

- *Ortho Lecture 3*
- *Dr. Serene*
- *Done by: Dalin Jihad*

Class II Division I

The lower incisors lie behind the cingulum of the upper incisors, the upper incisors are usually proclined but they could be upright.

In class II division II the upper incisors should be retroclined. So as soon as you see a retroclined incisors it's class II division II by default.

Normally, in class II division I there's an increased overjet, the distance is more than the average (2-3 mm). Most cases, class II molar relationship, the mesiobuccal cusp of the upper molar lies anterior to the groove of the lower. About 20% of the occasions have this malocclusion, (20% in the middle east, 20% in the USA, a bit more than that in west Europe and it's less than 10% in black Africans.)

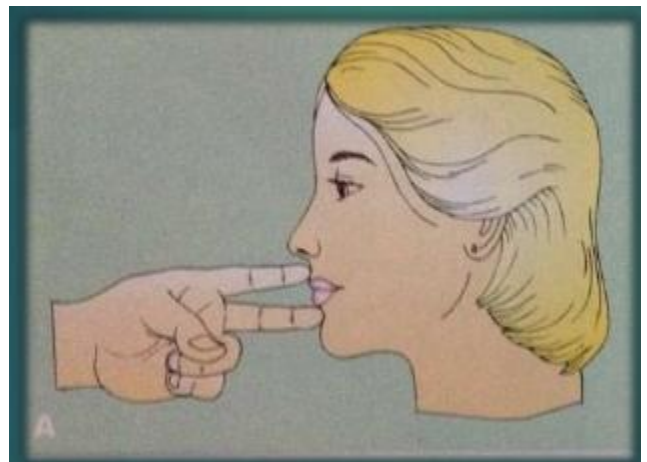
Aetiology:

we always have at least three factors that contribute to this:

- Skeletal, you think of it firstly, and we have two planes to think of:
 - Antero-posterior plane
 - maxilla is protruded
 - mandible is posterior to its position
 - or a combination of both

To find the A-P plane, you make the patient in a natural head position (by looking in the mirror) then using your two fingers like fig 1. Or by dropping a true vertical line perpendicular to Frankfort's horizontal plane. But Frankfort's plane is not really reliable, it's too variable and when we have discrepancies Frankfort's plane is definitely not to be used.

We determine the position of the mandible. Most of the patients of division I malocclusion have a retruded mandible. You can find patients who have a combination of retruded mandible and protruded maxilla. It's much easier to treat the mandibular deficiency and the patient is still growing.



Growth Rotation:

The patient may have a horizontal growth forward and upward rotation which leads to decreased facial height (anterior growth rotation). Or there could be vertical downward backwards rotation leading to increased facial height (posterior growth rotation), the chin moves downwards and backwards making

the problem appear more. Also, there will be decreased overbite or an open bite.

Anterior growth pattern is more favourable.

Not all Anterior growth rotations have a deep bite. Most of them have and you will expect a deep bite, but it's not always the case. Some cases you hardly find a reduced overbite or an open bite.

The main cause of class II division I malocclusions is skeletal. So skeletal factor is responsible for 76% of class II division I malocclusions, in all the cases. Some may be caused out of habits or due to soft tissue problems if class I skeletal pattern.

We can also find skeletal class III in class II division I malocclusion, but mainly it's skeletal class II.

Vertical:

It's usually average but it could be high angle when you have increased growth pattern.

When you have an anterior growth rotation in the mandible, it's more favourable for a class II patient, because it will not give poor appearance as the posterior growth, which is more difficult to treat and maintain stability.

When examining a class II division II, some cases the patient tries to mask the growth pattern to improve their appearance or to achieve the lip to lip seal (Sunday face). Always examine your patient in centric relation and make your treatment plan according to the centric relation, and make sure the patient is occluding properly in centric relation.

Soft tissue:

Secondary Role

Class II division I patient, the lips are usually incompetent, so at rest the lips are not contacting passively.

Normally we find that the upper incisors escape the effect of the lower lip, the lower lip doesn't cover 1/3 of the upper incisors, either because they're too proclined or due to skeletal problem. So we find the patients with low or normal lip line.

We find a high lip line in class II division II cases.

Tongue:

It can only cause a problem only in the presence of endogenous thrust, and fortunately; it's quite rare. To diagnose a tongue thrust: open bite, proclination of upper and lower teeth, class II malocclusion. But this is very very rare.

What we usually find is adaptive tongue behaviour. For some reason, the tongue lies somewhere where it shouldn't. Normally it should rest on the palate, but sometimes it lies between the teeth. The patient may try to achieve a lip to lip seal in order to swallow, but because he has a skeletal problem, the patient produces muscle activity to achieve that. So you see a patient with competent lips but with extra muscle work, mainly noticeable in mentalis muscle.

In other cases, the mandible postures forward to achieve this lip seal, when this happens the underlying skeletal pattern is camouflaged. You might not notice the patient having class II because he postures the mandible forward.

Lips:

other times you find the lower lip, to achieve a seal, is trapped behind the incisors, achieving a tongue-lower-lip seal. When this happens, this can help add to the problem we have by producing more pressure on the upper teeth proclining them even further.

So you might have a normal swallowing with normal lip-to-lip seal, an adaptive swallowing pattern, where the tongue touches the lower lip to achieve a seal with an increased incomplete overbite because the tongue is laying on the lower incisors. You could also find the lower lips actually touching the palate to achieve a seal, pushing the upper incisors to procline even further and retrocline the lower incisors, increasing the overjet and overbite.

Tongue position:

It doesn't actually cause malocclusion because we swallow only for a few seconds, it's not enough to cause a problem. A force must stay for a few hours in order to move teeth and cause malocclusion. But what happens sometimes is that the tongue is positioned where it shouldn't be and this causes problems.

A tongue lying on the incisors, what it actually does is prevent the lower incisors from erupting fully, causing incomplete overbite. This happens anteriorly but could also happen posteriorly, where also it could prevent the eruption of the posterior teeth and cause open bite posteriorly.

Habits:

If you have skeletal class I with features like anterior open bite or increased overjet, always think of habits, especially if the patient is still young.

What happens when the patient sucks on their thumb?

Anterior open bite, because the thumb is physically preventing the incisors from erupting, usually unilateral. Also, produces posterior cross bite; the negative pressure from sucking the thumb will cause the cheeks to push the posterior teeth inwards. The forces are imbalanced; there is no opposing to the cheeks pushing the upper posterior teeth palatally leading to a posterior cross bite. There is constriction in the maxillary arch due to the soft tissue imbalance.

This translates into unilateral constricted cross bite. It's only unilateral because the thumb sucking is not done for a long time to cause a bilateral constriction of the maxilla.

When the patient with cross bite, there will be cusp to cusp occlusion, so the mandible shifts to achieve a better occlusion and when this happens the patient shifts the mandible to one side and the

cross bite on the other side. Very rarely, there will be bilateral cross bite such as in the cases with mouth breathing.

So when you find a patient with anterior open bite, unilateral crossbite with mandibular displacement and the patient is young think of habits like thumb sucking.

Mouth breathing:

The tongue is always lowered, so there will be forces from the cheeks and unopposed by the tongue, also the mandible drops leading to an open bite and extrusion of lower posterior teeth, and a rotation in the mandible downwards and backwards. So, these patients with skeletal class II with an increased lower facial height. In these cases, you'll find bilateral cross bite and if it develops, it will lead to skeletal problems.

- Features of digital sucking:
 - Asymmetrical anterior open bite
 - Proclined upper incisors
 - Sometime retroclined lower incisors if the patient pushes the lower teeth backwards
 - Unilateral crossbite with displacement in the mandible.

In order to treat this case, you must stop the habit first.

Soft tissue and incisor position:

lower lip is usually trapped behind the upper incisors, when the overjet is increased. But sometimes, the lower lip covers part of the upper incisors with an increased overjet. This patient has a lip seal but you'll find that the lower lip is reverted, you'll find an accentuated ligamental fold. This patient will have a class II accentuated ligamental fold, with a deep bite and a reverted lower lip.

Lips:

Either normal or class II, there aren't a lot of diversity.

Lip competence:

potentially competent lips: meaning that if you correct the problem, the patient can achieve lip seal. When you correct the malocclusion and the lower lip covers part of the lower incisors, there will be stability after the treatment, so the upper incisors will be retained by the lower lip.

If there's short or incompetent lips, when you correct the overjet, the lip doesn't cover part of the upper incisors, there will be no force to balance against the tongue leading to a relapse of the overjet.

So this is important in your treatment plan, because you have to plan your stability and retention in the end. Because if it isn't stable, you'll have to think of permanent retention.

Incomplete open bite in the absence of digit sucking:

normally in this case, the lower incisors reflect the balance of the soft tissue balance. Meaning that if there's a change in this balance there will be a relapse. So do not change the position of the lower

incisors; there are only limited cases where you change the position of the lower incisors. If you procline them, the results will be unstable.

Two cases where you procline the lower incisors:

1- lower incisors held back during mandibular growth. Meaning, the mandible is growing but because of the deep overbite (?) the incisors are still in their position, retroclined and not moving with the mandible. Here you can procline them. You can procline them because it is not due to soft tissue balance.

2-when the patient has a digit sucking habit, the upper incisors are pushed forward, the lower pushed back. Here you can also procline the lower incisors, and it has to be in a growing patient.

Occlusal feature:

Class II incisal relationship with an increased overjet.

Upper incisors are usually proclined but they can be normal inclination.

usually deep overbite and incomplete, sometimes causing trauma to the palate “traumatic overbite”.

Molar relationship:

Class II relationship, unless you have early loss of primary teeth and the molars are in class I or III.

Sometimes you can find bimaxillary proclination, not only the upper are inclined but also the lower incisors. And in order to treat “*didn't hear after that*”. These patients have more pressure from the tongue than the lips. When you correct that be careful and plan the retention and stability.

Why do we treat class division I malocclusion?

1. It can cause oral health problems
2. It can cause a risk of trauma to the upper incisors if the overjet was more than 6 mm.
3. Aggravation of incompetent lips in mouth breathers adding to the problem
4. The overbite can be traumatic to the palate.
5. Also, psychosocial problem if the case was severe

The aim of our treatment is to achieve proper function and aesthetics, remove the risk of trauma and achieve a stable occlusion.

Always plan the treatment of the lower arch first. Because if you have to extract in the lower arch you have to in the upper arch, unless a surgical complicated case. But normally, when extracting for a class II in the lower arch you have to extract in the upper arch. We start with the lower first to achieve stability, since later we cannot change the intercanine width. Also, we do levelling of the curve of spee, which sometime need space. We don't expand the mandible, rotate the teeth inwards and outwards but we cannot expand it.

Then, you treat the upper arch according to the lower arch, achieving class I canine relation, and so on.

You have to plan anchorage very carefully in class II, in order to achieve a good class I incisal relation.

Sometimes, a patient come to the orthodontist with a class II division I malocclusion, and the orthodontists extracts the upper 4's and retrocline the upper anterior teeth, transforming the malocclusion from division I to division II. But division II isn't better esthetically than division I. Never do that.

Stability:

intercanine width, it's stable you cannot change it.

the curve of spee, in order to level it without extraction it will have to be on the expense of the lower incisors.

Transverse expansion is rarely indicated, in the lower arch. You can't just move the tooth outside the arch. Only rotation.

To treat the upper arch always look at the lower arch, if the lower arch needs extraction you do that first.

Objectives:

1. Reduce overjet
2. Good intercuspation between upper and lower teeth

1. If you find that the malocclusion is not severe, there's always the option to leave it.
2. Plan extraction, especially patients contraindicated for further treatment (*poor oral hygiene, poor compliance, etc.*)
3. Removable appliance
4. Treat one arch (upper arch)
5. Comprehensive fixed appliance (upper and lower arch)
6. Orthognathic surgery.

The best is to accept, or treat with functional appliance. Normally, class II patients are treated with functional removable appliances or with fixed appliances. If the case is too severe to be treated orthodontically, refer it to orthognathic surgery.

Extractions, you carry it on to fix the canine. When the canine is erupting, but there is no space, you extract the 4's and the canine erupts into its place. But rarely, you achieve good results; most of the cases need orthodontic appliance.

What we can do is treating the upper arch and distalise the upper buccal segment. If you have a molar relation with less than a half a unit class II relation, you can try to distalise and then correct the incisal relation.

You normally treat one arch if there a well aligned second arch. But still it's not advisable, because you need to correct both together, so the best is fixed appliance in both arches.

But still, it can be done, distalisation of the upper buccal segment and correction of incisal relationship. And if the case is indicated, you can use a removable appliance.

If you have a molar of more than half a unit class II, it will be difficult to distalize the upper buccal segment, in this case we extract upper 4's. This will result in full unit class II which is fine, it's stable relationship.

If you a molar relationship of half a unit class II, and crowded lower arch you need to extract in upper and lower arches (4's). In the end we should aim for a class I molar relationship, and in order to do that I need to hold the molars In place, reinforcing the anchorage.

If a canine is also half a unit class II, we need half a unit to put it in a class I, and the other half is for bringing the molar to class I. So we need reinforced anchorages since we cannot afford any space loss, we cannot allow the upper posterior teeth to drift forward.