

Clinical examination

The aims of orthodontic clinical examination are to document and evaluate skeletal, facial and occlusal proportion in 3 planes of the space in addition to function of the teeth, lips and tongue. This is usually obtained either direct from the patient by document of the case sheet or by the diagnostic records, which includes: the study model, orthopantomographs, cephalometries and facial photographs. The relationship of the jaws to each other can vary in all three planes of space and variation in any plane can affect the occlusion of the teeth, so the malocclusion could be as a result of:

1. Skeletal factor, Jaw mal-relationship to each other or the mal-relation of one or both of them to the cranial base in any plane of space.
2. Soft tissue factor only.
3. Dental factor only.
4. Combination of one or more than one of any above factors in one or more than one plane in space.

The orthodontic treatment depends on which factor that cause the malocclusion. The most important factor of orthodontics is the skeletal factor; because, it includes the bases that bearing the soft tissue and teeth and of course if this base is abnormal, it will affect the structures that include.

Clinical Evaluation, Facial Proportions and Appearance:

The orthodontist should make some diagnostic determinations “from the doorway” regarding the patient’s face, posture, and expression, one can often tell from the first moment whether the orthodontic problem will be largely a dental one or a difficult skeletal or facial problem.

The evaluation of facial appearance should be done with the patient’s head in a natural head position (NHP) (i.e., standing or sitting up, looking at the horizon not with the patient prone in a dental chair.

Examination of skeletal relationship:

The examination for skeletal factor can be done while the patient seated at the

dental chair in upright position in a comfortable state. The best way is to ensure that the patient is positioned so that the Frankfort plane (which is extended from the external auditory to the lower most aspect of the orbital margin) is horizontal-parallel- to ground and the teeth are in the maximum interdigitation.

The skeletal orthodontic examination should be assessed in three planes of space:

1. Antero-posterior (sagittal).
2. Vertical.
3. Transverse (Horizontal).

Antero-posterior relation: sometimes it is named antero-posterior positional relationship of the basal parts of the upper and lower jaw to each other with the teeth in occlusion is known as: skeletal relationship or skeletal pattern.

The patient is instructed to look at a point on a level of his eyes, straight ahead and the patient should be viewed from the side (lateral view). This will give some idea of skeletal relationship especially for those patients with gross discrepancies.

- For less marked discrepancies it could be masked by teeth position or by thickness and posture of the lips.

The more accurate impression can be obtained by *palpation method*.

Palpation method:

The tip of the index finger and the tip of the middle finger of one hand are placed on the soft tissue point A and point B respectively

Soft tissue point A: is the center of concavity between the base of the nose and the vermillion border of the upper lip.

Soft tissue point B: is the center of the concavity between the vermillion border of the lower lip and the bony chin.

The relative position of the finger then observed:

- ✓ If the fingers tips are equal at the same vertical plane *or* the index finger slightly anterior to middle finger “not more than 2mm”, this is a case of class I skeletal pattern.
- ✓ If the middle finger is in a back ward position relative the index finger, this is represent a class III skeletal pattern.
- ✓ If the middle finger is anterior to the index finger in vertical plane; so, it is a class II skeletal case.

It is important to know that: this classification only gives the position of the mandible and maxilla relative to each other, and does not indicate where the discrepancy lies. It is a subjective method of assessment.

Note: this method can be applied intraorally which is more preferable because it's not influenced by the thickness of the soft tissue.

Profile analysis:

The patient placed in natural head position and sitting in upright position with looking at a distant object, then we note the relationship between two lines: One dropped from the bridge of the nose to the base of upper lip. A second one extending from that point down ward to the chin. These line segments should form a nearly straight line, with only a slight inclination in either direction. A large angle between them indicates either profile convexity or concavity. Profile convexity or concavity results from a disproportion in the size of the jaws but does not by itself indicate which jaw is at fault.

A convex facial profile indicates a class II jaw relationship which can result from either **maxilla that** project too-far in a forward direction or the mandible in a backward direction.

A concave profile indicates a class III relationship which can result either from: Maxilla that is too far back or a mandible that protrudes to the forward direction.

Vertical relation:

The middle facial height is the distance from the eyebrow (glabella point) to the base of the nose (sn: subnasale) should almost equal to the distance from the base of the nose (sn) to the lower most point on the chin (me: menton). If the later distance is increased, the lower facial height is described as being increased and vice versa. Another way to assess the vertical relationship is by the Frankfort mandibular plane angle (FMPA) by placing a ruler at the lower

border of the mandible and another one at the Frankfort plane and then in the mind's eye extrapolate the planes, if the angle between the above planes around the average of 28°-30°, this is a normal condition. An increase or decrease in the angle reflects abnormalities in the vertical proportion.

Transverse relation:

It is important to remember that faces are asymmetric to a little degree; but marked discrepancies should be noted. It is preferable to examine the asymmetry to look for the patient face from above (Bird view) and the extent of the asymmetry is recorded whether (the lower facial third, the maxilla or the orbits are involved).

EVALUATION OF FACIAL PROPORTIONS (MACROAESTHETICS):

In Frontal View, Vertical Facial Relationships:

One of the major reasons for orthodontic treatment is to overcome the psychological difficulties relating to the facial and dental appearance; therefore, evaluating the esthetic factor is an important part of clinical examination. Facial esthetic is assessed by presence or absence of facial proportions.

The ideal face is divided vertically into equal thirds by horizontal lines adjacent to the hairline, glabella, the nasal base, and menton. The ideal lower third of the face: is divided into thirds, the upper lip makes up the upper third and the lower lip and chin comprise the lower two-thirds. The vertical measurement of the face is compromised with the width of the face to give (the normal facial index). In normal proportions: concerning the frontal view, an ideally proportional face can be divided into central, medial, and lateral equal fifths, each fifth is approximately equal to one eye width. The nose and chin should be centered with the central fifths, the width of the nose should be approximately the same as the inter-inner canthal distance while the width of the mouth should approximate the distance between the irises.

Evaluation of lip prominence and its relation to the teeth:

The teeth are protruded excessively if two conditions are met;

1. The lips are prominent & averted.
2. The lips are separated at rest by more than 3-4 mm, i.e. "Presence of lips incompetence".

In other words, there is excessive protrusion of incisors, is revealed by prominent and separated lips when they are relaxed. For such a patient retracting the teeth tend to improve both function and facial aesthetics. If the lips are prominent but closed over the teeth without strain, the lips posture is largely independent on the tooth position) and the retracting of the incisors will have a little effect on the lip function and produce a little or no change in lip prominence example on this case, a black patient with competent lips and having a bimaxillary dentoalveolar protrusion which is normal in such race the extraction of the premolars and then retraction of the canines and then retraction of incisors will add very little effect on the esthetic and the lips will not follow the retracted teeth and the relapse will be expected in such a case.