Orthodontics

Fixed Appliances

are devices or equipments that are attached to the teeth, cannot be removed by the patient and are capable of causing tooth movement .

Indications of fixed appliances

- correction of mild to moderate skeletal discrepancy
- intrusion and extrusion of teeth
- correction of rotation
- overbite over jet reduction
- multiple tooth movement

Advantage

- Precise control over force distribution to individual teeth
- Multiple tooth movement can be performed
- It is more comfortable than removable or myofunctional appliance and does not depend on the patient wear since it fixed in his mouth

Disadvantages

- Expensive
- Require great skill
- It takes more chair time
- It needs good oral hygiene

Different between removable and fixed appliance

The removable appliances produce tipping only,No control over root movement ,need Pt's co-operation and more .hygienic.But fixed Appliance .Bodily translation,Control of root movement Less dependent on pt's co-op, difficult to clean it.

Components of fixed appliance

-Separators

Types

. Metal : brass wire which is twisted tightly around the contact and left in place for 5-7 days •

• Elastomeric separators

• Springs which exert a scissor action above and below the contact

Function

It creates space among teeth to be banded for easy placement of orthodontic band, it needs 5-7 days

-Bands:

these are rings encircling the tooth to which buccal and lingual attachments are soldered or welded, mostly used on molars and it can be used on any tooth.

Indications of Banding

. Teeth that will receive heavy intermittent forces against the attachment

.Teeth that will need both labial and lingual attachment

. Teeth with short clinical crown

. Tooth surfaces that are incompatible with successful bonding

tight inter proximal contacts make impossible to properly seat a band so separato

Although separators are available in many varieties the principle is the same a device to force or wedge the teeth apart is left in place long enough for initial tooth movement to occur so that teeth are slightly separated before banding

band pusher is required to finally seat the band; excess cement is wiped off the occlusal surfaces.

Materials for Band Cementation

-Zinc phosphate orthodontic cement is supplied by the manufacturer in a powder-liquid form.

Zinc phosphate orthodontic cement must be mixed thicker than the cement that used for an inlay or a crown

-Glass ionomer cement of fluoride release also can be used as it has low cariogenicity-

BRACKETS

A divided according to:

MATERIALS

-Stainless steel

They were an esthatic improvement over the previously used bands , they are made from corrosion resistant stainless steel alloys , they are easy to manufacture , tough and cheep . Moreover they can be produced by casting or from thin metal strip material that is stamped to shape

- Plastic brackets

The first type of plastic was made of polycarbonate and plastic molding powder . So pure plastic brackets may be useful in minimal force situation and treatment of short duration , their main disadvantage is discoloration . Advantage is esthetic .

- ceramic brackets

They are mainly composed of aluminum oxide, they are bonded to enamel by mechanical and chemical retention , they have advantage of being esthetically acceptable

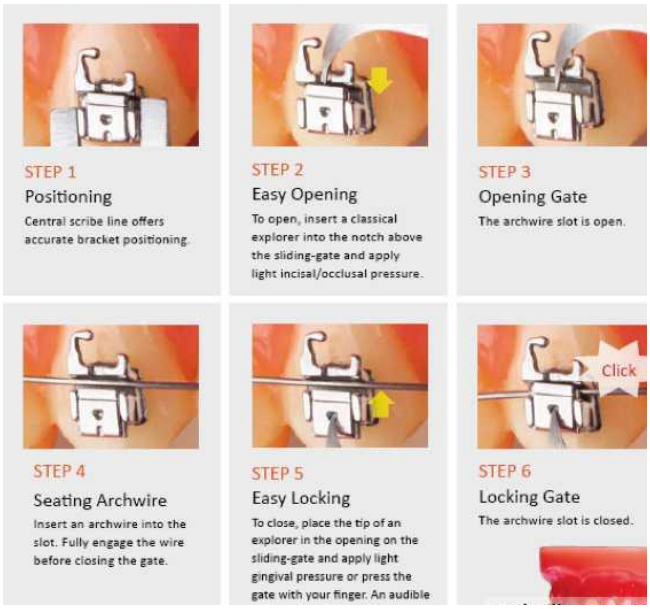
- Titanium brackets

They have good properties such as resistance to corrosion , low density , modulus, high strength , and biocompatibility with biological tissues . But are very expensive .

Lingual BRACKETS

Advantage:
• esthetic
• Disadvantage:
• 1- higher cost.
• 2- more time .
• 3- difficult in adjustment.
• 4- discomfort to patient

SELF LIGATING BRACKETS



Advantage of self ligating brackets

• reduced friction.
• Decreased treatment time.
• Less chair side assistance.
• Less patient discomfort.
• Improve oral hygiene.

Disadvantage

1- higher cost
2- breakage of the clip or slide

Slot Shape

-Vertical rounded slot

-Horizontal rectangular slot

-Combination

NO. of wings

-Single : 2 wings

-Twin : 4 wings

-Triple: 6 wings

Design

-Standard

-Straight wire appliance(preadjusted) by varying:

thickness of bracket base giving different buccolingual prominence

Inclination of horizontal slot with long axis giving different mesio-distal angulation

Inclination of horizontal depth with labial surface giving different buccolingual Inclination (Torque)

Measurements

-Vertical depth: 0.018 or 0.022”

-Horizontal depth: 0.025 or 0.028 or 0.030”

Technique of bonding

-Direct bonding in which direct attachment of orthodontic appliances to etched teeth using chemically and light cure adhesives. It is most popular due to its simplicity and reliability

-In direct bonding in this technique the brackets were first positioned on study casts with water soluble adhesive and then transferred to mouth with a custom tray.

ARCHWIRES

Ideal Properties

Springback, stiffness, Resilience, Joinability, Biocompatibility, Friction Characteristic

Material

-Stainless Steel

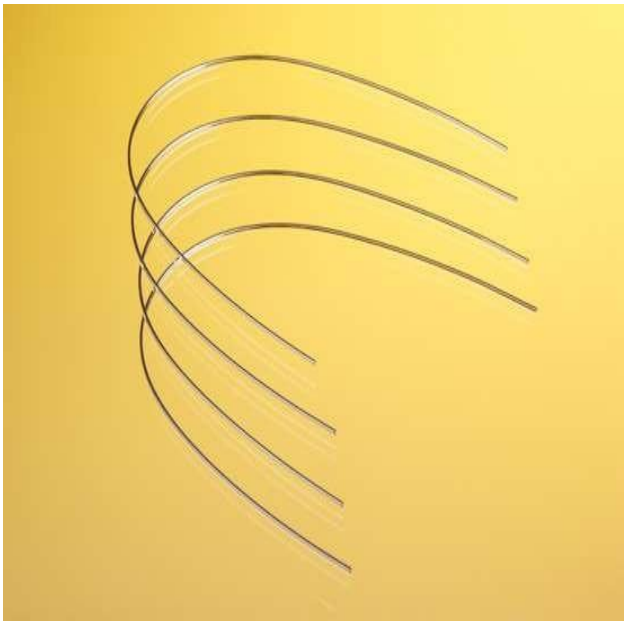
-Nickel Titanium

-TMA (Titanium Molybdenum Alloy)

-Cobalt-chromium Co-Cr

Titanium-niobium

Glass fiber



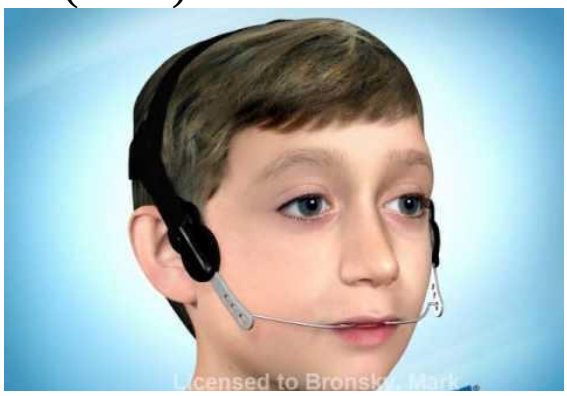
Auxiliaries

power chains :- are placed on adjacent teeth and are used to close space

Open and closed coil

Lingual arch and transpalatal arch to increase anchorage

Extra-oral appliance (EOT)



MOLAR TUBE

-Development of contemporary fixed appliance

-E-Arch

Only heavy interrupted forces. Only tipping movements achieved Unable to precisely position any individual tooth

-Pin and Tube

Improvement on E-arch Bands on other teeth with vertical tubes into which soldered pins were placed Pins repositioned at each appointment to bring about tooth movement It needed many small adjustments Limited mesiodistal movements Difficult to use

-Ribbon Arch

Archwire was small enough to have good spring qualities and efficiently aligned malposed teeth

Major weakness of the appliance was that it provided

relatively poor control of root position

Resiliency of the ribbon archwire did not allow generation of moments necessary to torque roots to a new position

Incisogingival and buccolingual tooth movements were possible but mesiodistal tooth movements could not be achieved

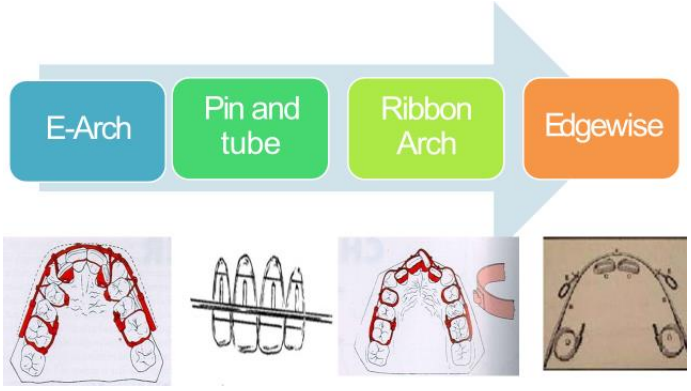
-Edgewise

Ability to move teeth in all 3 planes of space

Good control over tooth movement

Bodily movement possible

Precise finishing possible



Disadvantage of edge wise of Angle appliance

Heavy forces required Complex wire bending

Increased friction

Extraoral forces for anchorage required

Difficulty in opening deep bites

EDGEWISE TECHNIQUE IN WIRE BENDING

PURPOSE
COMPENSATION
First Order/In and Out bends
To compensate for difference in thickness of labial surfaces of individual teeth
Compensated by built-in variation in thickness of bracket base
Second Order/ Tip back bends
Required for mesiodistal root positioning
Compensated by angulating bracket base or bracket slot
Third Order/ Torque bends
Required to compensate for the difference in inclination of facial surface to the true vertical
Bracket slots are inclined to preadjusted appliances to compensate for third order bends

CONTEMPORARY EDGEWISE

- Major steps in evolution of edgewise include :

Automatic rotational control

Alteration in Bracket Slot Dimensions

Straight Wire Prescriptions