Sheets 13, 14 from 4th year <3

What are the types of orthodontic appliances? Fixed, removable and functional appliances .

In ortho we need the lightest force that causes tooth movement ;force is proportional to deflection and radius (to the power of four) , and inversely proportional to the length -

**This summary is for removable ;**

-What are the **removable appliances** made of? Acrylic and wires combined together to move teeth .

-Do we use removable appliances in the lower arch? Generally removable appliances are limited to the upper arch because they are less tolerated by patients due to their encroachment upon tongue space and the lingual tilt of lower teeth make them more difficult to apply in the lower arch. But there are some cases we use removable appliances in the lower arch.

the components of removable orthodontic appliances?

A active , R retentive , A anchorage , B base plate.

Part one-Active components :

The part of the appliance that causes tooth movement .

Its either : springs , elastics , screws , bows

' The center of resistance' : the part of the tooth that would result in bodily movement -note

We need at least 3 point of retention (two posterior and one anterior), and when iam using screws I need 4 points

-What are the disadvantages of screws? Patient cooperation ,more expensive than wires , more bulky.

Principles of bows design :

-Robert's retractor : when a patient comes after extraction and we need to close the space with a removable appliance . its used for retraction of anterior teeth.

-The other type is called labial bow, the difference between them is that there is no coil and just a U loop. So we activate it by squeezing the U loops.

Retentive component -

It’s the part of the removable appliance that functions to resist vertical displacement

Adam's clasp is used on posterior teeth engaging the undercut regardless of the level of the gingiva.

 Head gear : takes its support from the head of the patient , has inner bow attached to six's to retract them or hold them in place . A tube is soldered onto the bridge of adam's for extraoral bows.

Another retentive component is the ball end clasp, here we have a ball soldered to the wire this clasps are designed to engage the undercut interproximal (in the embrasure), and it's used only with lower incisors.

Another retentive component is the plint clasp .used to retain the removable appliance in the case of using both a removable and fixed appliance at the same time

Anchorage-

Anchorage is defined as resistance to unwanted tooth movement .

base plate-

It's the part that hold all the components together

Base plate is made of acrylic, we use the cold cure acrylic.

Heat cure acrylic's durability is better but we don’t care about durability because the appliance will be used for a limited period of time so its easier to use cold cure acrylic.

\*\*Why do we design the base plate so that it engages all the teeth? ( benefits of base plate )

1 } For anchorage ,

2 } pts with deep over bite ..

 Increasing the thickness of acrylic behind the upper incisors forming a flat anterior bite plane onto which lower incisors occlude and cause separation posteriorly and the posterior teeth will overerupt

3 } posterior bite plane used to cause disocclusion .

Posterior bite plane is made by covering the occlusal planes of teeth with acrylic this will cause separation of the anterior teeth , that will NEVER lead to over eruption of incisors since in the normal occlusion

\* What are the things I can achieve using the removable appliances?

 1)Tipping movement : by applying force away from the center of resistance we cause tipping movement and rotation around the center of resistance.

2) movement of block of teeth

 3) influence the eruption of teeth ( the ant. Bite plane principle of action)

 CONTAMPORARY use of removable appliance

**Functional Appliances**

**Definition of functional appliances:** they are either fixed or removable that utilizes, eliminate, or guide the forces of muscle function, tooth eruption and growth to correct malocclusion, so the end result is that I want to correct malocclusion, how? By using muscle function

The patient must be in **a growing phase more specifically in growth spurt period**. Growth spurt is an increase in growth in a short period of time.

\*\* only Appearance and psychological effect is a justification for starting treatment early.

**Types of malocclusion to be treated with functional appliances:**

**Class II division I 🡪** (ideal case of treatment with a functional appliance)

**Class II division II**

**Class III**

**classifications of Functional Appliances:**

1st classification: Tooth borne vs Tissue Borne

Tooth borne: Presence of clasp, example: adam’s clasp on the molar

Tissue borne: the teeth are not touched, instead the appliance is applied on the soft tissue

2nd classification: Active vs Passive

Active: an intrinsic force generation arrangement must be present. Example: presence of a Z-spring.

If such a component is not present then it is a passive functional appliance

**\*\* types :**

1. **Twin Block**

Made of two blocks one upper one lower, the patient can speak, eat and wear it 24 hours. However **the main disadvantage is the open bite**. No overeruption of the posterior teeth due to the presence of two blocks. Hence when patients are done with the treatment the orthodontist is left with a huge overbite that he has to deal with.

1. **MOA (medium opening activator)**

Made of one unit (block), the patient is forced to posture his/her mandible forward to fit into the incisor cap for him/her to bite. The patient cannot speak, eat, and cannot wear it 24 hours. There is a whole for breathing. Main advantage: posterior teeth are always exposed and the problem with the overbite in the twin block is not present here.

1. **Herbst:** Fixed-functional

There is a section attached to the upper buccal segment and a section attached to the lower buccal segment teeth. These sections are joined by a rigid arm that postures the mandible forward. Main advantage: no need for patient’s co-operation since it is a fixed functional and it is also a faster treatment. Main disadvantage: breakage inside the patient’s mouth and is much more expensive compared to the twin block

**D)Frankel** **Appliance**:

Purely tissue borne (the only type). All its retention comes from the soft tissues. Recall that the teeth are in balance due to the forces of the tongue (pushing the teeth forward) and the lips (pushing the teeth backwards), by removing one of these forces, I can move the teeth and this is the principle of Frankel.

Used for class II (put on the lower lip)- called Frankle II : used to procline the teeth

If we put the appliance on the upper lip – the teeh will procline to correct Class III – called Frankel III

Disadvantages: difficult to wear, expensive to make and is troublesome to repair. We don’t really use it anymore.

Upon clinical trials it was found that :

* The changes caused by the functional appliances are due to dentoalveloar changes. (80%)
* Some minor skeletal changes occurred (20%)

Failure of functional appliances: 20% why?

* Patient related problem (doesn’t wear it)