

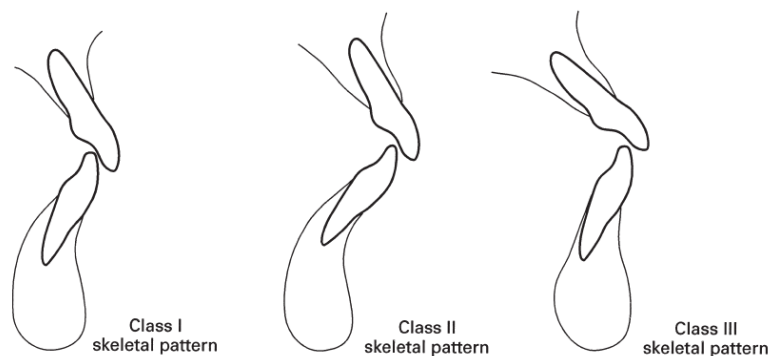
Definition:

Class I malocclusions is a situation where the anteroposterior occlusal relationship is normal and there is a discrepancy either within the arches and/or in the transverse or vertical relationship between the arches.

Aetiology

1. Skeletal causes

In Class I malocclusions, the skeletal pattern is usually Class I, but it can also be Class II or Class III with the inclination of the incisors compensating for the underlying skeletal discrepancy i.e. dento-alveolar compensation.



Marked *transverse skeletal* discrepancies between the arches are more commonly associated with Class II or Class III occlusions, but milder transverse discrepancies are often seen in Class I cases.

Increased vertical skeletal proportions and anterior open bite can also occur where the anteroposterior incisor relationship is Class I.

2. Soft tissue causes

In most Class I cases, the soft tissue environment is favourable (for example resulting in dento-alveolar compensation) and is not an aetiological factor.

Lip competence related effects

In bimaxillary proclination, the upper and lower incisors are proclined. This may be racial in origin and can also occur because lack of lip tonicity results in the incisors being moulded forwards under tongue pressure.

3. Dental and local causes

Dental factors are the main aetiological influences in Class I malocclusions. The most common are tooth/arch size discrepancies, leading to crowding or, less frequently, spacing.

The size of the teeth is genetically determined and so, to a great extent, is the size of the jaws. Environmental factors can also contribute to crowding or spacing. For example, premature loss of a deciduous tooth can lead to a localization of any pre-existing crowding.

Local factors also include displaced or impacted teeth, and anomalies in the size, number, and form of the teeth, all of which can lead to a localized malocclusion. However, it is important to remember that these factors can also be found in association with Class II or Class III malocclusions.

Common features in Class 1 malocclusion

1. Crowding

Crowding occurs where there is a discrepancy between the size of the teeth and the size of the arches.

In a crowded arch loss of a permanent or deciduous tooth will result in the remaining teeth tilting or drifting into the space created. This tendency is greatest when the adjacent teeth are erupting.

Most spontaneous improvement occurs in the first 6 months after the extractions. If alignment is not complete after 1 year, then further improvement will require active tooth movement with appliances.

Late lower incisor crowding

Physiologically, in most individuals, the intercanine width increases up to around 12 to 13 years of age, and this is followed by a very gradual diminution throughout adult life. The rate of decrease is most noticeable during the mid to late teens. This reduction in intercanine width results in an increase of any pre-existing lower labial crowding, or the emergence of crowding in arches which were well aligned or even spaced in the early teens. Therefore, to some extent, lower incisor crowding can be considered as an age change.

The aetiology of late lower incisor crowding is recognized as being multifactorial: the following have been proposed as influences in the development of this phenomenon;

1. Forward growth of the mandible (either horizontally or manifesting as a growth rotation) when maxillary growth has slowed, together with soft tissue pressures, which result in a reduction in lower arch perimeter and labial segment crowding.
2. Soft tissue maturation.
3. Mesial migration of the posterior teeth owing to forces from the interseptal fibres and/or from the anterior component of the forces of occlusion.
4. The presence of an erupting third molar pushes the dentition anteriorly, i.e. the third molar plays an active role.

2. Spacing

Generalized spacing is rare and is due to either hypodontia or small teeth in well-developed arches. Orthodontic management of generalized spacing is frequently difficult as there is usually a tendency for the spaces to re-open unless permanently retained. In milder cases, it may be wiser to encourage the patient to accept the spacing, or if the teeth are narrower than average, acid-etch composite additions or porcelain veneers can be used to widen them and thus improve aesthetics. In severe cases of hypodontia, a combined orthodontic–restorative approach to localize space for the provision of prostheses, or implants, may be required. Localized spacing may be due to hypodontia; or loss of a tooth as a result of trauma; or because extraction is

indicated because of displacement, morphology, or pathology. This problem is most noticeable if an upper incisor is missing as the symmetry of the smile is affected, a feature which is usually noticed more by the lay public than other aspects of a malocclusion.

A. Hypodontia

Hypodontia is defined as the congenital absence of one or more teeth. The prevalence in a Caucasian population (excluding the third molars) has been reported as being between 3.5 to 6.5 percent.

The third molars are missing in approximately 25–35 percent of the population. The next most commonly missing teeth are the second premolars (3 percent) followed by the upper lateral incisors (2 percent). Missing teeth are also found more commonly in patients with a cleft lip and/or palate.

Etiological factors

1. Familial tendency.
2. Association with syndromes (e.g. ectodermal dysplasia).
3. Small teeth.
4. Delayed dental development.
5. Retained deciduous teeth.

Management of missing upper incisors

There are basically three approaches to manage missing incisors:

1. Space closure
2. Space maintenance or opening
3. Auto-transplantation

Criteria for successful auto-transplantation

- Root development of tooth to be transplanted – 2 / 3 to 3 / 4 complete.
- Sufficient space in arch and occlusally to accommodate transplanted tooth.
- Careful preparation of donor site to ensure good root to bone adaptation.
- Careful surgical technique to avoid damage to root surface of transplanted tooth.

- Transplanted teeth positioned at same level as donor site and splinted for 7–10 days.

Requirements for the placement of implant to replace missing upper incisor

- Growth rate slowed to adult levels.
- Adequate bone height.
- Adequate bone width.
- Adequate space between roots of adjacent teeth.
- Adequate space for crown between adjacent crowns and occlusally.

Median diastema

In the lecture

B. Displaced teeth

Teeth can be displaced for a variety of reasons including the following:

- Abnormal position of the tooth germ:

Canines and second premolars are the most commonly affected teeth. Management depends upon the degree of displacement. If this is mild, extraction of the associated primary tooth plus space maintenance, if indicated, may result in an improvement in position in some cases. Alternatively, exposure and the application of orthodontic traction may be used to bring the mildly displaced tooth into the arch. If the displacement is severe, extraction is usually necessary.

- Crowding:

Lack of space for a permanent tooth to erupt within the arch can lead to or contribute to displacement. Those teeth that erupt last in a segment, for example upper lateral incisors, upper canines, second premolars, and third molars, are most commonly affected. Management involves relief of crowding, followed by active tooth movement where necessary. However, if the displacement is severe it may be prudent to extract the displaced tooth.

- Retention of a deciduous predecessor:

Extraction of the retained primary tooth should be carried out as soon as possible provided that the permanent successor is not displaced.

- Secondary to the presence of a supernumerary tooth or teeth:

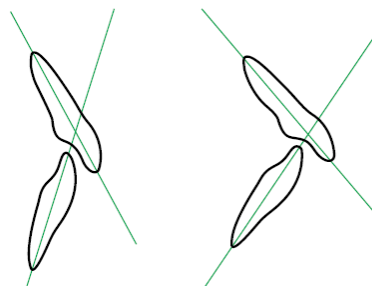
Management involves extraction of the supernumerary followed by tooth alignment, usually with fixed appliances. Displacements due to supernumeraries have a tendency to relapse and prolonged retention is required.

- Habit.
- Secondary to pathology, for example a dentigerous cyst. This is the rarest cause.

C. Bimaxillary proclination

Bimaxillary proclination is the term used to describe occlusions where both the upper and lower incisors are proclined.

Bimaxillary proclination is seen more commonly in some racial groups (for example Afro-Caribbean), and this needs to be borne in mind during assessment (including cephalometric analysis) and treatment planning.



Normal vs bimaxillary proclination

Management is difficult because the upper and lower incisors need to be retroclined to reduce the overjet. Retroclination of the lower labial segment will encroach on tongue space and therefore has a high likelihood of relapse following removal of appliances. For these reasons, treatment of bimaxillary proclination should be approached with caution and consideration should be given to accepting the incisor relationship. If the lips are incompetent, but have

a good muscle tone and are likely to achieve a lip-to-lip seal when the incisors are retracted, the chances of a stable result are increased. However, the patient should still be warned that the prognosis for stability is guarded. Where bimaxillary proclination is associated with competent lips, or with grossly incompetent lips which are unlikely to retain the corrected incisor position, permanent retention is advisable.

Vertical discrepancies

Variations in the vertical dimension can occur in association with any anteroposterior skeletal relationship.

Transverse discrepancies

A transverse discrepancy between the arches results in a crossbite and can occur in association with Class I, Class II, and Class III malocclusions.