be 30% less than bizygomatic width
transverse evaluation

1. Role of fifth

2. Intercanthal interpapillary distance
Anterior occlusal plane:

Parallel to interpupillary line.
Cant occlusion
Upper third evaluation

- **Shape and symmetry**: the temporal areas, frontal areas, eyebrows, and supraorbital rims
- Abnormality in this area often associated with craniofacial syndromes, these areas usually with normal limits in individuals with dentofacial deformities.
**Middle third evaluation**

- **Eyes and orbits:** intercathal and inerpupillary distance.
  - The vertical symmetry of inner and outer canthi of both eyes, (a true horizontal line will bisect the inner and outer canthi).
  - The eyelids examination (ptosis, entropion, ectropion)

•
**Nose:**
the symmetry of the nose, Glabella, dorsum, tip, alar base.
Proportion of alar base width to the nasal length (N-Prn) (0.60).
Lower third evaluation

**Balance:** the upper lip 1/3 of lower lip.

**Lips:**
- Symmetry of the lips at rest and at smiling. Asymmetry exists in:
  1. Intrinsic lip deformity (patients with cleft).
  2. Facial nerve dysfunction.
  3. An underlying dental-skeletal asymmetry.
Nasolabial angle

- should be 90 ± 10 degree
- It guides the upper lip support by the maxillary incisors
- Influenced by decrease in vertical maxillary dimension
- Increased in C II
- Decreased in C III
Submental and neck examination

In esthetic examination can be divided to

1. Mandibular angle definition.
3. Neck-chin length. The distance from pogonion to the neck-chin angle (42 ± 6 mm)

- Identify The posterior and inferior border of mandible.
- The parotid hypertrophy.
- Skin laxity, lipomatosi.
Upper lip length

- Measured from subnasale to lower lip
- 22 ++2 mm for male and 20 ++2 for female
- It increases with age
Ricketts line

- Line drawn from nasal tip to soft tissue pogonion
- Upper lip are 4 mm and lower lip 2 mm behind it
- Allow assessment of anteroposterior relationships of the lips
审美线

1~2 mm

2~4 mm
Labiomental angle

- 120 ± 10 degree
- More Acute in class II occlusion
- More obtuse in class III occlusion
Lower Lip-Chin - Throat Angle

- between line drawn from lower lip to Pog and submental line Normally $110^\circ \pm 8$.
- Acute angle in CIII.
- Increase in CII.
- Distance from neck throat angle to Menton $42 \pm 6$mm.
Lateral cephalometric analysis
Benefit of cephalograph in orthognathic surgery

Cephalometric analysis helpful in establishing the relation of:

- The maxilla and mandible to the base of skull.
- The maxilla to mandible.
- The maxillary teeth to maxilla.
- The mandibular teeth to mandible.
- The upper incisors to lower incisors.
skeletal analysis
• S sella
• G glabella
• N nasion
• ANS
• PNS
• Point A
• Point B
• Me menton
• Pg pogonion
• Go gonion
• Ar articulare
• Co condylion
• Or orbitale
• Po porion
Soft tissue analysis

- Soft tissue glabella (G).
- Soft tissue nasion (N).
- Pronasale (Pn).
- Subnasale (Sn).
- Labrale superior (Ls).
- Labrale inferior (Li).
- Stomion superius (Sts).
- Stomion inferior (Sti).
- Soft tissue pogonion (Pog).
- Soft tissue menton (Me).
Skeletal planes

- Frankfort plane
- Anterior cranial base (SN)
- Occlusal plane
- Mandibular plane
<table>
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<tr>
<th>Mean angular skeletal cephalometric values</th>
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Skeletal anteroposterior relationship

- SNA $81^\circ \pm 3$.
- SNB $78^\circ \pm 3$.
- ANB $3^\circ \pm 2$.
Facial angle (downs)

- Anteroposterior position of mandible to cranium base (n-pog).

![Facial angle diagram](image)
Dental models analysis
1. Tooth size analysis
2. Arch width analysis.
3. Curve of spee.
4. Curve of welson
5. Tooth arch symmetry.
Presurgical orthodontic treatment

Relieve of crowding

Level and align arches

Decompensate

Achieve root divergence at surgical site
model surgery technique:

- Impressions
- Occlusal record
- Face bow registration.
- Face bow transfer to the articulator and mounting of maxillary cast.
- Mounting of mandibular cast
• Maxillary model surgery.
• Intermediate occlusal wafer.
• Mandible model surgery.
• Final occlusal wafer fabrication
Surgical treatment
Mandibular excess
Body osteotomy
Subcondylar osteotomy
Inverted L osteotomy
Saggital split osteotomy
Mandibular deficiency
Saggital split osteotomy
Total subapical osteotomy
Genioplasty
Maxillary excess

- **Vertical Maxillary Excess**

- Rest position of a patient with *vertical maxillary excess* demonstrating "incompetent lips"
- Smile view of a patient with *vertical maxillary excess*
Teeth in Class I alignment

Powered by Ortho2
Maxillary and midface deficiency
Lefort osteotomy
Lefort I osteotomy

Lefort II osteotomy
Distractor osteogenesis
Distraction osteogenesis is the creation of neoformed bone and soft tissue by gradual and controlled displacement of a bone fragment using ridged stretching device delivers tensile force to the developing callus at the site of the bone cut.

Treating craniofacial deformities (HFMS, Crouzon, post trauma, post resection, cleft palate...ect)
Types of distractors

Intraoral distractor

Extra oral distractor
Terminology of distractors

- Latency period
- Distraction period
- Consolidation period
- Remodelling period
Hemifacial microsomia
Pierr robin syndrom
Alveolar distraction

**INDICATION**

i. Sever atrophied edentulous ridge
ii. Segmental deficiencies for implant placement or functionally & esthetically for crown bridge placement
iii. Narrow alveolar ridge (horz. Distraction)
iv. Gradual vertical movement of ankylosed tooth or osteointegrated implant with surrounding bone

**ADVANTAGES**

I. No bone graft needed with hard & soft tissue obtained
II. Less possibilities of bone exposure & graft resorption
III. More esthetic
IV. Allows the use of complementary regeneration techniques when outcome not satisfactory
Thank you