

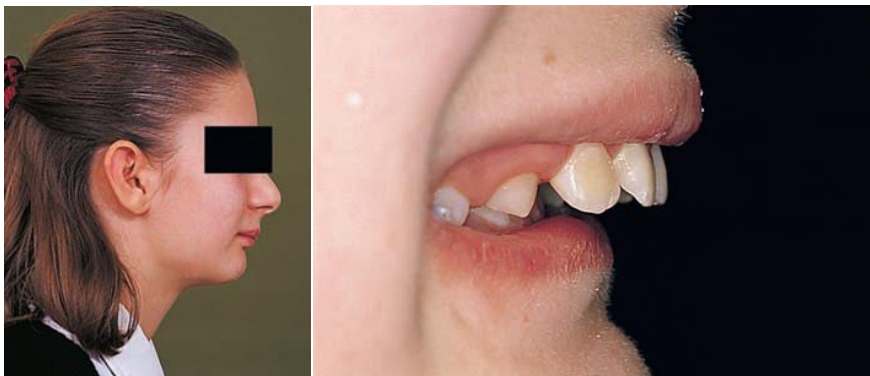
Class II division 1 incisor relationship is defined as 'the lower incisor edges lie posterior to the cingulum plateau of the upper incisors, there is an increase in overjet and the upper central incisors are usually proclined'. In a Caucasian population the incidence of Class II division 1 incisor relationship is approximately 15–20 per cent.

Aetiology

1. Skeletal causes

A Class II division 1 incisor relationship is usually associated with a Class II skeletal pattern or Class I skeletal pattern, commonly due to a retrognathic mandible. However, proclination of the upper incisors and/or retroclination of the lower incisors by a habit or the soft tissues can result in an increased overjet on a Class I or even a Class III skeletal pattern.

A Class II division 1 incisor relationship is found in association with a range of vertical skeletal patterns. Management of those patients with significantly increased or significantly reduced vertical proportions is usually difficult and is the province of the specialist.



2. Soft tissue causes

The influence of the soft tissues on a Class II division 1 malocclusion is mainly mediated by the skeletal pattern, both anteroposteriorly and vertically. Nevertheless, the resting position of the patient's soft tissues and their functional activity are important.

In a Class II division 1 malocclusion the lips are typically incompetent owing to the prominence of the upper incisors and/or the underlying skeletal pattern. Where the patient can achieve lip-to-lip contact by circumoral muscle activity or the mandible is postured forwards, the influence of the soft tissues is often to moderate the effect of the underlying skeletal pattern by dento-alveolar compensation. More commonly the lower lip functions by being drawn up behind the upper incisors, which leads to retroclination of the lower labial segment and/or proclination of the upper incisors with the result that the incisor relationship is more severe than the underlying skeletal pattern.

However, if the tongue habitually comes forward to contact the lower lip, proclination of the lower incisors may occur, helping to compensate for the underlying skeletal pattern. Infrequently, a Class II division 1 incisor relationship occurs owing to retroclination of the lower incisors by a very active lower lip.



3. Dental factors

A Class II division 1 incisor relationship may occur in the presence of crowding or spacing. Where the arches are crowded, lack of space may result in the upper incisors being crowded out of the arch labially and thus to exacerbation of the overjet. Conversely, crowding of the lower labial segment may help to compensate for an increased overjet in the same manner

4. Habits

A persistent digit-sucking habit will act like an orthodontic force upon the teeth if indulged in for more than a few hours per day. The severity of the effects produced will depend upon the duration and the intensity, but the following are commonly associated with a determined habit:

- proclination of the upper incisors;
- retroclination of the lower labial segment;
- an incomplete overbite or a localized anterior open bite;
- narrowing of the upper arch thought to be mediated by the tongue taking up a lower position in the mouth and the negative pressure generated during sucking of the digit.

The first two effects will contribute to an increase in overjet. The effects of a habit will be superimposed upon the child's existing skeletal pattern and incisor relationship, and thus can lead to an increased overjet in a child with a Class I or Class III skeletal pattern, or can exacerbate a pre-existing Class II malocclusion. The effects may be asymmetric if a single finger or thumb is sucked.

Occlusal features

The overjet is increased, and the upper incisors may be proclined, perhaps as the result of the influence of the soft tissues or a habit; or upright, with the increased overjet reflecting the skeletal pattern. Anterior open bite may result. If the lips are grossly incompetent and are habitually apart at rest, drying of the gingivae may lead to an exacerbation of any pre-existing gingivitis. The molar relationship usually reflects the skeletal pattern unless early deciduous tooth loss has resulted in mesial drift of the first permanent molars.

Assessment and treatment planning in Class II division 1 Malocclusions

Factors influencing a definitive treatment plan

Before deciding upon a definitive treatment plan the following factors should be considered:

- The patient's age
- The difficulty of treatment
- The likely stability of overjet reduction
- The patient's facial appearance
- Early treatment

Treatment for Class II division 1 malocclusions is best deferred until the late mixed/early permanent dentition where the transition from the functional to the fixed appliance can be made straightaway without having to wait for teeth to erupt; space can be gained for relief of crowding and reduction of the overjet by the extraction of permanent teeth (if indicated), and soft tissue maturity increases the likelihood of lip competence. If the upper incisors are thought to be at particular risk of trauma during the mixed dentition, treatment with a functional appliance can be considered.

When early treatment with myofunctional appliance is considered, the overall treatment time is considerably longer compared to preadolescent stage plus a period of "retention" is required between completion of the functional appliance phase and the commencement of fixed appliances which is problematic to manage.

Management of an increased overjet associated with a Class I or mild Class II skeletal pattern

Management of the more severe cases is the province of the experienced specialist. There are three possible approaches to treatment.

1. Growth modification

This can be either restraint of maxillary growth, encouraging mandibular growth, or by a combination of the two. Headgear can be used to try and restrain growth of the maxilla horizontally and/or vertically, depending upon the direction of force relative to the maxilla. Functional appliances appear to produce limited restraint of maxillary growth whilst encouraging mandibular growth. Success is dependent upon favourable growth and an enthusiastic patient.

2. Orthodontic camouflage

By using fixed appliances, bodily retraction of the upper incisors is achieved. The severity of the case that can be approached in this way is limited by the availability of cortical bone palatal to the upper incisors and by the patient's facial profile.

Malocclusions can be managed with orthodontics alone. Although growth modification with myofunctional appliances is limited, a small amount of skeletal change is appreciated and can be helpful.

In practice, the child with a moderately severe Class II skeletal pattern can often be managed by a combination of the previous approaches, provided that growth is not unfavourable. This usually involves initially functional appliance therapy carried out during the pubertal growth spurt, after which fixed appliances are used, plus extractions if indicated.

Orthodontic camouflage can also be achieved by proclination of the lower labial segment. However, this movement is inherently unstable, but it can be stable in a number of cases (where the lower incisors have been trapped lingually by an increased overbite or pushed lingually by a habit or by a lower lip trap).

Gummy smiles associated with increased vertical skeletal proportions and/or a short upper lip will often worsen as the incisors are retracted. Therefore active steps should be taken to manage this problem. Milder cases are best managed by either the use of high pull headgear to either a functional type of appliance or removable appliances.

3. Surgical correction

In severe cases of vertical maxillary excess or where there is an excessive amount of upper incisor show in an adult patient, surgery to impact the maxilla is advisable.

In cases with a severe Class II skeletal pattern, particularly where the lower facial height is significantly increased or reduced, a combination of orthodontics and surgery may be required to produce an aesthetic and stable correction of the malocclusion. The threshold for surgery is lower in adults because of a lack of growth.

Retention

Relapse encompasses the return following treatment of the original features of the malocclusion as well as long-term growth and soft tissue changes. Unfortunately it is not possible to accurately predict those patients who will relapse and so retention must be discussed with, and planned, for every patient. To aid stability, full reduction of the overjet and the achievement of lip competence are advisable.

If the overjet is not fully reduced there is the risk that the lower lip will continue to function behind the upper incisors, with a subsequent relapse in incisor position.