2 Indications

The general indications for surgical correction of a maxillofacial skeletal deformity are physical evidence of musculoskeletal, dento-osseous, and/or soft-tissue deformity. These abnormalities may result in difficulties with breathing, lip incompetence, speech pathology, masticatory and/or swallowing abnormalities, temporomandibular joint/associated muscular disorders, dental and/or periodontal pathology, and social or psychological impairment. Causes of these abnormalities may be congenital, developmental, or traumatic. Multiple studies have shown that patients who have vertical maxillary excess and mandibular retrognathia with a low hyoid bone can have narrow airways in the retropharyngeal region and at the base of the tongue. As a consequence, they are more predisposed to sleep apnea and can be helped by advancement and superior repositioning of the maxilla and advancement of mandible and chin.

Examples of congenital deformities are patients with cleft lip and palate, hemifacial microsomia, and a variety of other deficiencies and excess states. Development deformities usually become more evident with growth of the patient. Traumatic injuries can result in a variety of hard and soft-tissue deformities as well.

The timing of surgery is related to the age of the patient and severity of the symptoms. In general, waiting until adolescent patients reach the end of growth before doing surgery is the norm. This concept is generally accepted as the patient may otherwise grow after surgery with reoccurrence of the skeletal discrepancy. It also assumes that the patient does not have a significant functional problem that would necessitate earlier surgery. However, timing can vary with the skeletal discrepancy. With mandibular deficiency, surgery may be considered early, prior to the end of growth. If the jaw continues to grow after correction, it will usually be in a direction that counters any tendency for relapse. With mandibular excess, though, it is wise to wait until after growth is complete as future growth may result in reappearance of the malocclusion. Patients who have primary vertical disorders can have surgery after the cuspids and second molars have erupted as there is little vertical growth of the maxilla at this point. In patients with hemifacial microsomia, surgery to correct skeletal discrepancies and to improve soft-tissue discrepancies is often undertaken before the age of ten with one reason being early expansion of the soft-tissue envelope. Functional issues such as airway problems can prompt earlier surgery.

3 Diagnosis and clinical examination

3.1 Frontal

Patients may have discrepancies in multiple planes. The clinical examination is combined with the radiological and model assessments to establish a diagnosis and eventually a treatment plan. However, the accent should be on the clinical examination with x-rays confirming the clinical findings. The patient is examined noting hard- and soft-tissue relations. Discrepancies between the soft tissue and the underlying hard tissue structures can be managed either with primary surgery or in a delayed fashion.

The clinical examination of the patient should be done in two steps. The first is a preliminary examination, where postural, occlusal, or habitual movements are noted. The second examination is more detailed and the patient is assessed from both frontal and lateral views. Soft-tissue, skeletal, and dental issues should be noted in detail and documented with photographs.

While the patient must be viewed as a complete individual, it is convenient to think of them as having vertical, horizontal, and transverse discrepancies. Included in this assessment is any asymmetry that may exist in isolation or in combination with discrepancies in other planes.

A systematic examination should be done and recorded. This can start from the top of the head downwards, looking at symmetry of the face and vertical balance. The patient should be positioned at a level compatible with the examiner, with their head orientated with both the Frankfurt horizontal and the interpupillary lines parallel to the floor. Measurements should be taken directly from the patient in addition to obtaining facial photographs to document the clinical findings. At a minimum, photographs should include a frontal view with the lips at rest and in smile, three-quarter views, right and left profiles at rest and smiling, a submental vertex view, and intraoral views of the occlusion.

The face, extending from the hairline to the chin point, should roughly be divided into thirds. Facial height is subdivided into the region from the hairline to glabella, glabella to subnasale, and subnasale to chin. The normal balance is 30%, 35%, and 35% of the face respectively (**Fig 7.1-1**). To assess facial width, the face is divided into fifths (**Fig 7.1-2**).

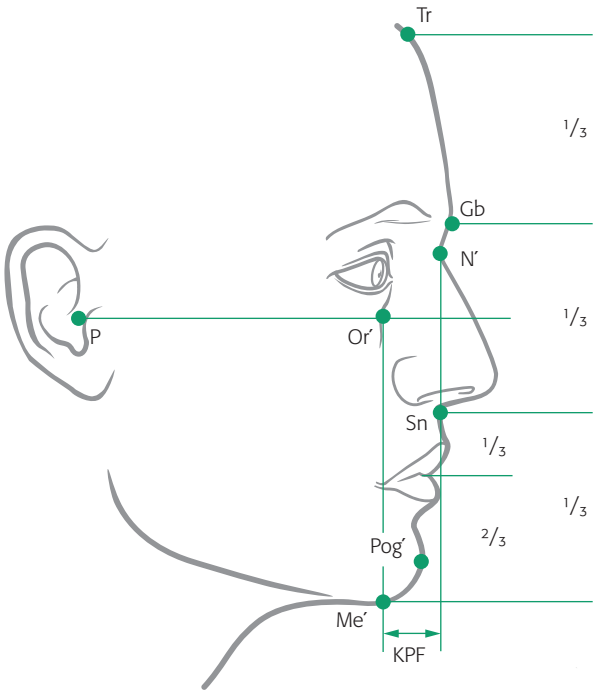

Fig 7.1-1 Vertical facial proportions. The face is divided into thirds.
Upper third: hairline to glabella.
Middle third: glabella to subnasale.
Lower third: subnasale to menton. The lower third is subdivided into an upper third from subnasale to stomion and lower two thirds from stomion to menton.

Tr	Trichion	Pog'	Pogonion (soft tissue)
Gb	Glabella	Me'	Menton (soft tissue)
Or'	Orbitale (soft tissue)	KPF	Kieferprofilfeld
Sn	Subnasale	P	Porion

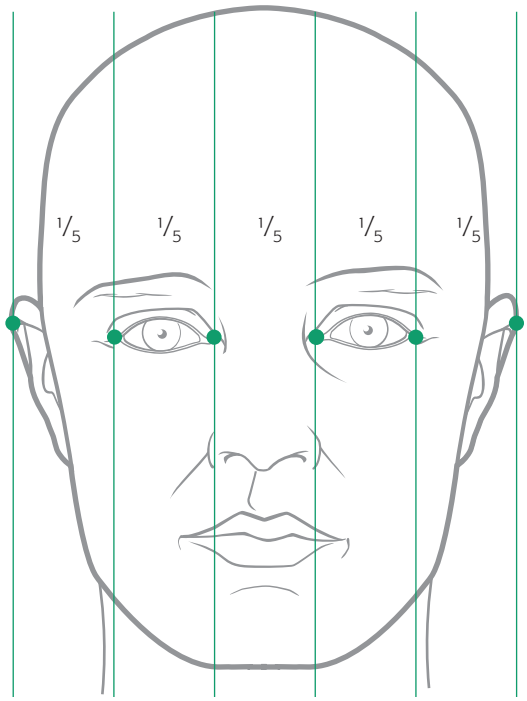

Fig 7.1-2 Transfacial proportions. The face is divided into five equal parts, each of which with the approximate width of the eye.

The upper third of the face is almost entirely comprised of the forehead. The forehead should be examined looking for symmetry, rhytides, and the position of the supraorbital rims. As part of an esthetic examination, the position of the eyebrows in relation to the supraorbital rims is noted.

The position of the ears and the periorbital region is examined next as part of the middle third of the face. Presence or absence of antihelical folds is noted as well as the stiffness of the cartilage. The intercanthal and interocular distances should be documented as well as soft-tissue abnormalities in the upper and lower eyelids. The nose should be examined for both functional and esthetic concerns. This is critical as maxillary surgery can have a dramatic effect on both the function and esthetics of the nose. For instance, numerous unfavorable changes can occur to the nose and nasolabial esthetics following a Le Fort I osteotomy. Many of these changes are preexistent conditions that are accentuated by the surgery. Minor modifications in the surgical procedure can alleviate some of these preexisting conditions. The width of the nose and any asymmetry is noted. Each subunit of the nose should be examined separately including the tip, alar base, and dorsum. An intranasal examination should be done looking for deviation of the septum and enlarged turbinates. Frequently when there is asymmetry in the base of the nose, the septum is deviated and the nostril sills will also be asymmetric. Examining the patient's ability to breath through both nostrils is an important part of the presurgical examination.