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The term orthognathic originates from the words orthos & gnathos.

Meaning of Ortho: to correct, Gnathos: jaw.

Orthognathic surgery refers to surgical procedures designed to correct jaw deformities. Orthognathic procedures are divided into three categories:

a. Maxilla
b. Mandible
c. Bimaxillary

Indication:

1. Indication for orthognathic surgery includes impaired mastication (due to cross bite), TMJ pain & dysfunction, sleep apnea, & susceptibility to caries & periodontal diseases. This may be due to difficulty in maintaining oral hygiene cause of severely protruding & irregular teeth.

2. Unaesthetic appearance of a dentofacial deformity resulting in undesirable psychological effects.

3. In severe malocclusion three possibilities for correction:
   a. growth modification
b. Orthodontic treatment or orthognathic surgery

c. In con junction with orthodontics to establish proper jaw relationship.

**Surgical procedures done in relationship to orthodontics:**

1. Extraction
   a. Therapeutic extraction
   b. Serial extraction
   c. Extraction of carious teeth
   d. Extraction of malformed teeth
   e. Extraction of supernumerary tooth
   f. Extraction of impacted tooth
2. Surgical uncovering of teeth
3. Frenectomy & labial gingival cleft.
4. Pericision
5. Transplantation
6. Resection & osteotomies
7. Cosmetic surgery
8. Corticotomy
1. Extraction

   a. Therapeutic extraction:

      It is undertaken as a part of fully fledged orthodontic treatment mainly
to gain space. Prior to therapeutic extraction a through diagnostic exercise
is essential.

   b. Serial extraction:

      It involves removal of some deciduous teeth followed by specific
permanent teeth for an arch length deficiency exists with prevents normal
alignment of teeth.

   c. Extraction of supernumerary, impacted & ankylosed teeth:

      The presence of these teeth is important local causes of malocclusion.
The most commonly seen supernumerary teeth are the mesiodens. It can
also occur in the incisor, premolar & molar region.

      Impaction in the maxillary arch, generally occur in the canine region.

2. Surgical uncovering of teeth:

   Causes:

   1. Arch length discrepancies
2. Presence of supernumerary teeth

3. Mucosal or bony barrier

4. Retained deciduous teeth

3. Frenectomy:

   **Definition:**
   
   When a median diastema is being caused or held open by a thick, short & fibrous labial frenum which is attached to the gingival papilla. Sometimes this frenum may insert into the intermaxillary suture area on the palatal aspect.

   **Examination test:**
   
   When tension is applied to the frenum the incisive papilla should blanch.

   **Procedure:**
   
   It is better to first close the space orthodontically, then carefully resects the fibrous attachment & legate the teeth together immediately scaring then reduces the relapse tendencies.

   If surgery is done before space closure scar tissue may form & can hinder correction of the diasteme.
Purpose:

The purpose of frenectomy is to eliminate the fibrous tissue between the roots of central incisors so that there is no obstruction on to approximate of these teeth by appliance therapy.

Technique:

Frenectomy is an operation designed to remove the frenum & the fibrous tissue lying in the intermaxillary suture between the roots of central incisors.

1. Usually it is done under anesthesia
2. The frenal band is removed; with the excision of tissue down to the bone as it extend between central incisors to the incisive papilla.
3. The intermaxillary suture is cleared of fibrous tissue at least upto the level of the apices of incisors.
4. Mucosa of the lips is determined & the edges are closed by the simple suture.
5. Healing is rapid & the suture can be removed a week.
Transplantation

Autogenous transplantation is usually carried out for misplace maxillary canines when adequate room is present in the arch. It is usually performed in younger adults in whom bone is elastic & success of transplantation tooth is more likely when the apex is wide open.

Precautions to be applied while transplanting of any tooth or canines:
1. Adequate space must be available for the transplantation.
2. Success of transplantation of tooth is more likely when the apex is wide open.
3. Root should not be handled.
4. Root canal filling should not be attempted at the time of transplantation it can be done later, when tooth is firm in its new position.
5. Ankylosed & resorption of the root may occur.

Labial gingival cleft

Labial gingival cleft are generally seen in lower anterior region due to traumatic occlusion.
It can be managed by

a. Massage
b. Conservative medication
c. Excision of muscle attachment
d. Surgical flaps.

**Resections & Osteotomies**

Where the active growth is complete, the management of severe skeletal class II, class III & vertical malrelations can be corrected by various resections & osteotomies as follows-

Classification –

A. Soft tissues procedure –
   1. labial frenectomy
   2. Pericision
   3. Exposure of impacted teeth

B. Hard tissue procedure –
   1. Creation of space by extraction
2. Removal of obstruction of eruption

3. Removal of impaction


5. Corticotomy

6. Transplantation

7. Osteotomy of rapid palatal expansion

8. Serial extraction

**Pericision**

It is generally assumed that a stable position of the teeth in the dental arch after orthodontic tooth movement can only be established when the connective tissues of the gingival have been allowed to adapt to newly created situation. Supracrestal gingival fibres of an orthodontically moved tooth stretch & undergo re-adaptation very slowly. The pull of the fibers is a major factor in relapse.

If these supra crestral fibers are sectioned & allowed to heal while the teeth are held in the proper position, relapse caused by gingival elastic fibers is generally reduced. Re attached of these fibers at a new relaxed position on
the root surface stabilizes the tooth in its new position. The procedure is called pericision. It is effective in controlling relapse of a derotated tooth.

**Technique:**

Circumferential supra crestal fibrotomy:

1. Under L.A no 11 knife is placed through the gingival sulcus up to the alveolar bone. Cuts are made interproximal on each side of a rotated tooth & along the labial or lingual gingival margin. No periodontal pack is necessary & there is only minor discomfort after this procedure.

2. The procedure done only the end of the finishing phase of the treatment. After the procedure, the teeth are held in a good alignment until healing in a week.

**PERICISION (short note)**

**Synonym** – Circumferential supra-crestal fibrotomy.

**Definition** – Is a minor surgical procedure that is undertaken to counter the relapse tendency of the stretched gingival fibers.
Why occur – The trans-septal and alveolar crest group of gingival fibres remains stretched and do not readily readapt to the new tooth position following correction of rotation, causing relapse.

Procedure – Pericision involves surgical sectioning of these fibres by passing a sharp narrow seal pet [Blade no 11] through the gingival -- around the tooth to a depth of ---- apical to the alveolar crest.

When done: Pericision is generally undertaken as an adjunctive retention procedure of correction of rotation.

Corticotomy

This procedure is usually carried out on the anterior maxillary teeth in young adults when the duration of the appliance therapy to be shortened one or more teeth needs to be moved rapidly if corticotomy is performed prior to appliance therapy.

Technique:
This technique involved the sectioning of the dento alveolar region into multiple small unit to has a n orthodontic tooth movement. Labial flaps are raised & inter dental bony cuts are made parallel to the long axis of the
teeth. These cuts may be joined together by a horizontal bony cuts above the apices of the roots. Care should be taken & following the surgery, orthodontic tooth movement is initiated by fixed appliance.

**Osteotomy for rapid palatal expansion**

Adult with skeletal maxillary construction, rapid palatal expansion is not possible with orthodontically because fusion of mid palatal & lateral maxillary suture

A jack screw expansion device is cemented before surgery than corticotomy are performed in the lateral antral walls bilaterally. The mid palatal suture is also osteomized through a small vertical incision. The jack screw is activated & expansion is carried out daily in small increment until complete. A sterilization period of 6 weeks is required for the bony consolidation to occur.
Planning of orthognathic surgery:

1. clinical examination
2. socio- psychological evaluation
3. X-rays
4. photograph
5. Cephalometric evaluation
6. study model
7. prediction tracing
8. model surgery

Procedure:

A. Ant- post correction-
   Maxillary surgery – advanced & retraction
   Mandibular surgery – Advanced & set back

B. Vertical correction-
   Maxillary surgery & Mandibular surgery

C. Transverse correction-
Maxillary surgery & Mandibular surgery

D. Skeletal open bite correction

E. Genioplasty

Anterior posterior correction

Maxillary surgery:

For Advancement Lefort 1 down fracture & advancement is preferred technique for maxillary retrognathism. The length of the vascular pedical & soft tissue complains the limit the extent of anterior movement.

For retraction Lefort 1 segment is difficult due to presence of pterigo mandibular plates or tuberosity. Therefore anterior segment osteotomy (wassmund procedure) is most commonly preferred offer extraction of premolars on either side.

Mandibular surgery:
For advancement bilateral sagittal split osteotomy (BSSO) is currently the most preferred technique since it can be performed easily intra orally. Inverted L osteotomy & C osteotomy are also performed in the ramus for advancement of the mandible. C osteotomy is done extra orally eg; class II.

For setback bilateral sagittal split osteotomy (BSSO) or trans oral vertical or oblique ramus osteotomy are usually performed for this movement. Eg; incase of class III skeletal relationship.

**Vertical correction**

Maxillary surgery:

Both superior positioning (for long face correction) & inferior positioning (for short face correction) can be performed Lefort 1 down fracture technique.

Lower 1/3 = middle 1/3 = anterior 1/3

Lower border of nose to upper border of lip = 1/3 & chin 2/3

(For long face correction = cut of maxilla is above)
Mandibular surgery:

Shorting of vertically excessive mandible should be done by inferior border osteotomy & chin augmentation horizontally. Elongation of lower facial can be done with BSSO, when rotate the mandible down & forward.

**Transverse correction**

Maxillary surgery:
Expansion of maxillary arch usually performed in conjunction with Lefort 1 down fracture in which parasagittal osteotomy immediately medial or lateral to the nasal wall with an extension going between the roots of the central incisors is carried out. Bone graft is needed to fill the space created by the lateral movement of the posterior segment.

Mandibular surgery:
Because of TMJS transverse correction are difficult on mandible. Anteriorly extraction of a tooth & osteotomy can be performed to achieve construction
of arch. Expansion is better done by distraction osteogenesis rather than osteotomy.

**Skeletal open bite**

Skeletal open bite commonly occurs in long face individuals who have vertical maxillary excess, anterior posterior deficient mandible with short ramus height. Lower anterior teeth may be over erupted. Lefort 1 down fracture & superior repositioning of the maxilla especially posteriorly best treat these patients. The mandible auto rotates upwards & forwards, which bring the chin anteriorly.

**Genioplasty**

The chin can be moved in all three plans after osteotomy or may be augmentation by an only auto graft or allograft. Genioplasty is done to improve results of mandible advancement or reduction or to correct asymmetry.
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Dedicated To

My Mom, Zubaida Shaheen
My Dad, Md. Islam
&
My Only Son
Mohammad Sharjil
Acknowledgments
I wish to acknowledge the expertise and efforts of the various teachers for their help and inspiration:

1. Prof. Iida Junichiro – Chairman, Dept. of Orthodontics, Hokkaido University, Japan.
3. Asst. Prof. Kajii Takashi – Dept. of Orthodontics, Hokkaido University, Japan.
8. Prof. Amirul Islam – Principal, Bangladesh Dental college
9. Prof. Emadul Haq – Principal City Dental college
11. Asso. Prof. Lamiya Chowdhury – Chairman, Dept. of Orthodontics, Sapporo Dental College, Dhaka.
13. Asso. Prof. MA Sikder – Chairman, Dept. of Orthodontics, University Dental College, Dhaka.
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