

The prominence of the cheeks and whether they are symmetric should be noted. The point of malar prominence is usually 10 mm lateral and 15 mm inferior to the lateral canthus of the eye. It is not uncommon for patients with maxillary deficiency to have deficient malar prominences. The infraorbital rim should be within 2 mm of the projection of the globe when viewed from profile. In the paranasal areas, the nasolabial folds should not be excessively deep.

In the lower third of the face, the maxillary and mandibular midlines should be noted and whether they are congruent with the facial midline. The lips should be symmetric. A cant in the soft tissue of the lips is often indicative of a cant in the occlusion. If such a cant is suspected, placing a tongue blade between the teeth and viewing the patient from a short distance to see if the tongue blade is parallel to the interpupillary line will confirm whether a cant is present. The length of the upper lip is determined at rest to differentiate vertical maxillary excess from deficient soft tissues. Normal exposure of the upper central incisor is between 2 and 5 mm during smile. Amount of tooth show at rest and at smile should be noted. Patients who habitually posture their jaws and have active perioral muscles may need help to learn to relax their lips so that an adequate assessment can be made. Excessive tooth show at rest may be due to vertical maxillary hyperplasia or a short lip. Excessive tooth show in animation may be due to either horizontal or vertical maxillary excess. While it is important to note whether the patient has an Angle's Class I, II or III malocclusion, it should be remembered that the dental relationships do not necessarily parallel skeletal discrepancies.

Thickness and symmetry of the vermillion should be noted. Maxillary and mandibular dental midlines are noted in relation to the facial midline, to one another, and to the midline of the chin. The chin should be symmetric and in harmony with the facial midline. The shape of the chin should be examined. The angles of the mandible should be symmetric. Asymmetric angles of the mandible may look worse with advancement of the mandible, especially if the patient's mandibular midline is deviated to one side. Prominent angles and inferior border of the mandible define the breaking point between the face and the neck.

Intraorally, the position and size of the tongue should be noted. Tongue position is classified based on the ability of the examiner to see the pharynx of the patient. Occlusal classification of the teeth is noted as well as any obvious pathologic conditions involving the teeth.

### 3.2 Profile

In profile, the balance of the face is again examined. The upper facial third is examined for frontal bossing or depression. Supraorbital and infraorbital rim projection are noted. The supraorbital rim should project 5–10 mm beyond the most anterior projection of the cornea.

In the middle facial third the nose is inspected for columellar show, supra tip break, and nasolabial angle. The radix of the nose is normally 5–8 mm anterior to the cornea. Whether the mandibular plane angle is flat or obtuse and what sort of cervicomental soft-tissue angle the patient has is documented.

### 3.3 Temporomandibular joints and function

Any examination should include an assessment of jaw and joint function. This includes maximum vertical opening, right and left lateral excursion and protrusive movements. Clicking of the joints and muscular tenderness should be noted. Functional shifts of the occlusion either forward or from one side to the other should be documented.

### 3.4 X-ray examination

Routine x-rays include a panoramic x-ray, periapical films (when necessary), and frontal and lateral cephalograms. The panoramic film is a general screening film to assess gross changes in the dentition and surrounding structures. Periapical films are used to detect divergence of tooth roots, periapical pathology, and space between teeth when interdental osteotomies are considered. A frontal cephalogram is used to assess asymmetry and transverse deficiencies in the maxilla. The lateral cephalogram is used to confirm the findings of the clinical examination and in the treatment planning phase it is used as a basis for planning the surgical phase of the therapy.

There are a variety of cephalometric analysis systems that can be used to aid in the assessment of a patient. What most cephalometric analysis systems have in common is that the skeletal and dental positions in space are related to some reference line in the cranial base. This assumes that there is no discrepancy in the cranial base. While many of the analysis systems were designed prior to the advent of routine orthognathic surgery, some of the more recent ones were designed with orthognathic surgery in mind.

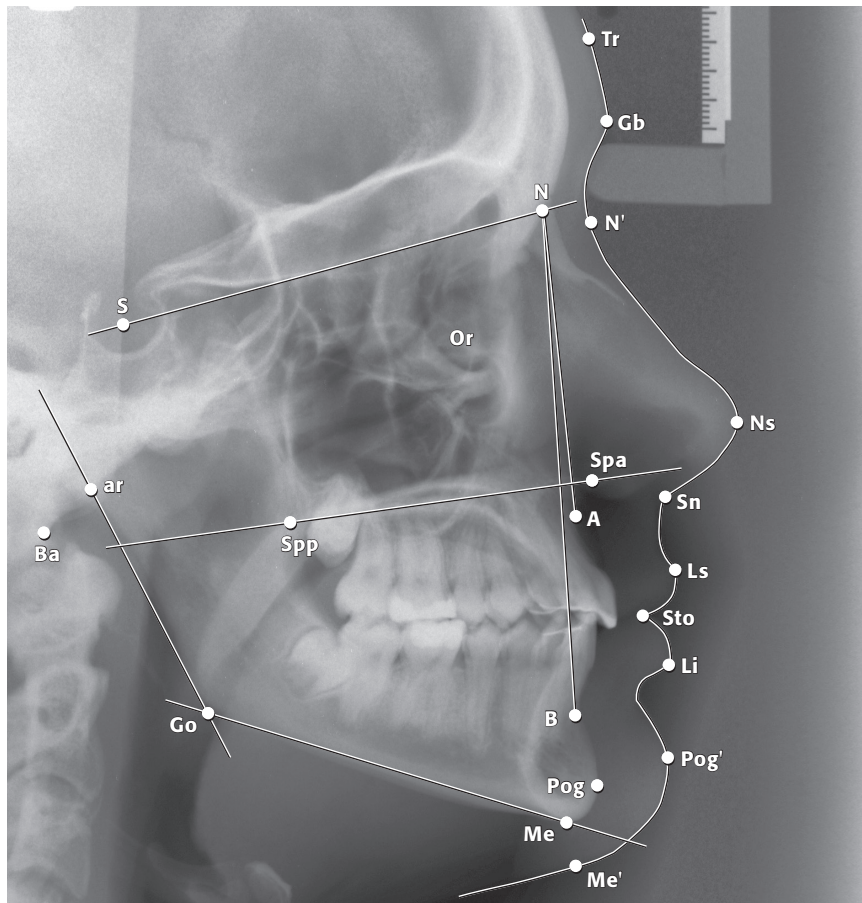


An in-depth discussion of all cephalometric analysis systems available is beyond the scope of this chapter. A brief review of one frequently used system will be included. The cephalometrics for orthognathic surgery (COGS) system was developed at the University of Connecticut. Similar to a clinical examination, it describes the horizontal and vertical position of the facial bones. The size and relative position of bones are represented by linear measurements both horizontally and vertically (**Fig 7.1-3**).

Use of this system can isolate vertical discrepancies in the anterior and posterior components of the face. Vertical dental dysplasia is divided into an anterior and posterior component. Angular measurements are used to further assess the positions of bones in space. The system also accounts

for differences in males and females. The standards are based on a population of northern Europeans, and this should be kept in mind when individuals of other ethnic groups are examined. In addition, as with all two dimensional cephalometric analyses, it does not account for the three-dimensional nature of patients.

Traditionally, x-rays were traced and analyzed on acetate paper. More recently, there have been a number of commercially available programs where the x-ray can be digitalized and then a number of different systems may be used to analyze the patient. These programs can also be used to predict different surgical procedures for the patient. Today the tendency is to plan three-dimensionally on the basis of a CT scan with 3-D cephalometry.



**Fig 7.1-3** Lateral cephalometric radiological examination. Bone and soft-tissue landmarks are marked.

A	A-point or subspinale
ar	Articulare
B	B-point or supramentale
Ba	Basion
Gb	Glabella
Go	Gonion
Li	Labrale inferior
Ls	Labrale superior
Me	Menton
Me'	Menton (soft tissue)
N	Nasion
N'	Nasion (soft tissue)
Ns	Nasale
Or	Orbita
Pog	Pogonion
Pog'	Pogonion (soft tissue)
S	Sella
Sn	Subnasale
Spa	Spina nasale anterior
Spp	Spina nasale posterior
Sto	Stomion
Tr	Trichion