

Contemporary Fixed Appliances

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CONTEMPORARY ORTHODONTICS, Proffit, 6th Edition

Proffit, CO Chapter 15, 16 and 19



THE UNIVERSITY OF
WESTERN AUSTRALIA

FACULTY OF
Medicine and Dentistry



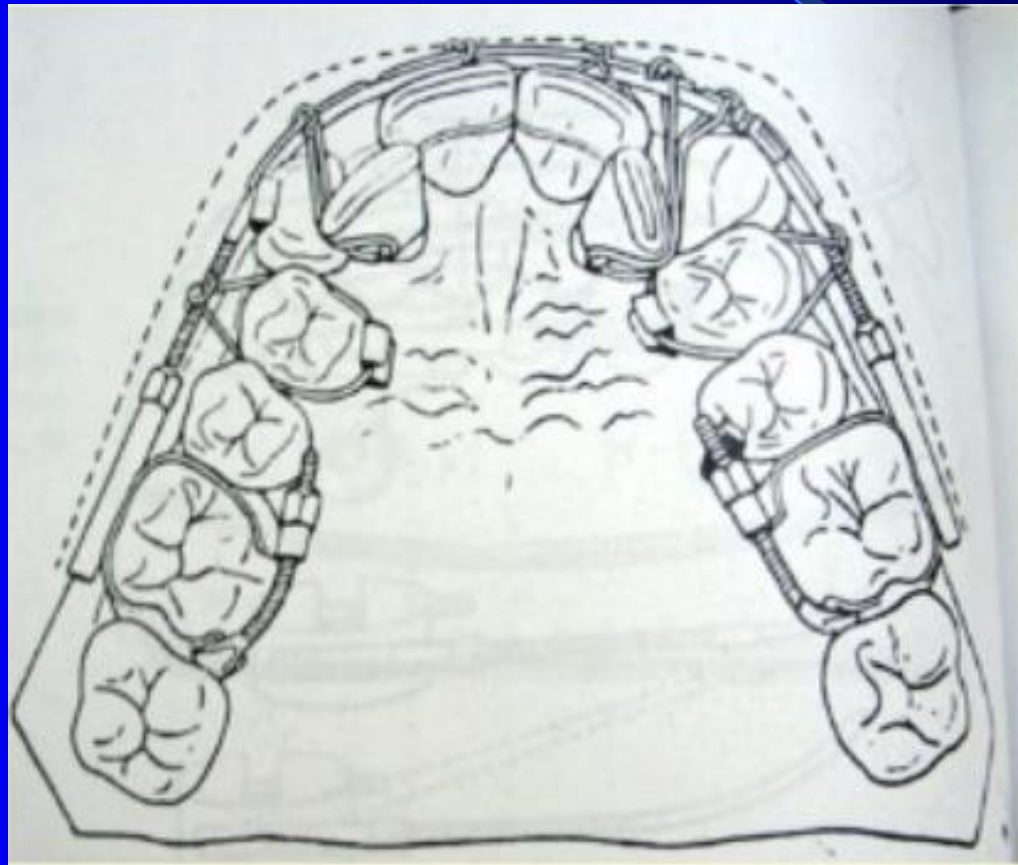
Development of Contemporary Fixed Appliances

- Angle's Progression to the Edgewise Appliance
- Other Early Appliance Systems
- Begg Appliance
- Contemporary Edgewise: The Modern Appliance

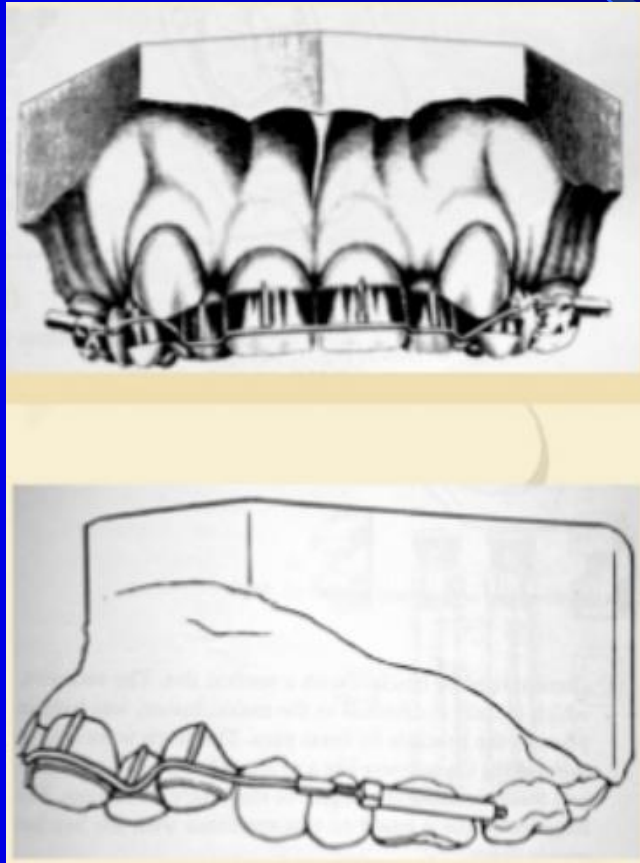
Angle's Progression to the Edgewise Appliance

- The E-Arch
- Pin and Tube
- Ribbon Arch
- Edgewise

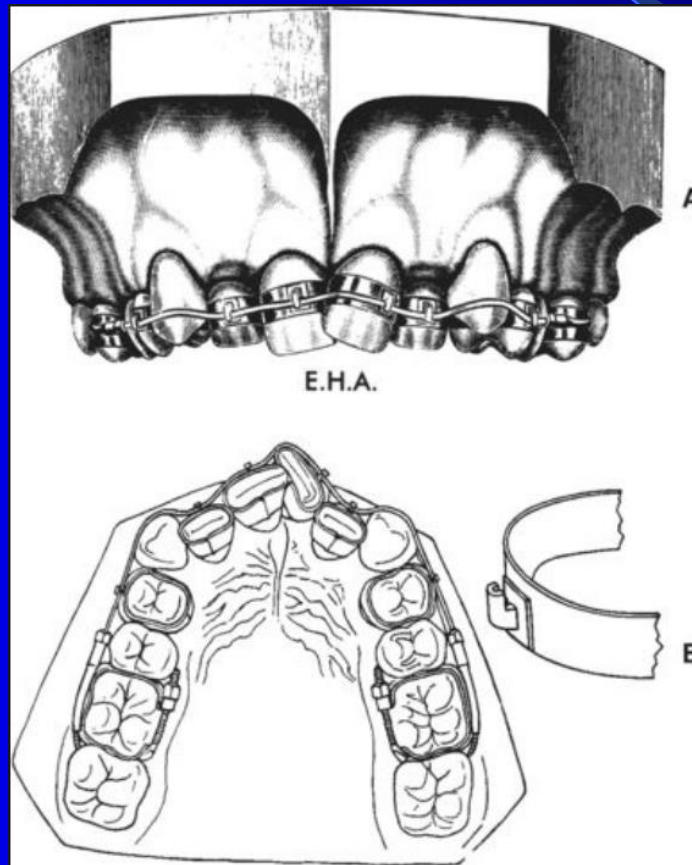
E-Arch 1900



Pin and Tube 1910



Ribbon Arch 1915



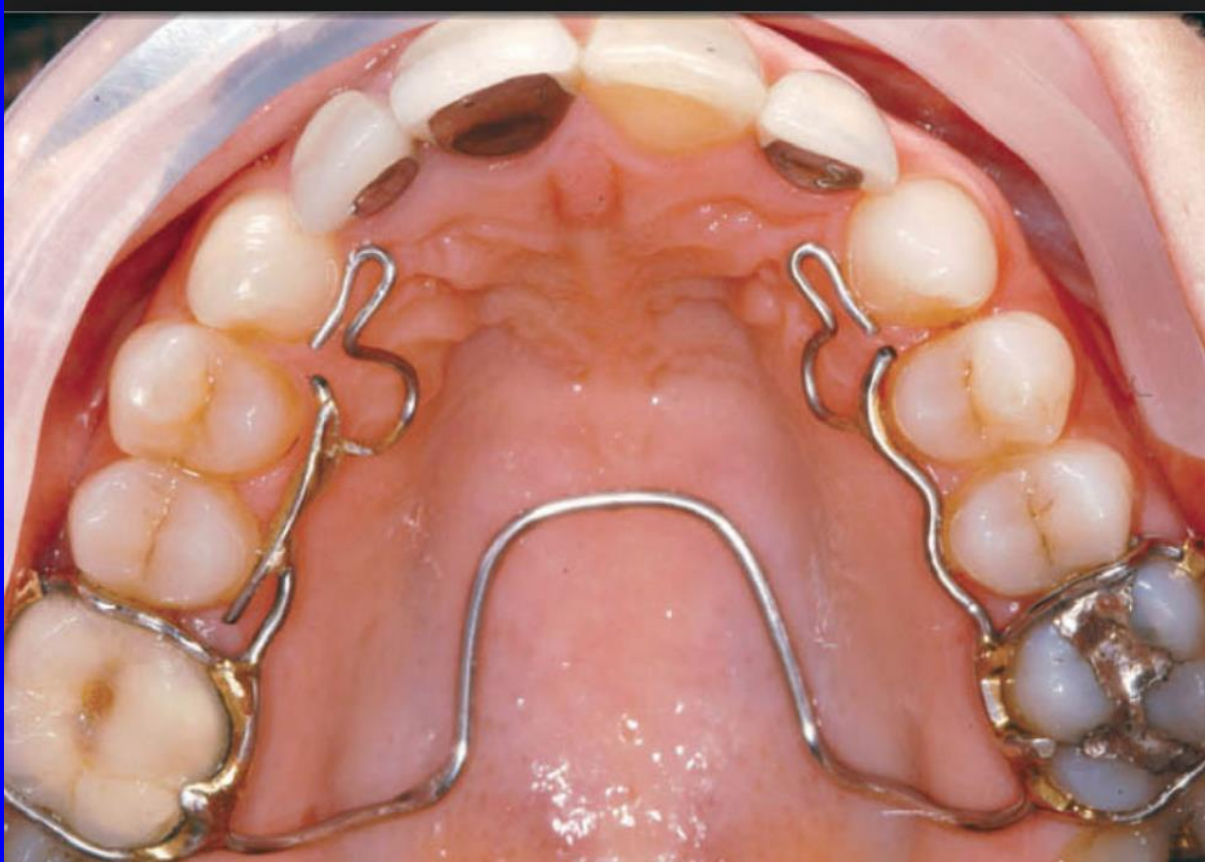
Edgewise 1925



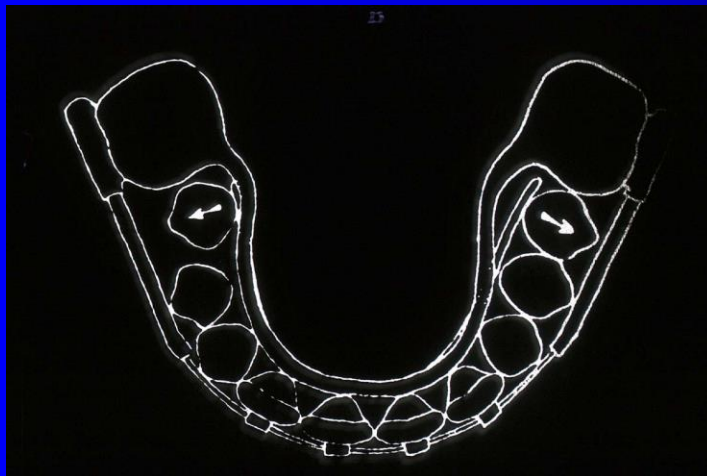
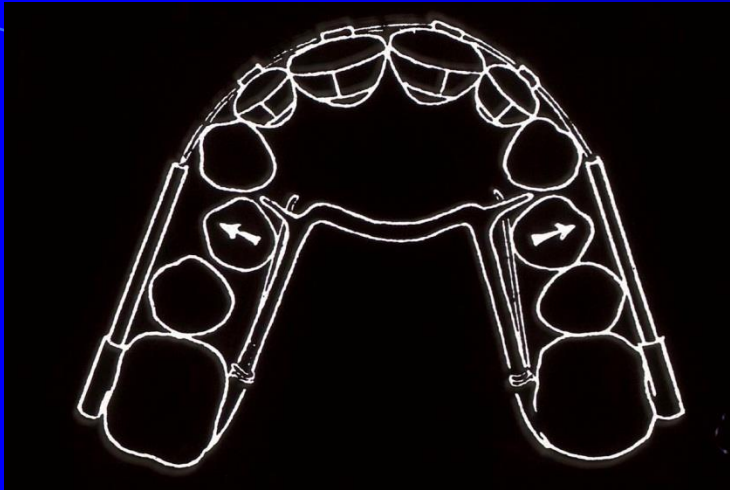
Other Early Appliance Systems

- Crozat Appliance
- Labio-Lingual Appliance
- Johnson Twin-wire Appliance

Crozat 1920



Twin Wire 1930



Begg Appliance



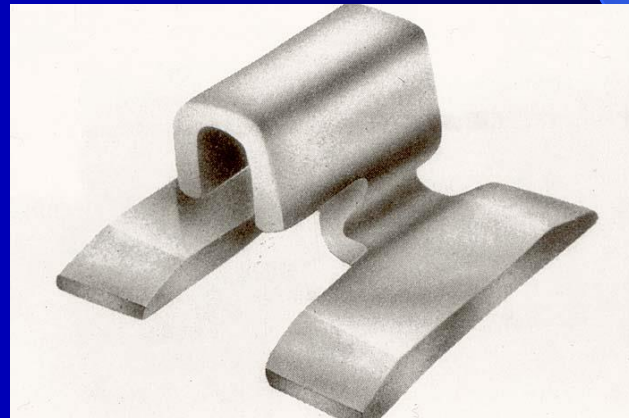


Begg Appliance:

- Point contact only
- Round wire exclusively
- Multiple individual tooth auxiliaries

Begg Appliance

- Molar Tube (round or oval)
- Bracket (pin and tube)



Edgewise Appliance

This is the:

"Contemporary Fixed Appliance"

3M Unitek

 Dentsply
Sirona


INTERNATIONAL INC.


Synergistic Solutions for
Progressive Orthodontics | RMO
rocky mountain orthodontics

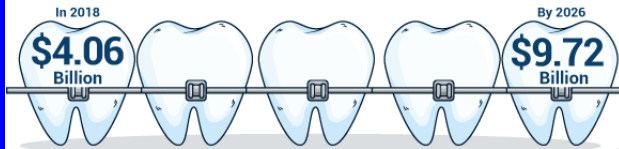

AMERICAN
ORTHODONTICS

Orthodontics Market

Global Orthodontics Market Size, 2015-2026 (USD Billion)

Global Orthodontics Market Share
By Product Type, 2014

 Instruments  Supplies



North America Orthodontics Market Size, 2018



USD 1.84 Billion



 HENRY SCHEIN®
ORTHODONTICS



TP Orthodontics, Inc.




ORTHODONTIC SUPPLY & EQUIPMENT CO., INC.



Major Elements of Contemporary Fixed Appliances

- Bands / Bonded Brackets (Attachments)
- Archwire (in main bracket slot)
- Auxiliary Elements (lingual arch and labial auxiliary elements, etc.)

Contemporary Edgewise Appliance:

- Horizontal Rectangular Slot
- Round, Square or Rectangular Wire

Components: Brackets

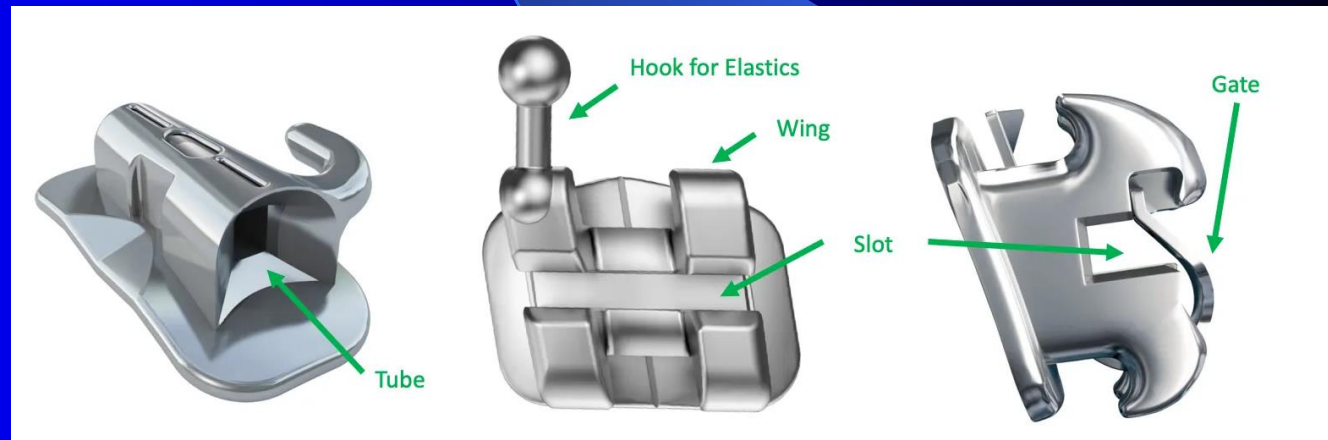


Typically for anterior teeth and bicuspids

Wings - twin or single

All have horizontal slot

Many variations in materials and size of the attachment depending upon the manufacturer



Brackets

Metal (Stainless Steel)

Clear or Tooth Colored
(Ceramic or Plastic)

↳ higher friction with ceramic brackets

Lingual (Stainless Steel or Gold)

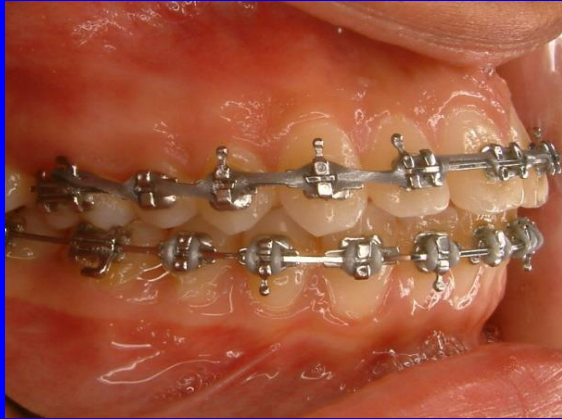
Self-Ligating (Stainless Steel and combination of Ceramic and Stainless Steel)

↳ become yellow in 2 weeks



self ligating

Metal Brackets - Twin wing



On upper
central and
lateral incisors

Metal Brackets - Single wing



On canines,
bicuspid and
lower incisors



↳ single system = more narrow = more interbracket distance = ↓ force ↓ ctrl

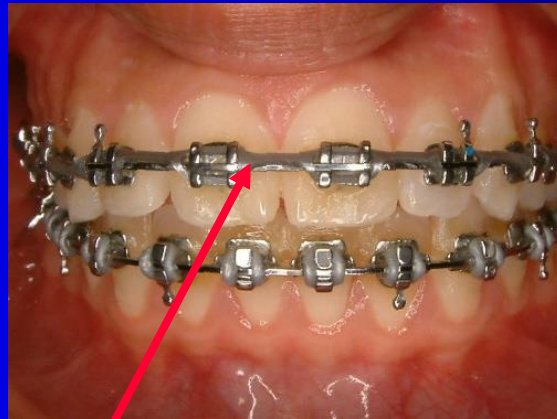
Ceramic Brackets



In this case on the upper anterior teeth



Change Elastics or Elastic Chain



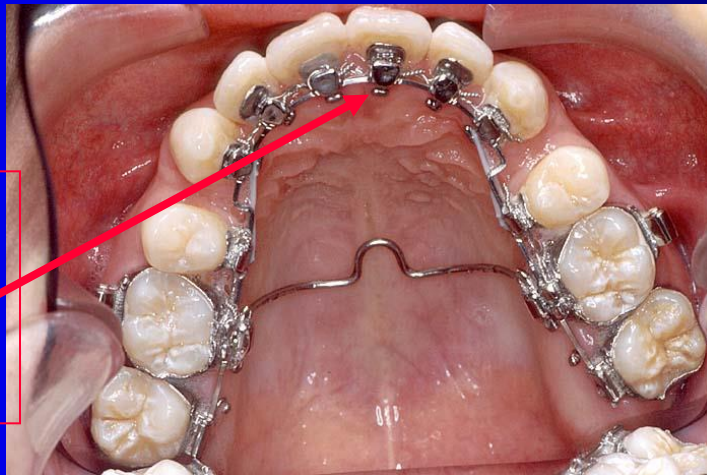
You should ensure you do this at least once or twice for a patient



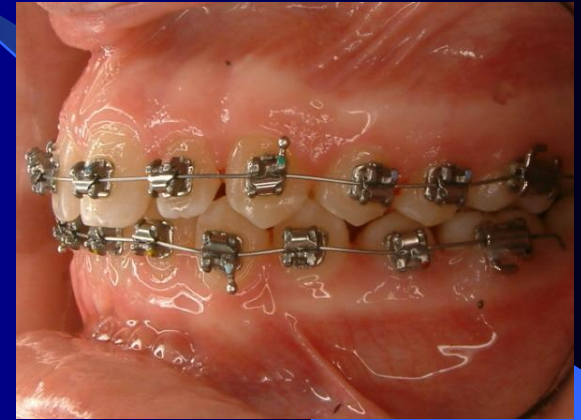
Lingual Brackets



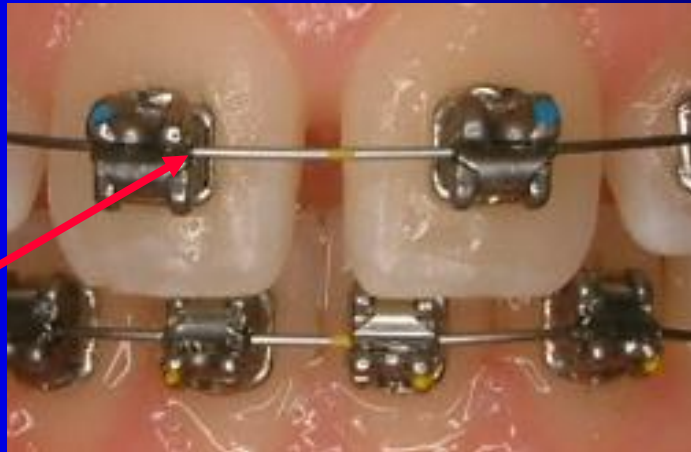
In this case upper
bicuspids and
anterior teeth



Self Ligating - Brackets

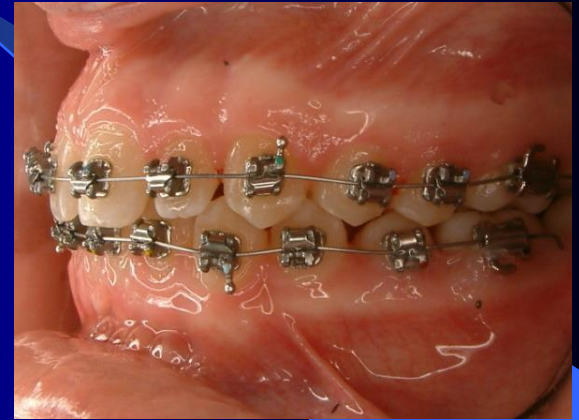


In this case on
the bicuspids,
canines and
incisors

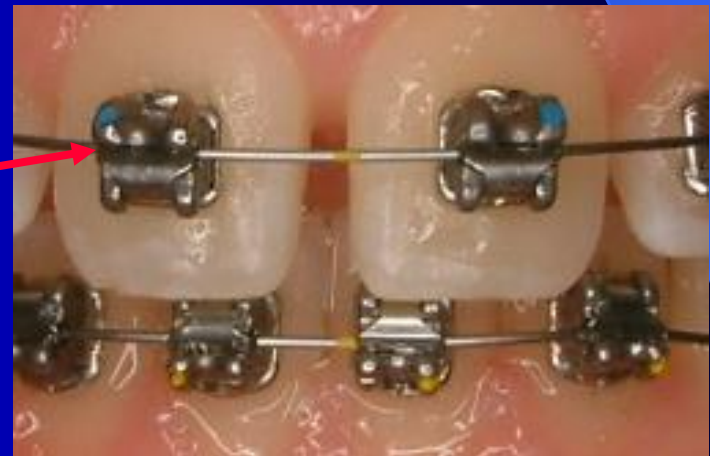


Start here

Opening and Closing of Self Ligating Brackets

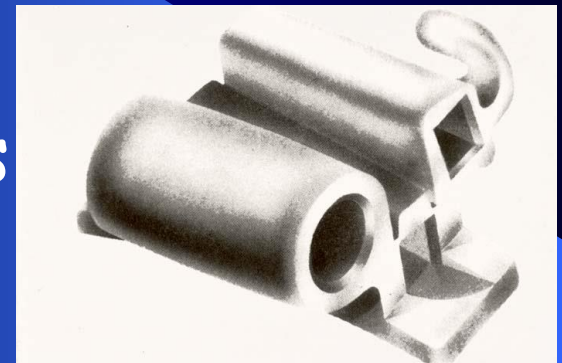


You should ensure you do this at least once or twice for a patient

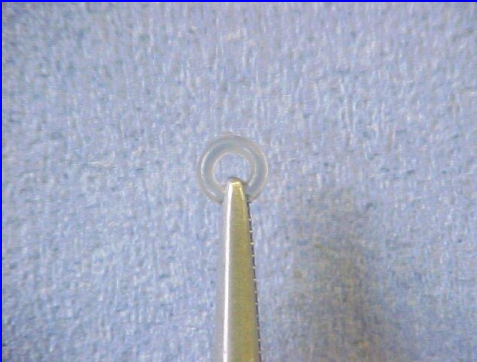


Components- Bands

- Typically for molars and occasionally premolars
- Horizontal tube (slot)
- Heavy stress application
- Lingual attachments
- Auxiliary and headgear tubes



Changing Alastic Modules



Using the Mathieu or mosquito forceps grip and remove a Alastic module from its 'tree'



Hook the module onto one wing of the bracket, then over the remaining wings to hold the archwire in place

Band Fitting

Placing Separators

Separators are placed 7-10 days before band placement (often on the same visit as bond-up) to separate the molar teeth slightly. This facilitates band placement. Usually elastomeric separator are used, but either brass wire or Kesling separator can be used (see orthodontic staff for more information on these alternatives)





Placing Separators

Separator pliers or Dental Floss Separator Procedure (2 Methods)

Separator pliers

Separators are placed over the end of the separator pliers and squeezed between the teeth. **EXTREME CARE** is needed in order that the pliers do not slip and cause injury

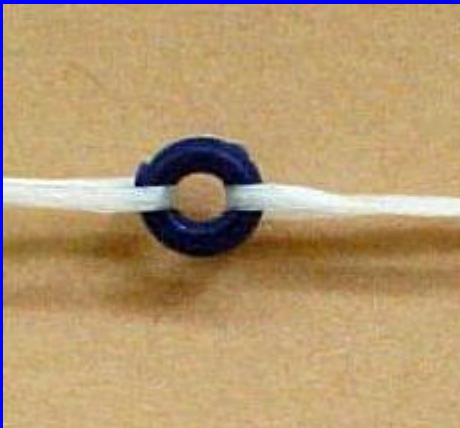


Placing Separators

Separator pliers or Dental Floss Separator
Procedure (2 Methods)

Floss

Two lengths of Dental Floss are threaded through the separator.



Band Fitting

Handpiece, rubber cup and oil free prophylaxis paste

Band fit Tray (Band pusher, bite stick, band removing pliers, etc.)

Cotton wool rolls, Glass ionomer cement, glass mixing slab and spatula





Band Fitting Procedure

Remove any separators present (use a Probe or Schure to hook them out)





Band Fitting Procedure

Select the band size to be fitted and press into place using band seater.





Band Fitting Procedure



Use the handle of the bite stick to have the patient bite lightly to start seating the band



Band Fitting Procedure



Use the flat side of the tip on the buccal attachment or on the top of the band

Mesial buccal bite on the edge of the band gently





Band Fitting Procedure



Use one of the points of the triangle to lightly push the edge of the band
Have the patient bite gently on the lingual and hold the buccal attachment with the thumb to avoid over seating

Band Fitting Procedure



Band seated and now to inspect for band fitting to contours of the tooth

Notice a small gap on the distal lingual cusp





Band Fitting Procedure



Take the band file or Schure and contour the band into the distal lingual cusp if necessary

Check the tooth for any gaps and use the file to contour areas if gaps are seen



Band Fitting Procedure



Band seated after contouring;
no gaps on the distal cusps

Notice the relative position of
the band to the occlusal
margins of the tooth

Band Fitting Procedure



Some but not all of you will get the opportunity to fit bands. Ask if you can . . . when you see the procedure being completed as you will benefit immensely

Band Cementation

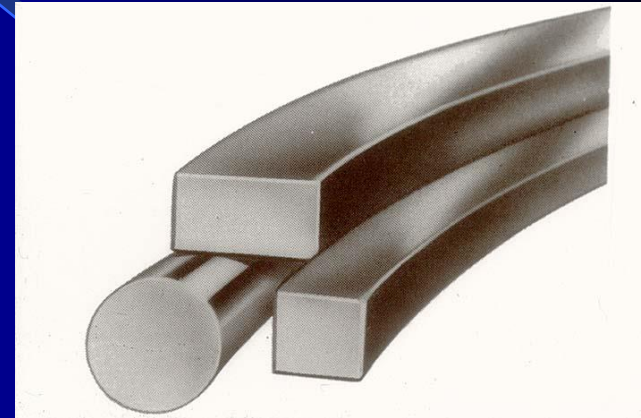


Band cementation is much like cementing a crown with the cement placed at the gingival margins of the band and just repeat the process of band fitting/seating

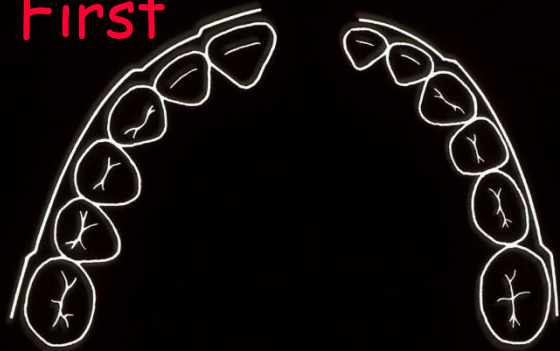


Archwires

- Continuous or Segmented
- Round, Square or Rectangular
- First, Second and Third Order Bends

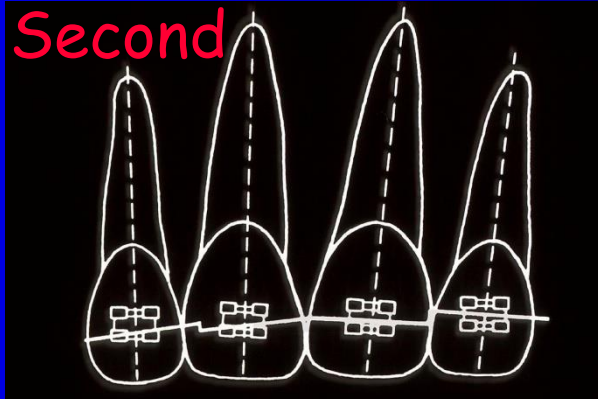


First



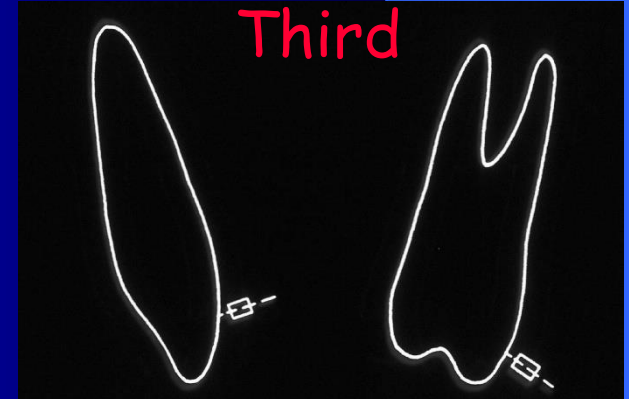
↳ buccolingual

Second



↳ mesiodistal inclination

Third



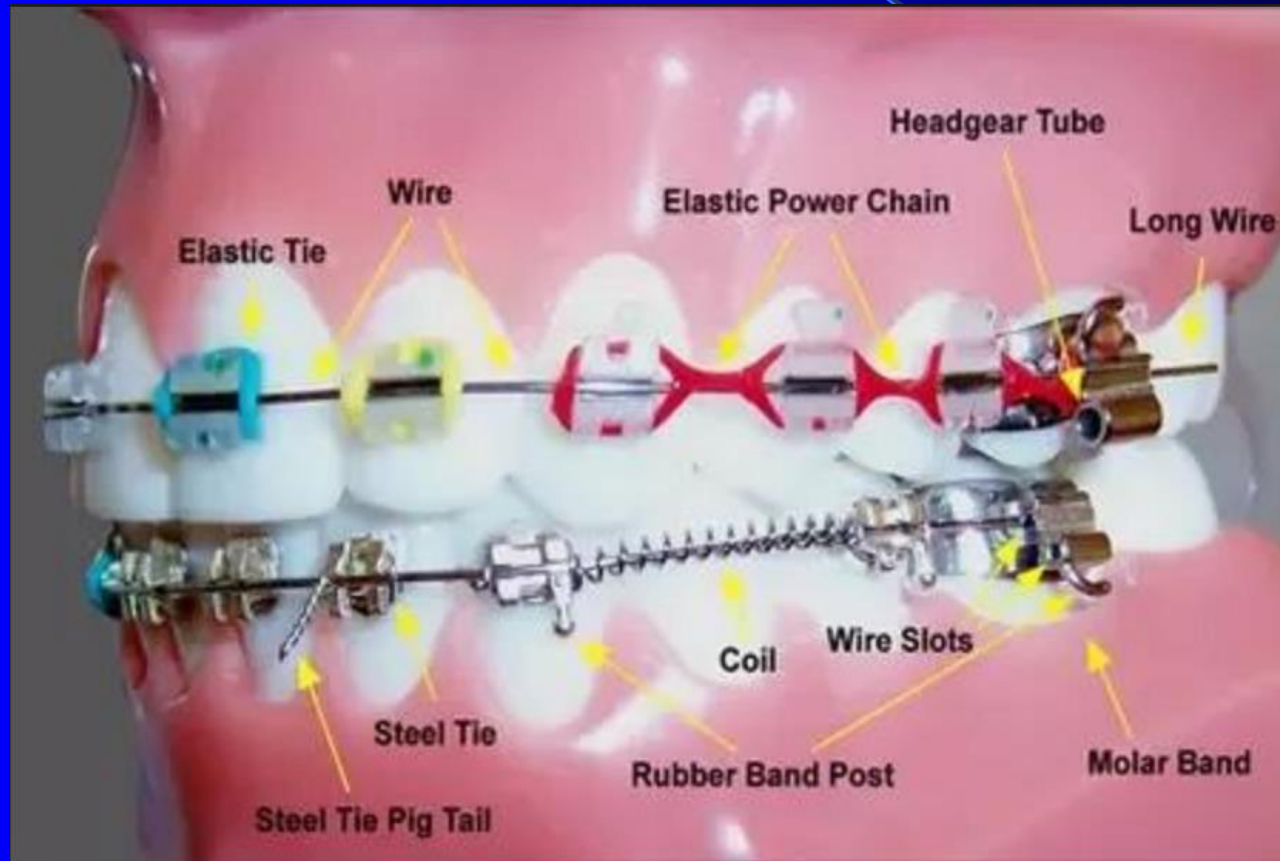
↳ torque/torsion

Auxiliaries

- Tubes on Bands
- Arches
- Arch wires
- Elastics
- Hooks → Anchor elastic bands
- Coils → open space



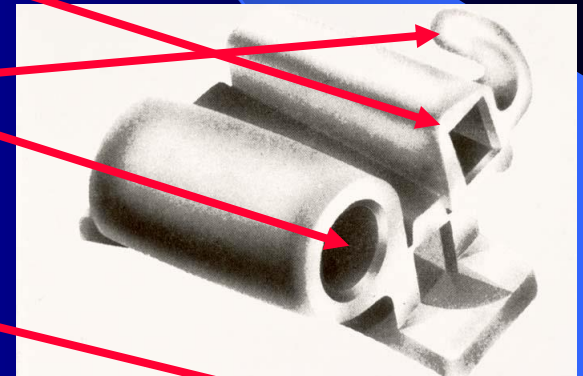
Auxiliaries



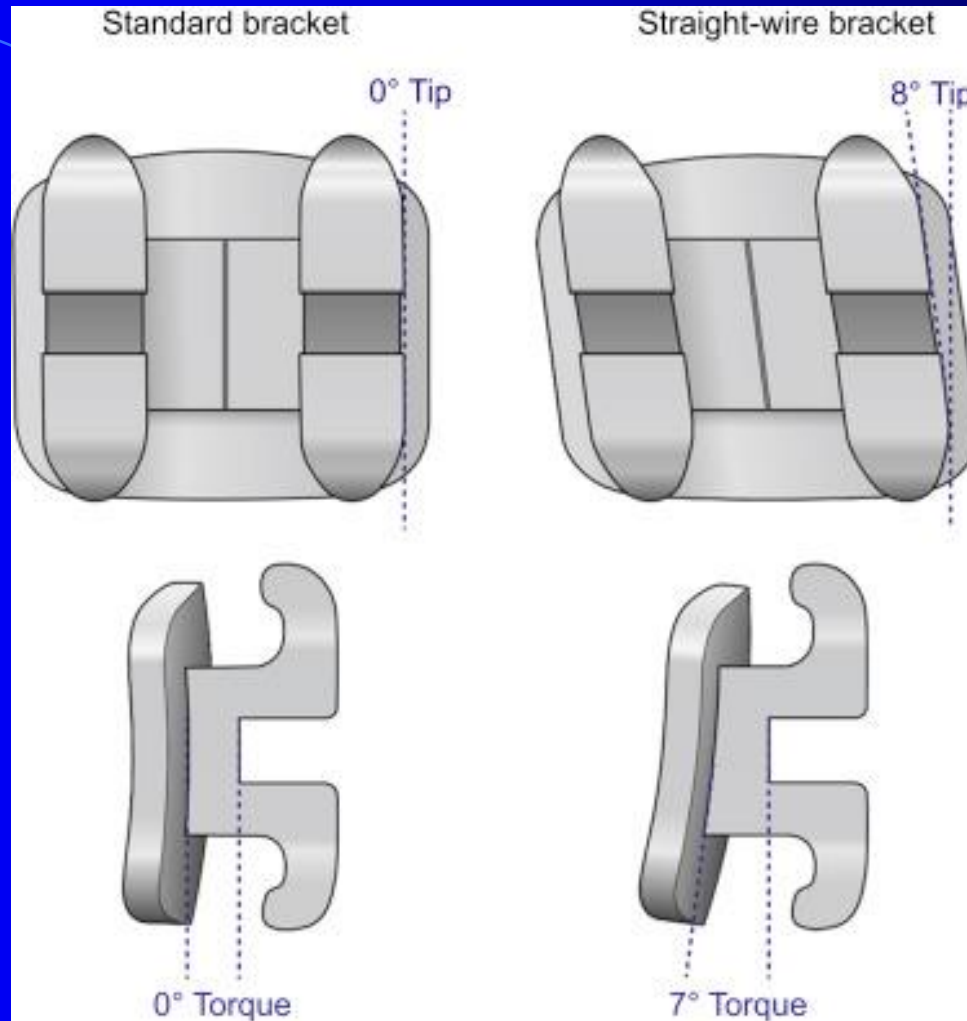
Powerchain:
↳ achieves movement

Bracket / Band Auxiliaries

- Auxiliary tubes (buccal, palatal or lingual)
- Headgear tubes
- Hooks



Standard vs "Straight wire" Bracket



• Each brand has different prescription

Common Prescriptions Chart *

TIP		1	2	3	4	5	6	7
UPPER	Andrews	5	9	11	2	2	5	5
	Roth	5	9	13	0	0	0	0
	MBT	4	8	8	0	0	0	0
LOWER	Andrews	2	2	5	2	2	2	2
	Roth	2	2	7	-1	-1	-1	-1
	MBT	0	0	3	2	2	0	0

TORQUE		1	2	3	4	5	6	7
UPPER	Andrews	7	3	-7	-7	-7	-9	-9
	Roth	12	8	-2	-7	-7	-14	-14
	MBT	17	10	+7/0/-7	-7	-7	-14	-14
LOWER	Andrews	-1	-1	-11	-17	-22	-30	-30
	Roth	-1	-1	-11	-17	-22	-30	-30
	MBT	-6	-6	+6/0/-6	-12	-17	-20	-10

ROTATION		1	2	3	4	5	6	7
UPPER	Andrews	0	0	0	0	0	10	10
	Roth	0	0	4	2	2	14	14
	MBT	0	0	0	0	0	10	10
LOWER	Andrews	0	0	0	0	0	0	0
	Roth	0	0	2	4	4	4	4
	MBT	0	0	0	0	0	0	0



Auxiliary Arches

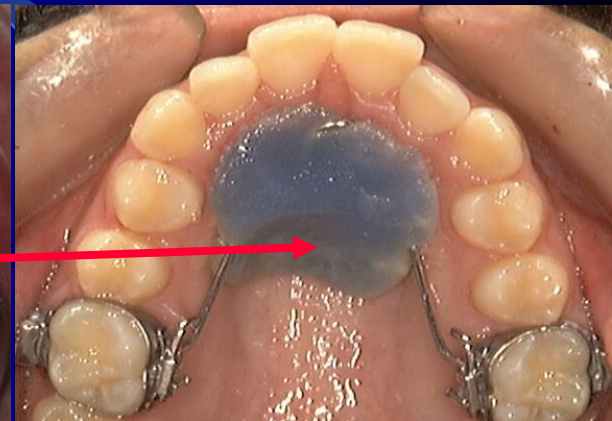
Can rotate upper 6's

- Trans-palatal
- Palatal
- Nance Button
- Lingual
- Lip Bumper

Trans palatal



Nance button



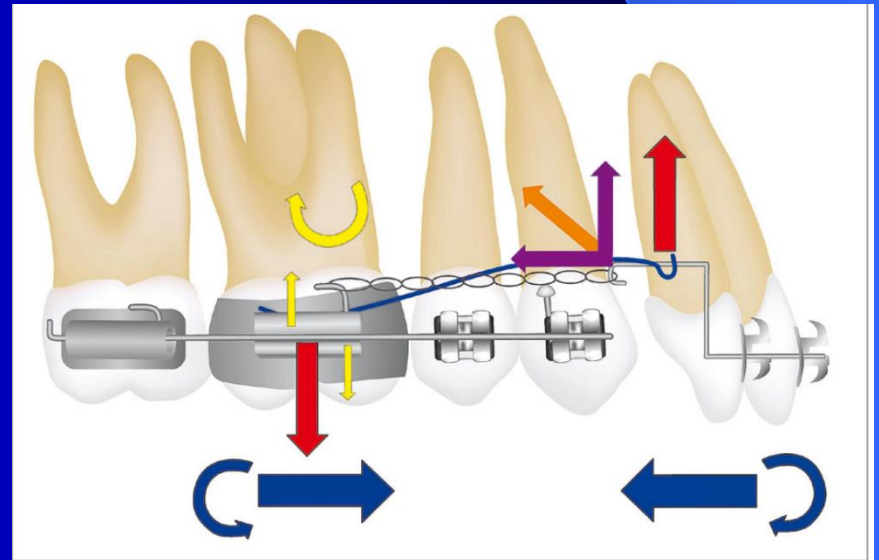
Lingual bar



Lip bumper

Auxiliary Arch Wires

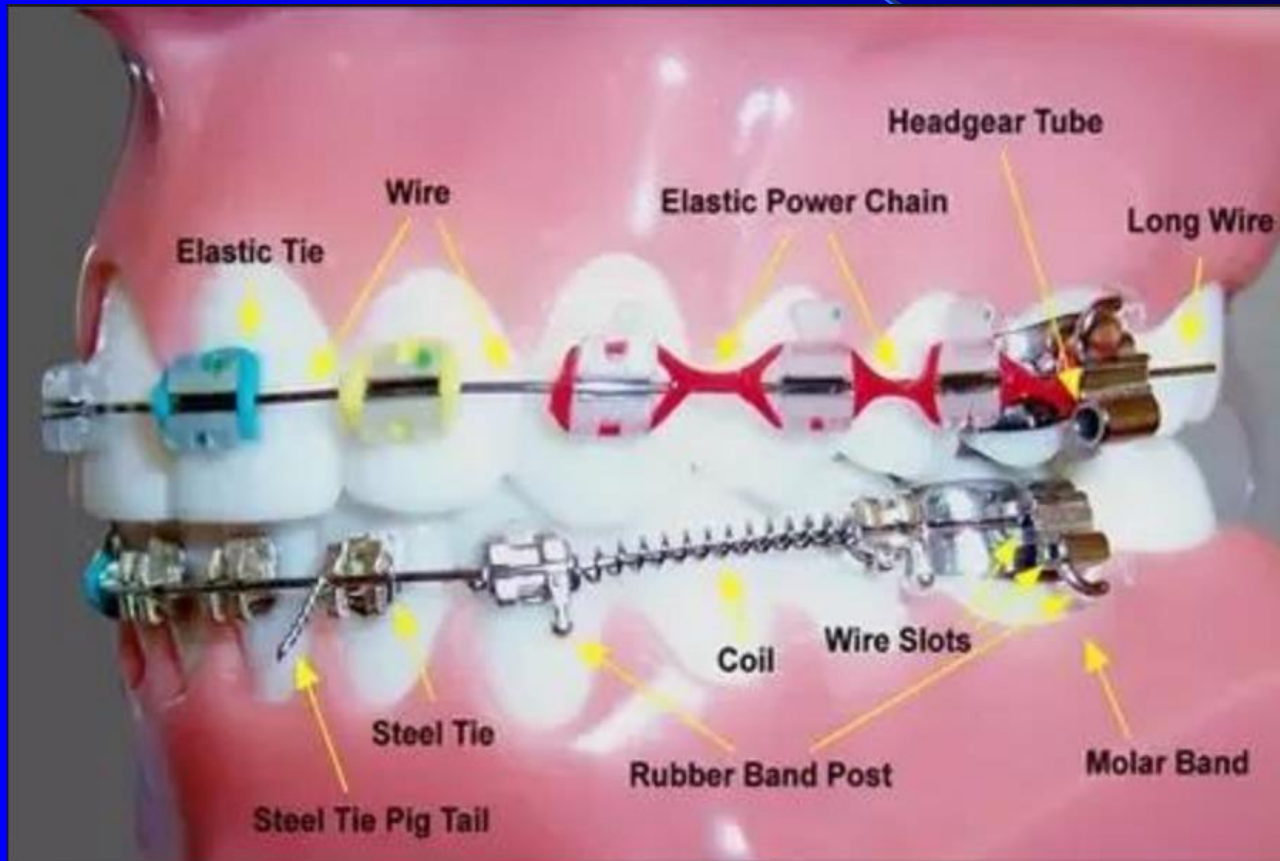
Intrusion Arches (also referred to as auxiliary arch)
Sectional arches



Elastomeric Auxiliaries

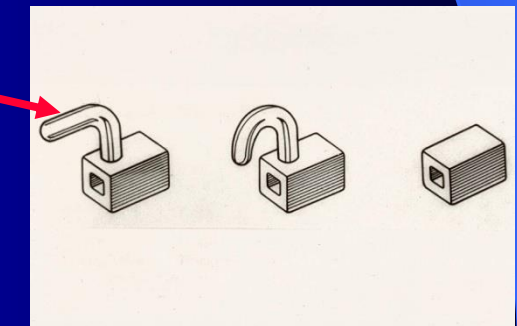
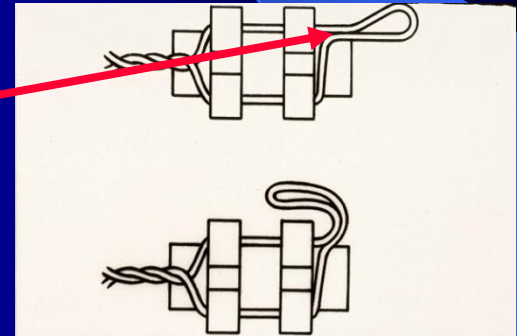
- Elastic ligature thread
- Elastomeric modules
- Power Chains
- Elastics
 - Intermaxillary
 - Intra-arch

Auxiliaries



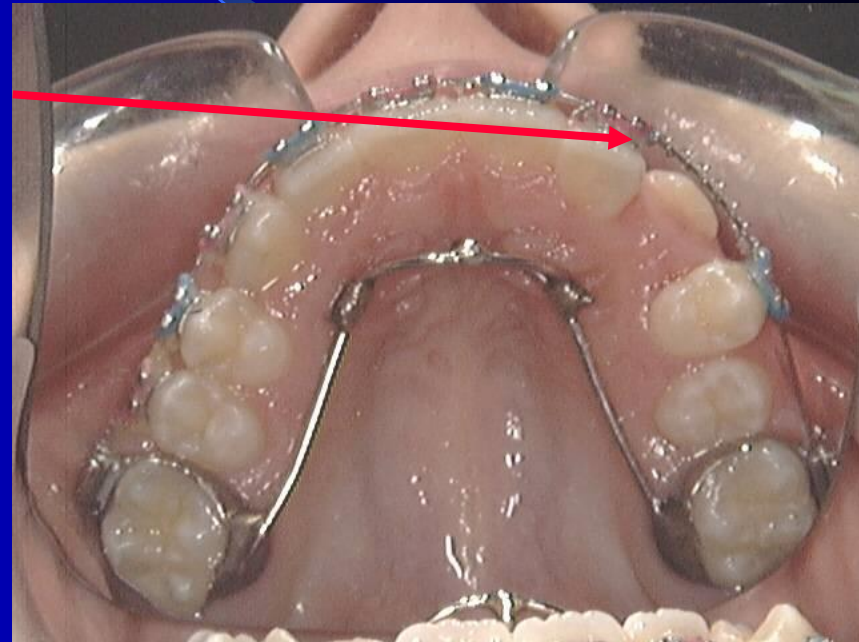
Auxiliary Hooks

- Incorporated into the bracket
- Soldered brass
- Kobayashi ligature wires (k-ties)
- Sliding
- Surgery



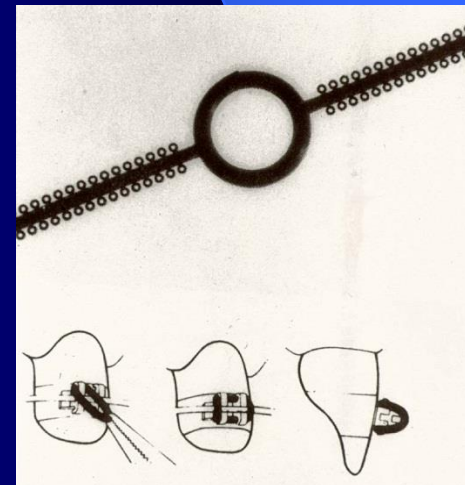
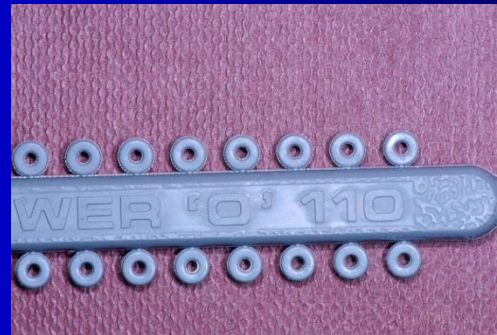
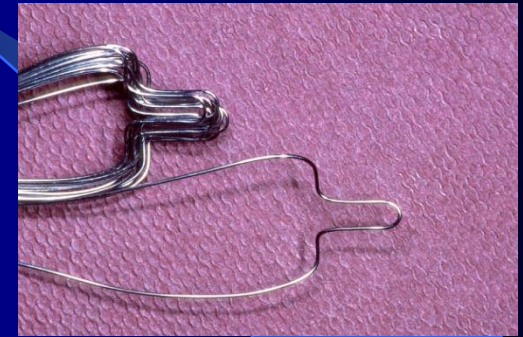
Auxiliary Coils

- Push (open) coil spring
- Pull coil spring
- Closed coil spring



Types of Ligatures

- Stainless Steel wire
- Elastomeric donut-shaped modules
- Elastic Thread





Orthodontic Arch Wires

- Auxiliary arches
- Arch wire materials
- Arch wire types
- Arch wire forms
- Auxiliary arch wires



Auxiliary Arches

- Trans-palatal
- Palatal
- Lingual
- Nance Button
- Lip Bumper

Arch Wire Materials

- Precious Metal Alloys
- Stainless steel and Cobalt-Chromium Alloys
- Nickel Titanium (NiTi) Alloys A-NiTi and M-NiT (austinitic / martinsitic)
- Beta-Titanium
- Composite plastics



Electric current on NiTi can cause it to change
used to correct deep bite

Arch Wire Types

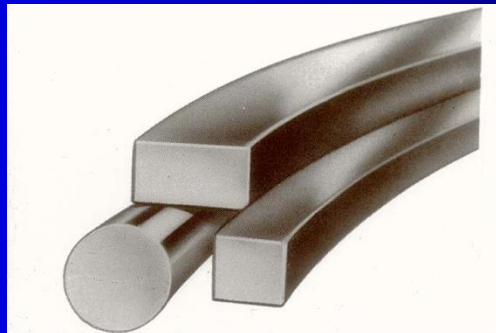
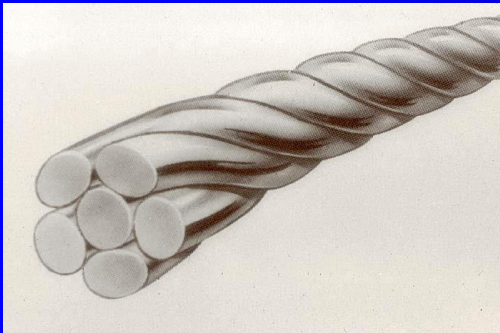
- Continuous or segmented





Arch Wire Types

- Solid or multistranded
- Round, square or rectangular



Arch Wire Form

- Bonwill-Hawley
- Cantenary curve
- Brader arch form
- Lingual appliance arch forms (mushroom Arch)
- Most if not all arch wires require some form of modification to match the patient's arch form



Traditional Stages of Orthodontic Treatment

- Stage 1 - Leveling and Alignment
- Stage 2 - Space Management
- Stage 3 - Finishing
- Stage 4 - Retention

Critical Fixed Appliance Limitations



- Fixed appliances are limited to moving teeth within the confines of the alveolar bone. Therefore, fixed appliances depend upon an adequate and healthy periodontium

Critical Fixed Appliance Limitations



- Fixed appliances often require a high degree of patient cooperation. The best treatment results depend upon faithful wearing of elastics, headgear and/or other orthodontic or orthopaedic auxiliaries

Critical Fixed Appliance Limitations



- Fixed appliances require an acceptable level of oral hygiene to allow movement of the teeth with minimal loss of crestal bone, as well as to prevent dental caries.



Critical Fixed Appliance Limitations

- Fixed appliances require an acceptable skeletal relationship prior to the completion of treatment. The skeletal relationship may be achieved before or during fixed appliance treatment by the use of extraoral traction, functional appliances or orthognathic surgery.

Orthodontic Complications

- Pain - Appliance impinging on soft tissues
pain associated with tooth movement
- Appliance Breakages - Bracket/bond/wire
- Oral Hygiene - Periodontal/Dental caries issues
- Root Resorption - due to patient susceptibility or treatment mechanics

Orthodontic Complications

- Devitalization
- Muscle and/or TM Joint Pain
- Relapse
- Tooth mobility - due to bone loss or tooth movement into area of inadequate osseous support
- Loss of crestal bone - due to gingival inflammation

Orthodontic Complications

- Atypical Growth - growth that distorts the skeletal relationship beyond the orthodontist's ability to compensate.
- Compliance
- Ceramic Brackets - potential enamel damage
- Complimentary Aesthetic Dentistry
- Loose or Debonded Fixed Retainer

Complications Orthognathic Surgery

- Altered Sensation / Anesthesia
- Surgical Relapse
- Fixation Time
- Tooth Devitalization/Root Resection
- Condylar Resorption
- Reduced TM Joint Mobility
- TM Joint Pain

Complications Orthognathic Surgery

- Pain
- Inflammation Swelling
- Hemorrhage
- Avascular Necrosis



At the end of this course, you DO
NOT have the didactic knowledge
or clinical skills to treat
comprehensive orthodontic cases.