Orthodontics lecture no. (4)  
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-(Class 2 division 1)'s most common and main etiological factor is :  
skeletal (retrognathic mandible or prognathic maxilla or a combination of both)...   
-Soft tissues are considered as a secondary etiological factor (lip trap can aid in the proclination of upper incisors)  
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How to treat those patients?  
1- We start our treatment with the lower arch for 2 reasons:  
a) For stability purposes( we can't really procline or expand the lower arch because it won't be stable)   
b)And because if extractions are needed in the lower arch, we have to extract in the upper arch as well.   
next..  
2- Upper arch is built around the lower arch.  
note: be careful not to convert class 2 division 1 into class2 division 2 ! (don't solve a problem by creating a new one)  
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**1-Lower arch**

* Inter-canine width becomes stable at the age of 9- 10 years, sometimes it evens constricts a bit with age.
* Based on that, we must not change the inter-canine width by proclining the lower incisors, unless we have something that's holding back the lower incisors or retroclining them from their true position (e.g. thumb sucking habit).
* We need to level the curve of spee.. and that requires space ! >> it's not 1:1 , it's less! but we still need space.
* Again, proclination of the lowers is not advisable (not stable)
* Transverse expansion of the lower arch is rarely indicated (if the molars are very tilted >> you can upright, but if they are already upright don't expand)
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  **2- Upper arch**
* It's built around the lower arch
* Extractions in the upper arch are planned according to the lower and depend also on the anchorage requirements.  
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  OBJECTIVES:  
  1) Improve function and esthetics  
  2) Reducing OVB and then after that:  
  3) Reducing OVJ and achieving a stable interincisal angle (less than 150)  
  4) Reliving crowding  
    
    
    
    
  Treatment options:  
  1- Accept the malocclusion( if you have a mild case, e.g. 4 mm OVJ with competent lips)  
  and we also accept the malocclusion if the risk outweighs the benefit.

2-Extractions ONLY (rarely fixes the problem , as we usually end up with spaces and tilted teeth)  
3-Removable appliances  
4-Functional appliances  
5-Single arch fixed (upper arch treatment if the lower is okay)  
6-Upper and lower arch fixed  
7-Orthognathic surgery (in severe cases)  
  
\*Just in class 3 cases we can extract from the lower arch alone..normally in class 2 w extract from both the lower and upper .  
\*mild means slight rotations, slight crowding, OVJ is not exceeding 4 mm.. (little to no treatment needed according to IOTN, falls in the range of grade1-2.)   
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Extractions ONLY:  
  
-Done when the patient can't undergo orthodontic treatment, just to relief crowding in lower/ upper arch.  
-The canine should be angulated mesially so it can take up 1/2 of the space left after extraction, the rest of the space will be occupied by the mesial drifting of the posterior teeth.  
 -It's very rare to need extractions only with no orthodontic treatment and sometimes we do it if the patient can't afford orthodontic treatment.  
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SOME SCENARIOS:  
  
1) Molar relationship of half a unit class 2 or less + well aligned lower arch  
options:  
-Distalize the buccal segment to achieve a class 1 molar relation, then you retract the canines and then retract the incisors and with that we reduce the overjet. (The buccal segment is distalized half a unit or less..we can use a headgear )  
  
2) Molar relationship more than half unit class 2 + well aligned lower arch  
options:  
-Distalizng the buccal segment will take a long time. (we can do that, but it takes a lot of time)  
-It's much easier to EXTRACT in this case  
\*) we aim for a full unit class 2 molar relationship>>stable   
\*) so we extract in the upper arch only..  
\*) then we retract the canine (which will end up as in class 1) and the 6 will move mesially ending up in a full unit class 2  
Note:  
\*\*\*\*We accepted the full unit class2 because we didn't want to extract in the lower arch as there is no crowding or need to do so..   
  
3)Molar relationship of half a unit class 2 + crowding in lower arch  
options:  
-**Extraction in lower and upper arch (1st premolar ) +orthodontic appliance**   
now for this point you have to imagine !  
In the lower arch the canine will fill half the space and the rest will be filled by the buccal segment...  
IF the same happens in the upper >>the molar relationship will REMAIN uncorrected !  
so, what we need is **to fix the upper 6 in place** (so that the Molar relationship is corrected to class 1) and then retract the canine .

Note: Anchorage is something to keep in mind at all times, it's because we will have less anchorage if we extract the 5 and more mesial drift of the posteriors , that we chose the 4 to extract.  
Also anchorage is needed to fix the upper 6.  
  
4) More than a half unit class 2 + crowded lower arch  
-We need to extract in the lower and also distalize in the upper (if we don't distalize we will still end up with a full unit class 2 canine relationship and an increased overjet).  
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When can we us a removable appliance?  
- When only tipping movement is needed  
  
The Dr. showed a case in which the **upper 4's were first extracted**, then **the canines were retracted**/**Distalized** (with a palatal finger spring -if the canines are in the line of the arch- //or a buccal canine retractor -if the canines are buccally displaced- )  
-After the canines become in class 1 relation,, the 2nd stage of URA is intiated.  
In the previous case.. assume the patient had an increased Overbite,,, we use an Anterior bite plane to reduce the OVB.  
-Once you retract the canines..you hold them in place with stops and put a Robert's retractor to retract the incisors.  
  
Again the steps simply :  
-extraction of the 4's  
-distalization of the 3's into class1  
-stops to hold the 3's in place  
-retraction of the incisors (by robert's)  
  
Retention: Adam's on 6's /southend clasp on 1's  
  
Anchorage should be planned as well.. in the previous case the baseplate provided enough anchorage.  
In case we needed more anchorage..tubes are soldered to adams' and headgear is used.

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Let's talk a bit about anchorage:  
Assume you want to distalize the 6's and you didn't provide enough anchorage in your design.  
What happens is that the anterior teeth will move more anteriorly causing the overjet to increase!  
The best thing to do in this case to negate the force that is causing the anteriors to move by using a head gear which will transmit a distal force to the baseplate. This will distalize the 6's and cancel the unwanted force on anteriors. This is the concept used in Twin screw appliance with head gear( in which the 7's are extracted then a headgear tube is soldered to Adam's clasp )  
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Another appliance we may use is: En Masse appliance   
It's used to distalize and expand the buccal segments..also used with a head gear  
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Now, HOW do we measure our treatment progress and assess our anchorage:  
-Measure and record changes in tooth position at each visit (APPLIANCE should be removed from pt's mouth first)  
-Use reproducible points or points that are fixed (for example if we are retracting the upper canine and we measure from the tip of the upper canine to the upper molar.. it may give us a wrong reading if the molar moved.. so we try to take a point that is reproducible such as the lower molar if we are not treating the lower arch, and measure from the canine to the lower molar)

- While we are retracting the canines.. anchorage loss could happen... Anchorage loss is noticed if :  
A) OVJ INCREASES >> incisors move anteriorly  
B)MOLAR RELATION (increase in class 2)>> molars move anteriorly   
\*\*Anchorage loss should be checked at every visit, as it's very easy to lose anchorage and very difficult to regain it.  
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Another option is to use a FUNCTIONAL appliance:  
- In growing patients

-prior to pubertal growth spurt (10-12 in females and 12- 14 in males)  
-It works more on the mandible than on the maxilla (as opposed to headgear which works on the maxilla)  
-Normally used if we have a retrognathic mandible

-Lower facial height or the FMPA should not be too high.. because functional app. increases the lower facial height.  
-So we should have a reduced or avg. lower facial height to begin with.

-Upper incisors should be proclined (we can still use it in class 2 div 2.. but we procline the upper incisors first then we use functional)

-Lower incisors should be either average or retroclined (because the dental effect of functional is to procline the lower incisors)  
  
ex of functional appliances :Medium opening activator/ twin block/ anderson  
(note: for class 3 we may use twin block or frankel)

Whatever functional appliance you end up using for class2 the end result will be to retrocline the uppers and procline the lowers.  
It also has skeletal effect, it encourage the re-direction of growth of the mandible ( to come forward)  
  
The dr. showed us a case of class2 with deep OVB and the end results after using medium opening activator.(it works! )>> we chose MOA because it extrudes the posteriors allowing for the deep bite to be corrected (as if the lower incisors are intruded).

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Another treatment option is FIXED appliance:  
  
-It is used for all the movements that a removable can't do  
ex: rotations, bodily movement...  
  
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NOTE:   
OVB reduction in ADULTS using REMOVABLE appliances (ant bite plane>> works by extruding posterior teeth) will NOT be stable. As there is no growth in adult patients this will cause relapse.  
  
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Early mixed dentition treatment indications:  
  
- Normally we don't treat in the early mixed, because it will prolong our treatment and the end results will be the same! (if we choose to treat the patient before the age of 10 we will need a two phase treatment ..we start then stop for 2-3 years then continue after )..this 2 phase treatment will have the same result to single phase treatment (which initiates at late mixed/early permanent)  
- The few indications include:  
a) psychological stresses on the patient (being bullied at school for his appearance)  
b)pt at increased risk for dental trauma ,OVJ very increased. (10 year olds with 9mm OVJ have x2 risk )  
-Other than that..we start our treatment normally at the growth spurt of the pt (functional then fixed later on for ex)   
- Stability of treatment at this stage is an issue. It's also affected by soft tissue maturity.  
-Another issue we have is the position of the canines in relation to the roots of the laterals.( If the canines are still unerupted, be careful not to endanger them and the roots of the laterals, by tipping the laterals against the canines. This will cause resorbtion of the lateral roots.  
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Treatment in late-mixed and permanent dentition:

-Deep OVB should be corrected first (using an anterior bite plane), before reducing the OVJ

- For stable OVB correction:  
a)We should have a favorable incisor edge- centroid relationship ( lower incisor's edge should lie at or 2mm infront of the upper incisor's centroid or else OVB reduction won't be stable).  
b) Interincisal angle should not be more than 150 degrees. (use prognosis tracing)  
  
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notes:  
-Extractions depend on the amount of space required to relieve crowding and reduce OVJ.  
If we need just some space we can extract the 5's.. if severe crowding exists we can extract the 4's.  
- Post-treatment stability depends on:   
 skeletal factors, soft tissue factors, and occlusal/dental factors.   
Accordingly, you should plan for retention (whether long term or short term).

- Skeletally : we prefer to have an anterior growth rotation for stability rather than a posterior growth rotation.(reduced LFH rather than increased LFH)

-Soft tissue : we have to have competent lips and lower lip covering 1/3 of upper incisors for stability, if that's not the case.. OVJ correction will relapse if we don't use permanent retention.

-Dental factors: Spacing between the teeth...rotations..may need permanent retention