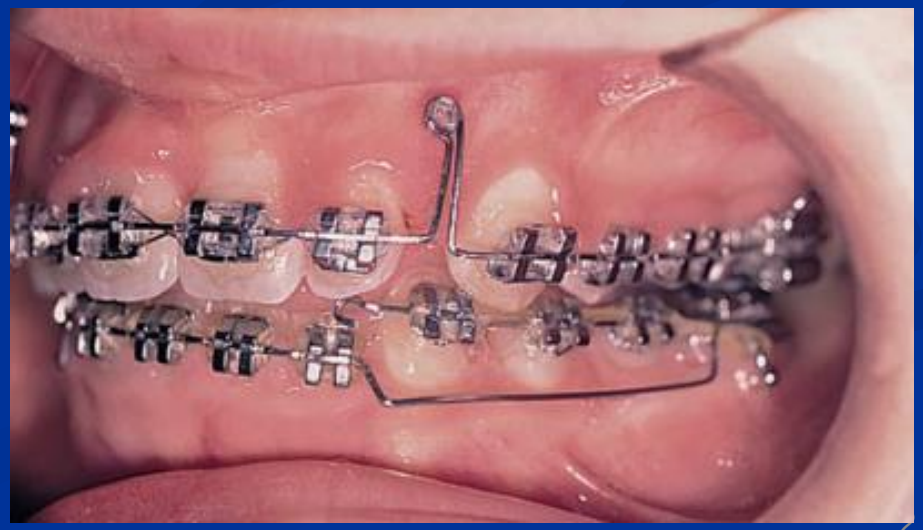
Fixed Orthodontic appliances

Appliances that have attachments fixed (brackets, buccal tubes, bands...etc.) onto tooth surfaces, the orthodontic force applied on these attachments by using archwires and/or auxillaries.

Advantages of Fixed Orthodontic appliances

1. Precise control over force distribution to individual tooth is possible.
2. Multiple tooth movements: Fixed appliances allow for the control of position of several teeth during treatment.
3. Patient cooperation is reduced in comparison with removable appliances.
4. Fixed appliance produces variety of tooth movement, e.g. bodily movement, rotation, uprighting, torquing, and intrusion.



Disadvantages OF Fixed Orthodontic appliances

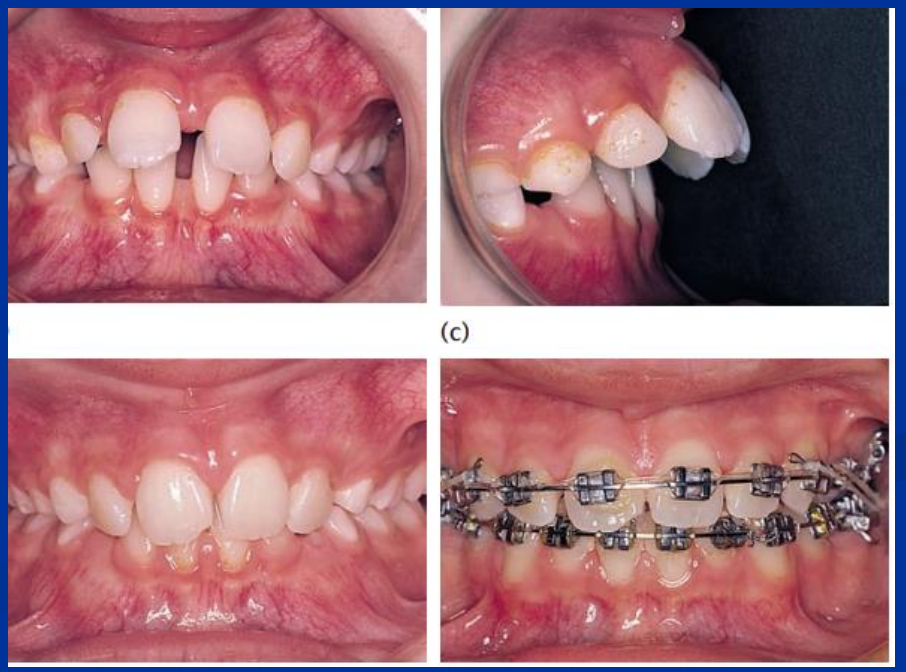
1. Oral hygiene requirement.
2. Esthetic requirement
3. Fixed appliance technique is complex and requires special training.
4. Chairside time is long
5. Anchorage control is difficult.
6. The possibility of producing adverse tooth movement.
7. Increase cost of treatment.

Indications of Fixed Orthodontic appliances

Fixed appliances are indicated when precise tooth movements are required.

1. Correction of mild to moderate skeletal discrepancies: as fixed appliances can be used to achieve bodily movement it is possible, within limits, to compensate for skeletal discrepancies and treat a greater range of malocclusions.

2. Intrusion/extrusion of teeth.



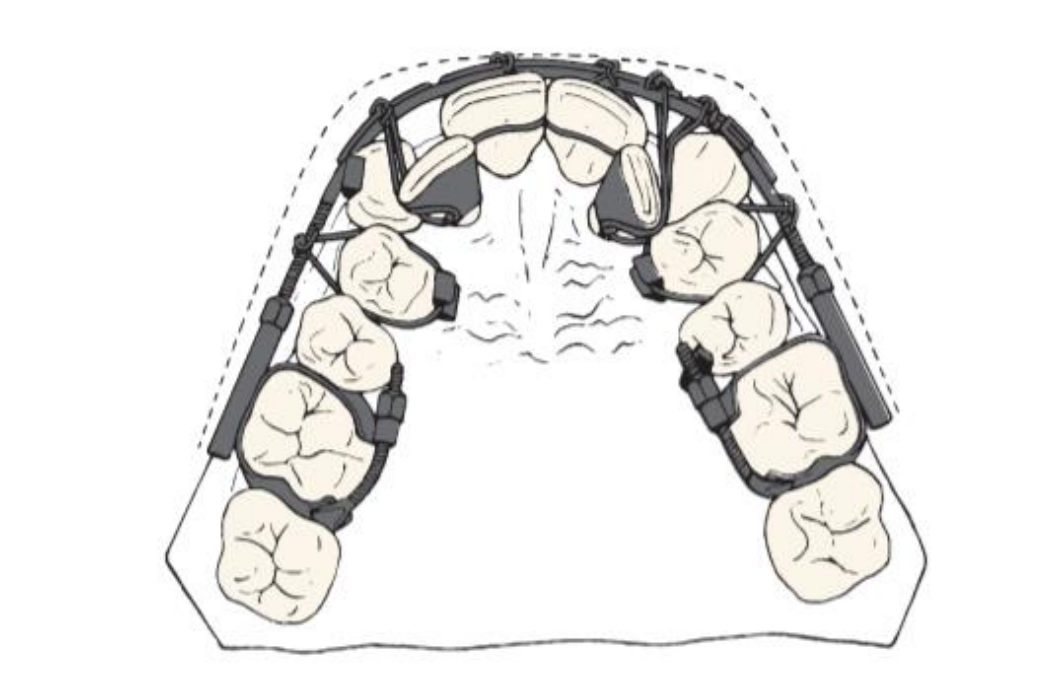
Indications of Fixed Orthodontic appliances

3. Correction of rotations.
4. Overbite reduction by intrusion of incisors.
5. Multiple tooth movements required in one arch.
6. Active closure of extraction spaces, or spaces due to hypodontia.

the development of contemporary Fixed Orthodontic appliances

Edward Angle's as the "father of modern orthodontics" is based not only on his contributions to classification and diagnosis but also on the creativity in developing orthodontic appliances.

E-arch

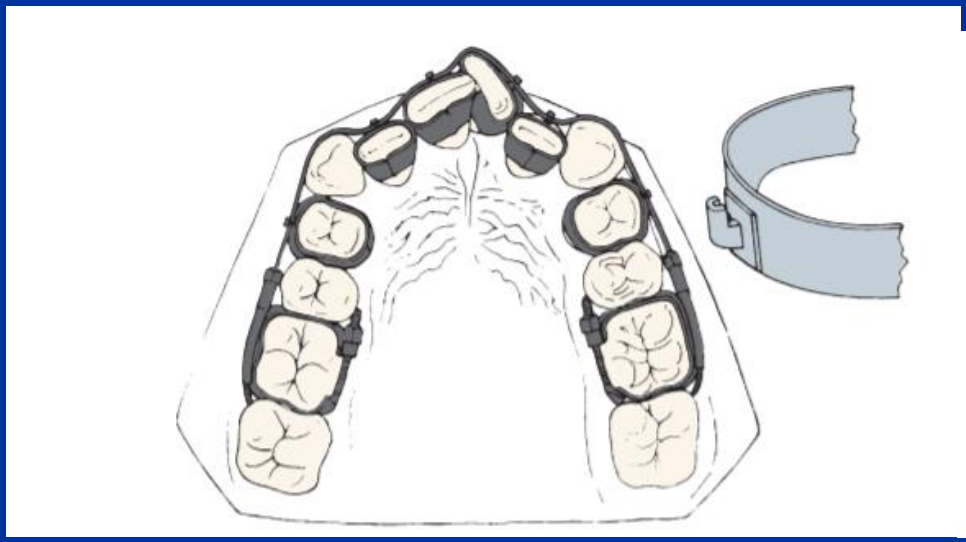


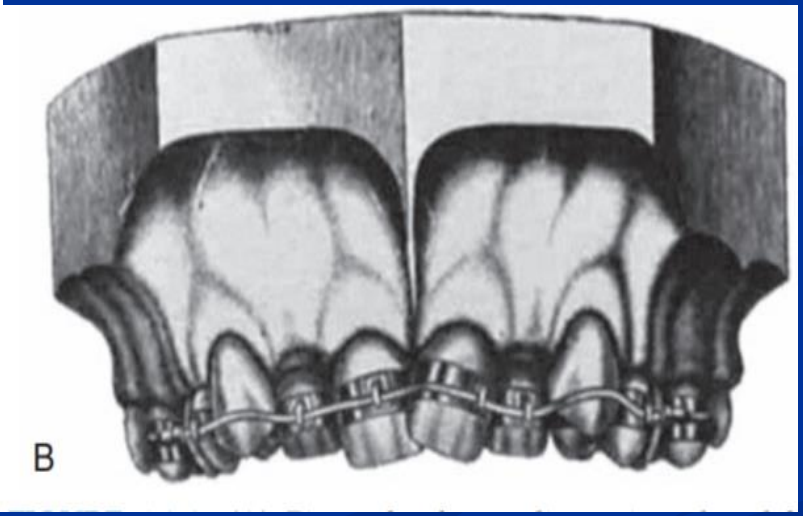
Edward Angle's E-arch from the early 1900s. Ligatures from a heavy labial arch were used to bring malposed teeth to the line of occlusion.

Historical development of Fixed Orthodontic appliance types

Ribbon arch

Angle ’s ribbon arch appliance, introduced about 1910, was well adapted to bring teeth into alignment but was too flexible to allow precise positioning of roots. It was the first introduction of brackets. Used a gold wire of 10*20.





Historical development of Fixed Orthodontic appliance types

Edgewise:

Angle's edgewise appliance received its name because the archwire was inserted at a 90-degree angle to the plane of insertion of the ribbon arch to overcome deficiency in ribbon archwire.

The Begg appliance uses a modification of the ribbon arch attachment, into which round archwires are pinned. A variety of auxiliary atchwires were used in this system to achieve more control of root position.

Contemporary Edgewise

Preadjusted Edgewise Brackets "straight-wire" appliance. It eliminated the difficult wire-bending procedures in conventional edgewise by modifying the brackets

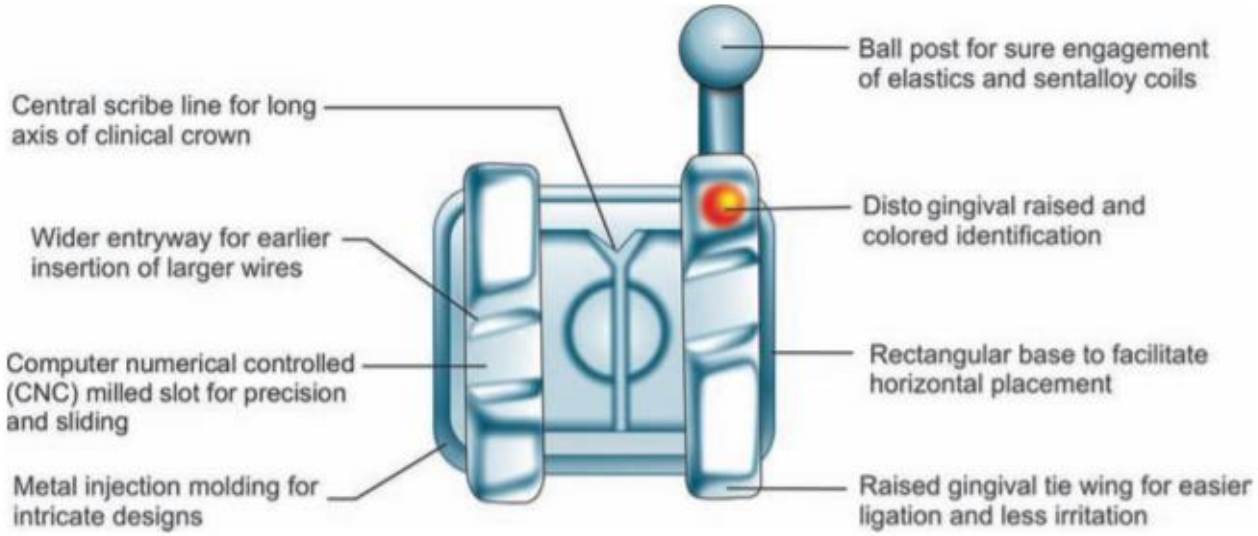


FIGURE 26.10 Parts of straight-wire brackets.

Parts of straight-wire brackets.

Components Fixed Orthodontic appliances

- Attachments
- Archwire
- Auxilaries.

Components Fixed Orthodontic appliances

Attachments (**passive components**):

- Bands
- Buccal tube
- Brackets
- Lingual attachment (button, cleats, eyelets, sheath…etc.)
- The attachment may be welded to bands, or directly placed to the tooth surface.

Components Fixed Orthodontic appliances

- Bands

These are rings encircling the tooth to which buccal, and as required, lingual, attachments are soldered or welded.

Prior to the introduction of the acid-etch technique (1980s), bands were the only means of attaching a bracket to a tooth. With the development of modern bonding techniques, directly bonded attachments became popular

Components Fixed Orthodontic appliances

However, many operators still use bands for molar teeth, particularly for the upper molars when headgear or a cemented palatal arch is to be used.

Bands can be used on teeth other than molars, most commonly following the failure of a bonded attachment, but for aesthetic reasons bonds are preferred

Fixed appliance case where bands have been used for the canines, premolars and molar teeth. The impact of bands upon the aesthetics of the appliance can be readily appreciated.

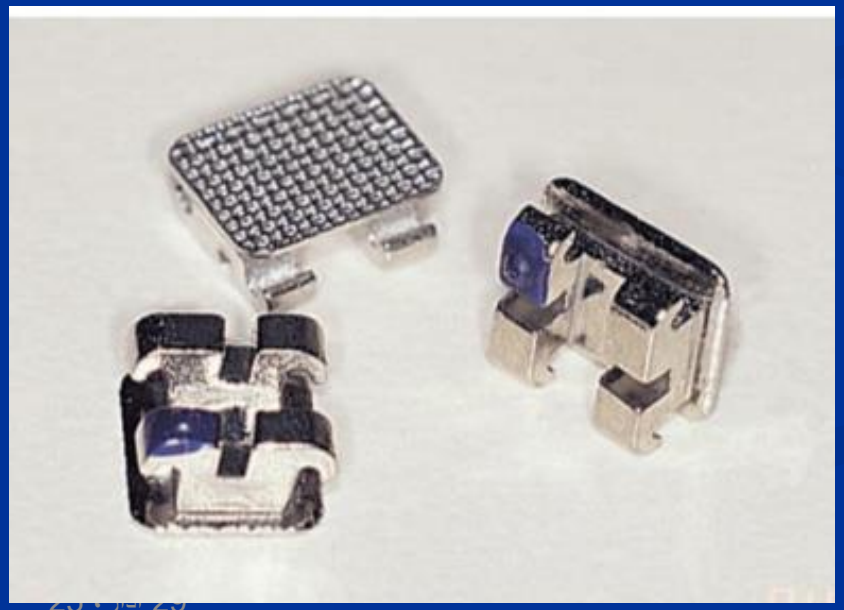
Components Fixed Orthodontic appliances

Buccal tube

Components Fixed Orthodontic appliances

- Brackets

Bonded attachments were introduced with the advent of the acidetch technique and the modern composite. Adhesion to the base of metal brackets is gained by mechanical interlock. It made up of base, stem with bracket slot, and some form of hook used for intermaxillary attachment of elastics or coil.



Bracket types

There are many types can be classified as follow

- According to the material
- According to the prescription
- According to the slot size
- According to the ligation method.

Components Fixed Orthodontic appliances

Lingual attachment (button, cleats)

Components Fixed Orthodontic appliances

Minscrew (temporary anchorage device)

Components Fixed Orthodontic appliances

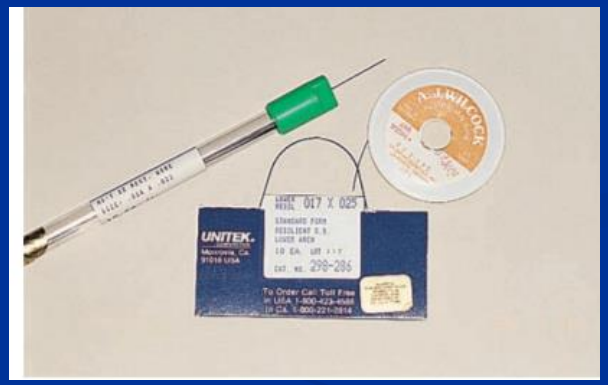
Active components:

- Archwires
- Ligature wires & elastics
- Separator
- Elastics (extra and intraoral)
- Springs
- Palatal or lingual arch
- Expansion screw

Components Fixed Orthodontic appliances

Archwires

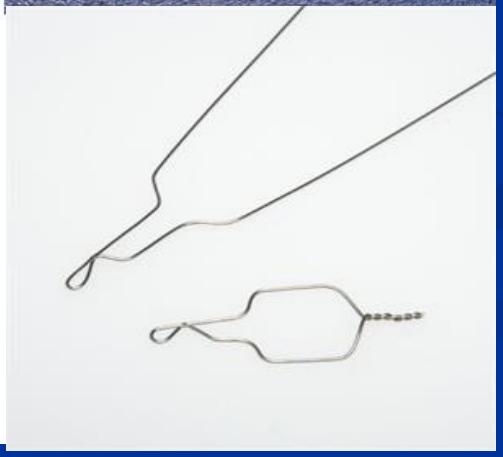
Once an operator has chosen to use a particular type of bracket, the amount and type of force applied to an individual tooth can be controlled by varying the cross-sectional diameter and form of the archwire, and/or the material of its construction



Components Fixed Orthodontic appliances

Ligature wires & elastics

Very small elastic bands, often described as elastomeric modules or wire ligatures are used to secure the archwire into the archwire slot. Elastic modules are quicker to place and are usually more comfortable for the patient, but wire ligatures are still used selectively as they can be tightened to maximize contact between the wire and the bracket.



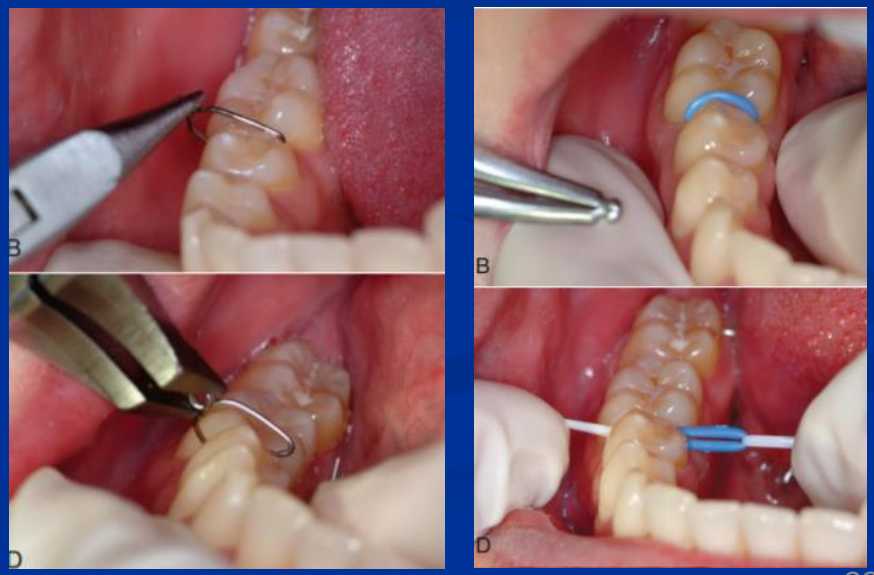
Components Fixed Orthodontic appliances

- Separators

  Metal separators

  Elastic separators

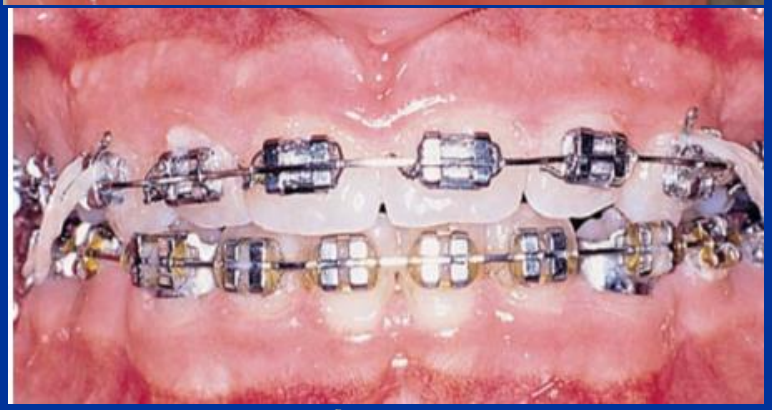
Tight interproximal contacts make it impossible to properly fit a band, which means that some device to separate the teeth usually must be used before banding.

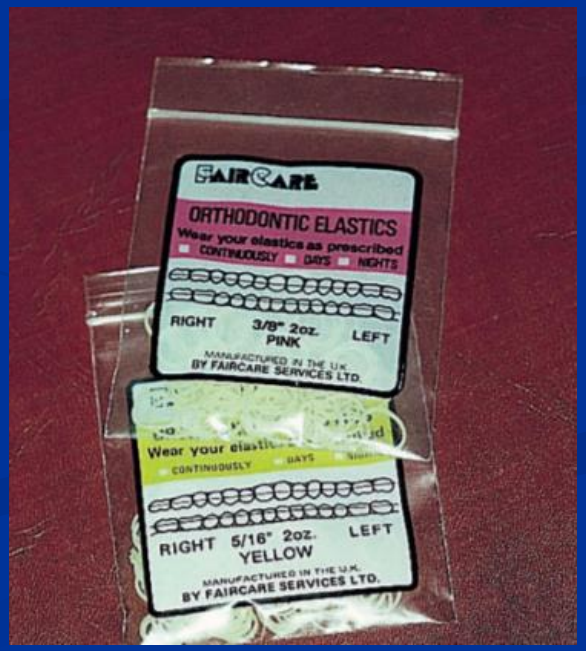


Components Fixed Orthodontic appliances

Intra-oral elastics

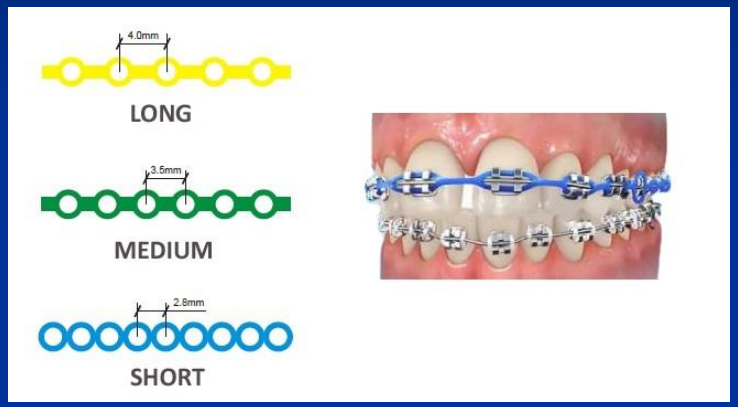
Intra-oral elastics for traction are commonly available in 2-, 3.5- and 4.5-ounce strengths and a variety of sizes, ranging from 1/8 to 3/4 inch. For most purposes they should be changed every day. Latex-free varieties are now available.





Components Fixed Orthodontic appliances

Power chain



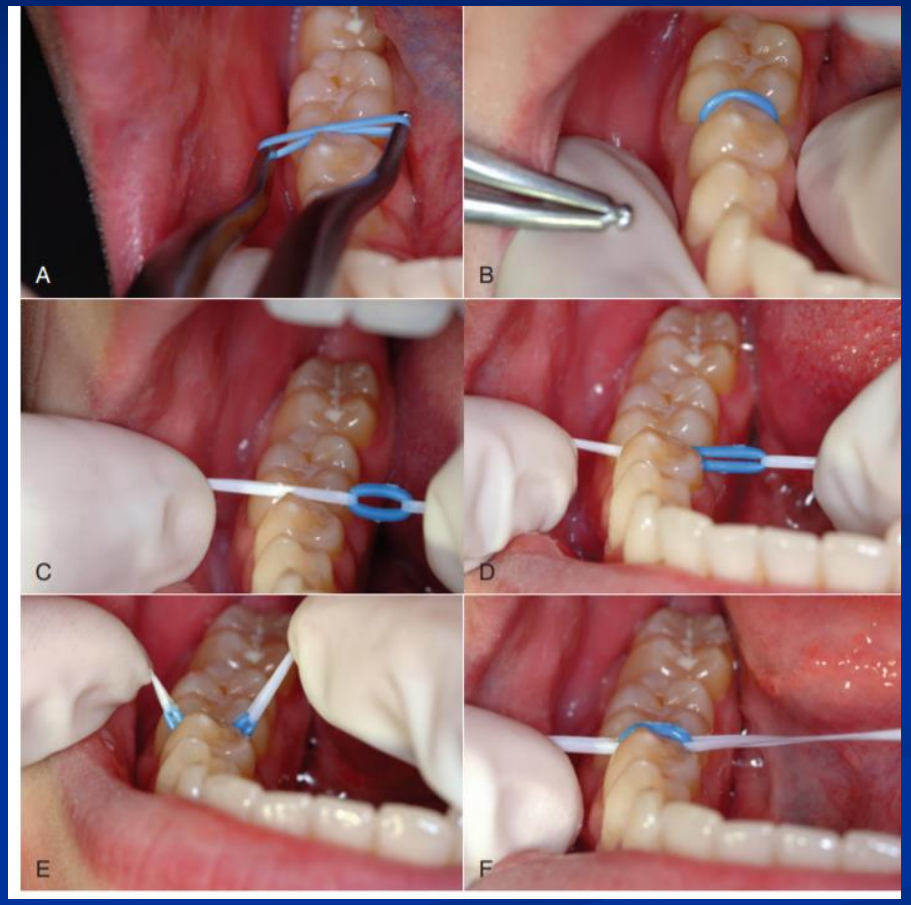
Springs

Expansion screws

Number of indications still exist for using band over bonding attachment :

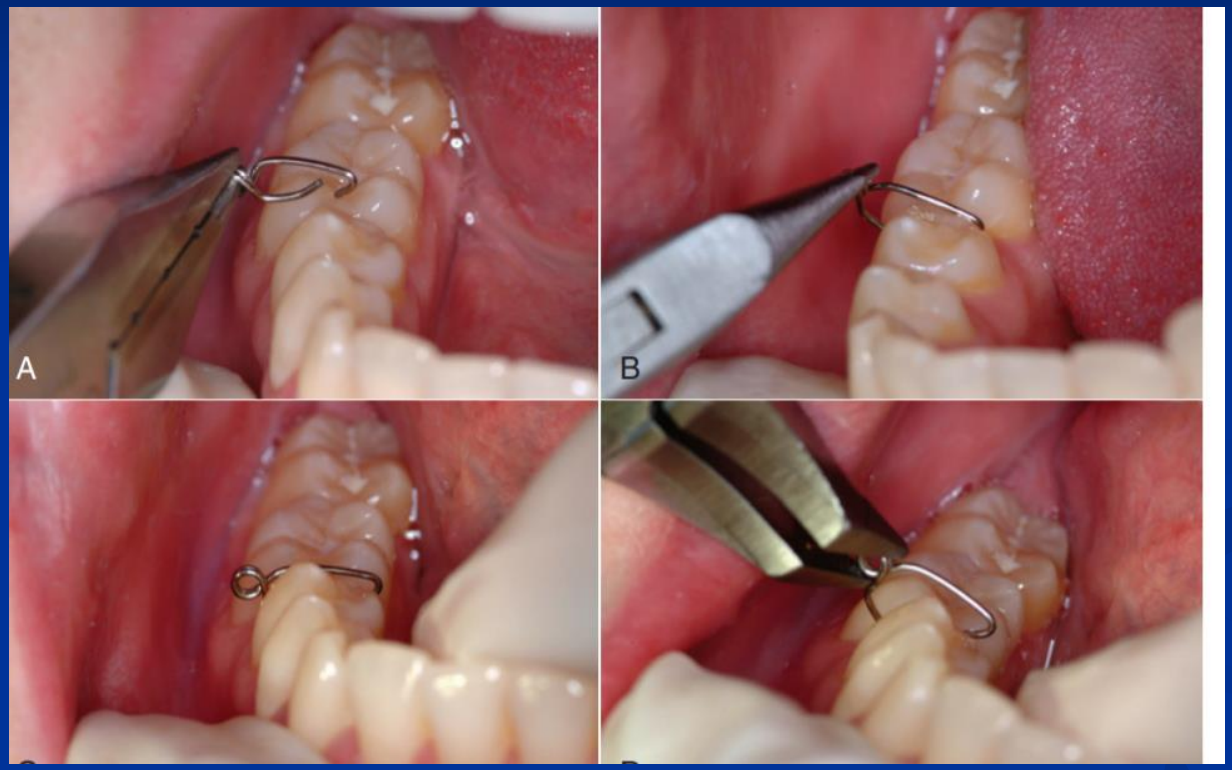
- Heavy intermittent forces against the attachments. This is the primary indication for banding. An excellent example is an upper first molar against which extraoral force will be placed via a headgear.
- Teeth that will need both labial and lingual attachments, such as a molar with both headgear and lingual arch tubes and transplatal arch.
- Teeth with short clinical crowns, so that bonded brackets are difficult to place correctly.
- Teeth with extensive restorations

banding of Fixed Orthodontic appliances



Separation with an elastomeric ring or “doughnut.”

banding Fixed Orthodontic appliances



Separation with steel separating springs

lingual Fixed Orthodontic appliances