Maxillofacial Anomalies and Orthognathic Surgery

Aetiology
The embryology of the face provided the cause of dentofacial anomalies which includes various growth factors induce formation of 'growth centers. The malformation may occur in the facial area because of

1- There is defects in these centers .
2- There is lack of coordination between them.

The most common causes of growth centers disorders which may produce facial anomalies are :
1- Genetic disturbances.
2- Trauma either during pregnancy or development.
3- Drugs
4- Alcohol
5- Malnutrition
6- Radiation or chemotherapy
7- Infection (bacterial or viral)

Classification of maxillofacial anomalies
Classification of these anomalies was done according to the clinical presentation of the cases and the affected part of the face. Sometimes the facial anomalies are associated with other defects in the body. Facial anomalies are classified into:
1- Cleft lip and palate
2- Maxillary anomalies
3- Mandibular anomalies
4- Craniofacial anomalies

Cleft lip and palate (CLP) : the most common anomalies affecting the facial area which cause disruption in the anatomy of the facial anatomy including the lip, peri oral muscles, nose , alveolar bone and soft palate . (CLP) varies with racial and geographical factors. It’s occurring in about 1: 750 birth and affecting males more than females. The highest incidence is in Japan (about 2-3: 1000) while in Iraq it’s about 1:1000)
Maxillary anomalies: usually affecting the maxilla bone or the midface, also the anomalies may be present alone or associated with other anomalies. The maxillary anomalies include premaxillary protrusion, maxillary protrusion maxillary hypoplasia and midface hypoplasia.

Mandibular anomalies: these can be divided into the
1- Symmetrical mandible anomalies which also subdivided into:
   a- Congenital defects like manbidular prognathism.
   b- Acquired anomalies like bilateral temporomandibular joint ankylosis

2- Asymmetrical mandible anomalies which also subdivided into:
   c- Congenital defects like manbidular hemihypertrophy.
   d- Acquired anomalies like temporomandibular joint ankylosis due to infection or trauma.

Craniofacial anomalies: usually affecting the facial and cranial bones with its soft tissues structures like Crouzon syndrome and Apert’s syndrome.

Complications of facial anomalies
1- Malnutrition
2- Growth disturbances
3- Speech defects
4- Dental mal occlusion
5- Psychological problems
6- Chest or ear infections

Diagnosis
For dentofacial anomalies, the diagnosis will describe the maxillary and mandibular base relationship relative to the skull together with a description of the dental occlusion and comments about general condition of the dentition and oral hygiene. The mandible and maxilla may be described as prognathic, hypoplastic or asymmetrical. The effect of these may be to produce a long face, open bite or short face. The chin may also be described using various classifications of excess (macrogenia), hypoplasia(microgenia) and asymmetry. For craniofacial anomalies, the diagnosis will also describe the orbits, eyes, ears and other features and may suggest various syndromes in a differential diagnosis.
Orthognathic Surgery
Orthognathic surgery involves the correction of occlusal and facial disharmony (jaws deformity). These operations usually done after the age of 18 years. Most of facial deformity needs combined orthodontic and orthognathic treatment.

Indication of orthognathic surgery
1- Restore of the function like mastication, speech or swallowing.
2- Improvement of facial appearance.
3- Treatment of associate problems like infection or psychological disorders.

Preoperative planning
1- Medical history and examination.
2- Psychological assessment.
3- Special imaging for evaluation of the hard and soft tissues.
4- Preoperative photography.
5- A surgical plan is made to correct the abnormality described by the lateral cephalometric tracing. The surgically predicted outcome may be produced readily by computer software packages designed for this use and visualised on screen.
6- Model surgery is carried out on duplicate models and dental splints (occlusal wafers) are constructed for use during the operation to position correctly the bony fragments once osteotomised.

Types of orthognathic surgery
Mandibular surgery
There are many surgical techniques for the correction of the mandibular position. The sagittal split osteotomy is the most popular technique. It enables the body of mandible to be moved forwards or backwards by sliding the split ramus and angle and thus providing a large amount of bone overlap for healing. After repositioning, the mandibular fixation is achieved directly with screws or mini-plates, or indirectly with intermaxillary fixation (IMF).

Genioplasty
The chin may be reduced or undergo augmentation as an isolated procedure or as part of a mandibular or maxillary Orthognathic operation. Genioplasty may be undertaken via an intra-oral approach and fixation with mini-plates is usual.
Maxillary surgery
The surgical techniques used for maxillary surgery are generally described by the Le Fort classification used for fracture description. The higher level osteotomies are obviously more complicated surgical operations. The most common maxillary osteotomy is the Le Fort I. This operation is very versatile and enables movement of maxilla in any direction. Access is by an intra-oral approach and bone cuts are made with a saw and chisels. Fixation is with mini-plates. Higher-level maxillary osteotomies may require access via discrete skin incisions.