SEMMELWEIS UNIVERSITY

Faculty for Dentistry
Department for Paediatric Dentistry
and Orthodontics

REMOVABLE APPLIANCES

Assoc. Prof. Noémi Katinka Rózsa DMD, MSc, PhD

Lecturer: Dorottya Bányai DMD

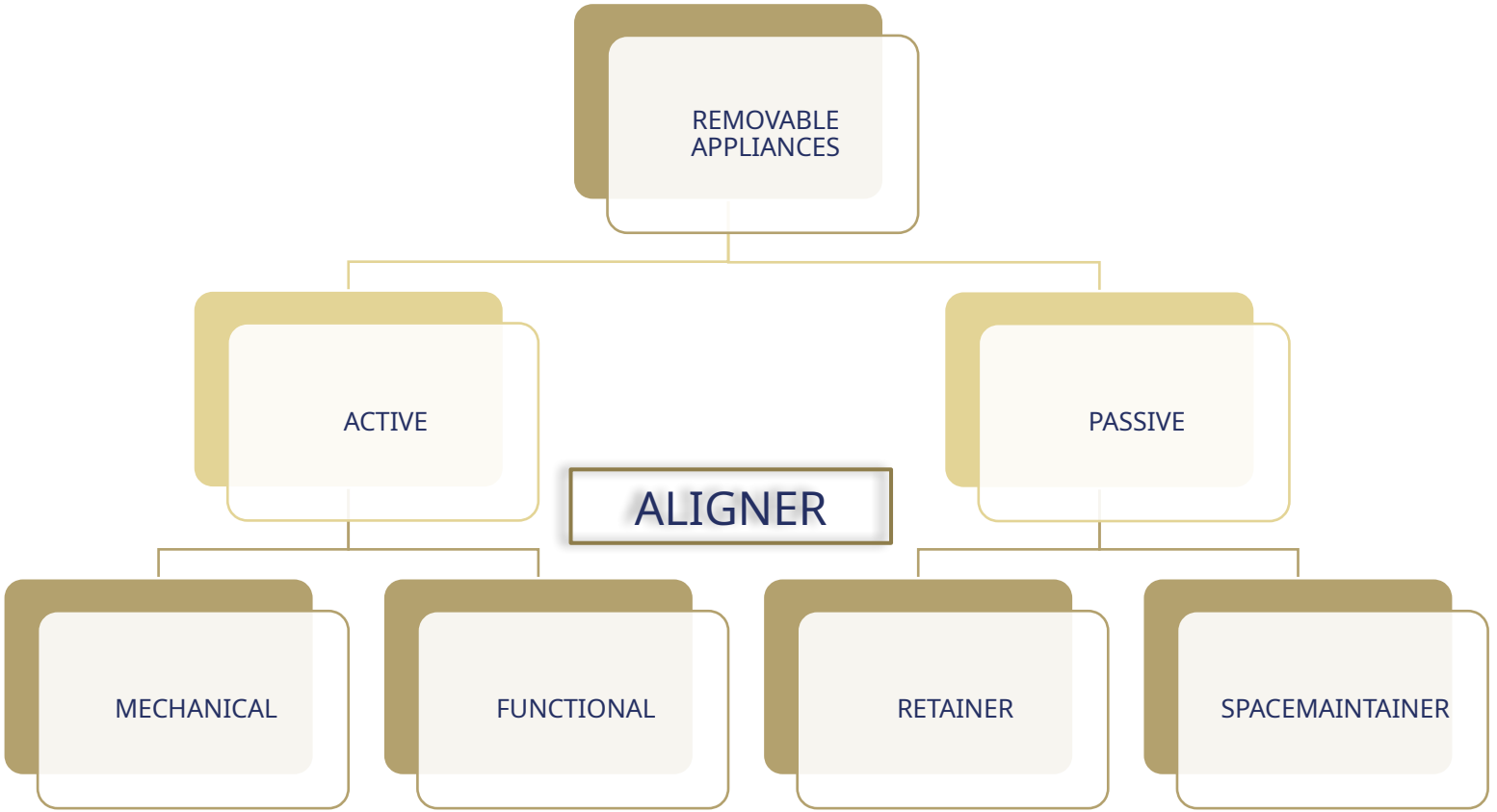
REMOVABLE APPLIANCES ADVANTAGES

- It can be removed from the mouth for a better oral hygiene;
- It uses lighter forces for tooth movement and expansion than multibond type fixed appliances
- Removable appliances used mainly in mixed dentition.

REMOVABLE APPLIANCES DISADVANTAGES

- Patients don’t wear their appliances as much as it would be necessary;
- Longer treatment time;
- Weak (light) forces;
- Bodily movement and torque are not possible (only tilting);
- Patients sometimes get their appliances lost!
- May cause speech problems.

REMOVABLE APPLIANCES CLASSIFICATION

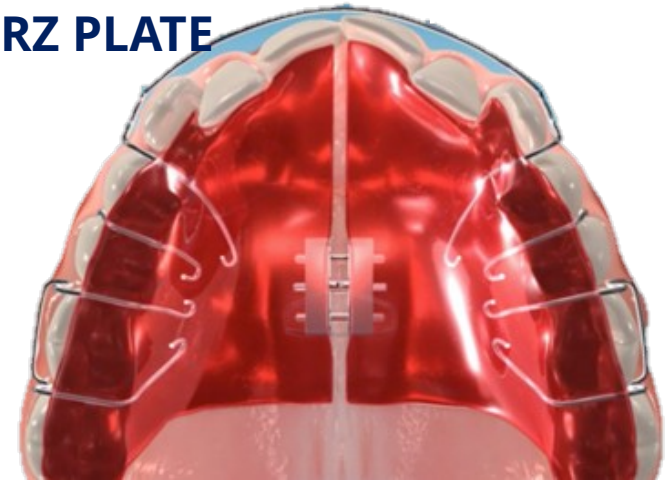


MECHANICAL REMOVABLE APPLIANCES-COMPONENTS

- ACTIVE COMPONENTS: *springs, screws, bows*
- RETENTIVE COMPONENTS: clasps – *Adams', southend, ball hooks, arrow clasps, ball clasps etc.;*
- ANCHORAGE:
  - *Newton's 3rd law: „For every action there is an equal and opposite reaction"*
  - *Proffit (1993): „Resistance to unwanted tooth movement"*
  - *increasing anchorage by using extraoral appliances like Headgear, Delaire-facemask etc;*
- BASEPLATE: *acrylic base, anchorage!*

MECHANICAL REMOVABLE APPLIANCE

SCHWARZ PLATE



REMOVABLE APPLIANCE COMPONENTS

- ACTIVE COMPONENTS: ***springs***, *screws, bows*

COFFIN spring: Walter Coffin, 1881;

- an omega shaped spring for arch expansion.

Anterior finger springs;

- incisors: 0.5 mm SS wire,
- canine and premolars: 0.6 mm SS wire;
- for mesial or distal movement,
- treatment of *diasthema medianum*.

Z-spring:

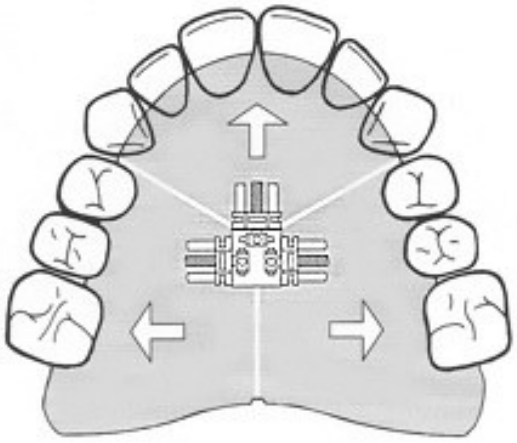
- incisors: 0.5 mm SS wire,
- proclination of one or two incisors.
- to correct mild rotations if only one helix is activated

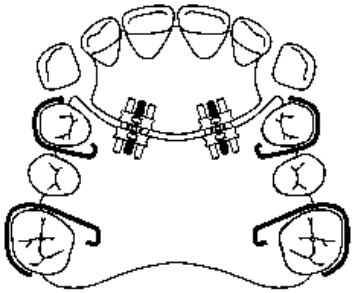
REMOVABLE APPLIANCE COMPONENTS

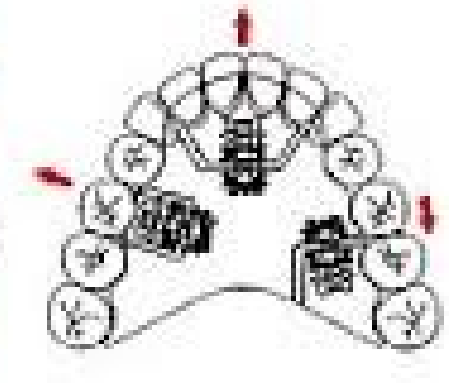
- ACTIVE COMPONENTS: *springs*, ***screws***, *bows*

- *it is activated by the patient by using a key.*
- *assures mainly three types of movement:*

- *Expansion of the dental arch;*
- *Tooth movement to buccal or labial direction;*
- *Tooth movement to mesial or distal direction.*

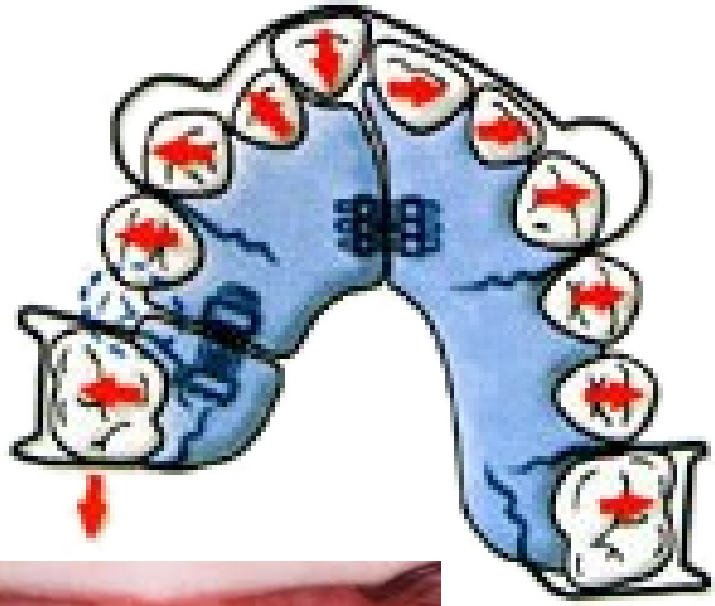


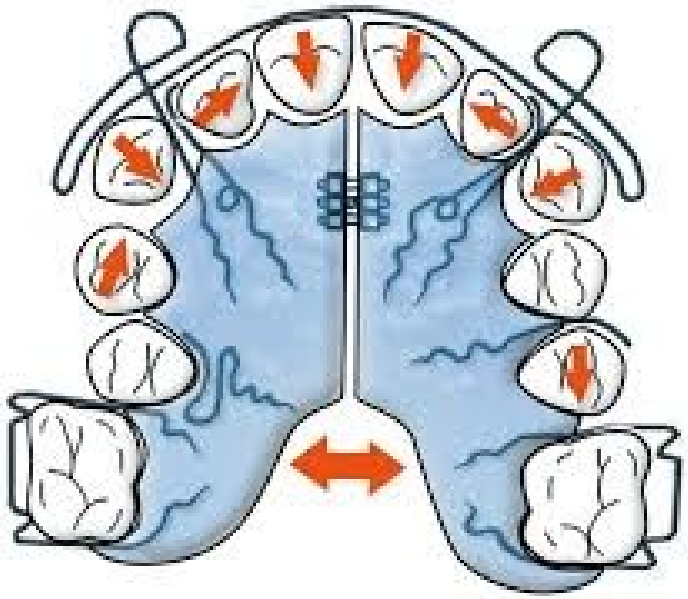




REMOVABLE APPLIANCE COMPONENTS

- ACTIVE COMPONENTS: *springs*, *screws*, ***bows***

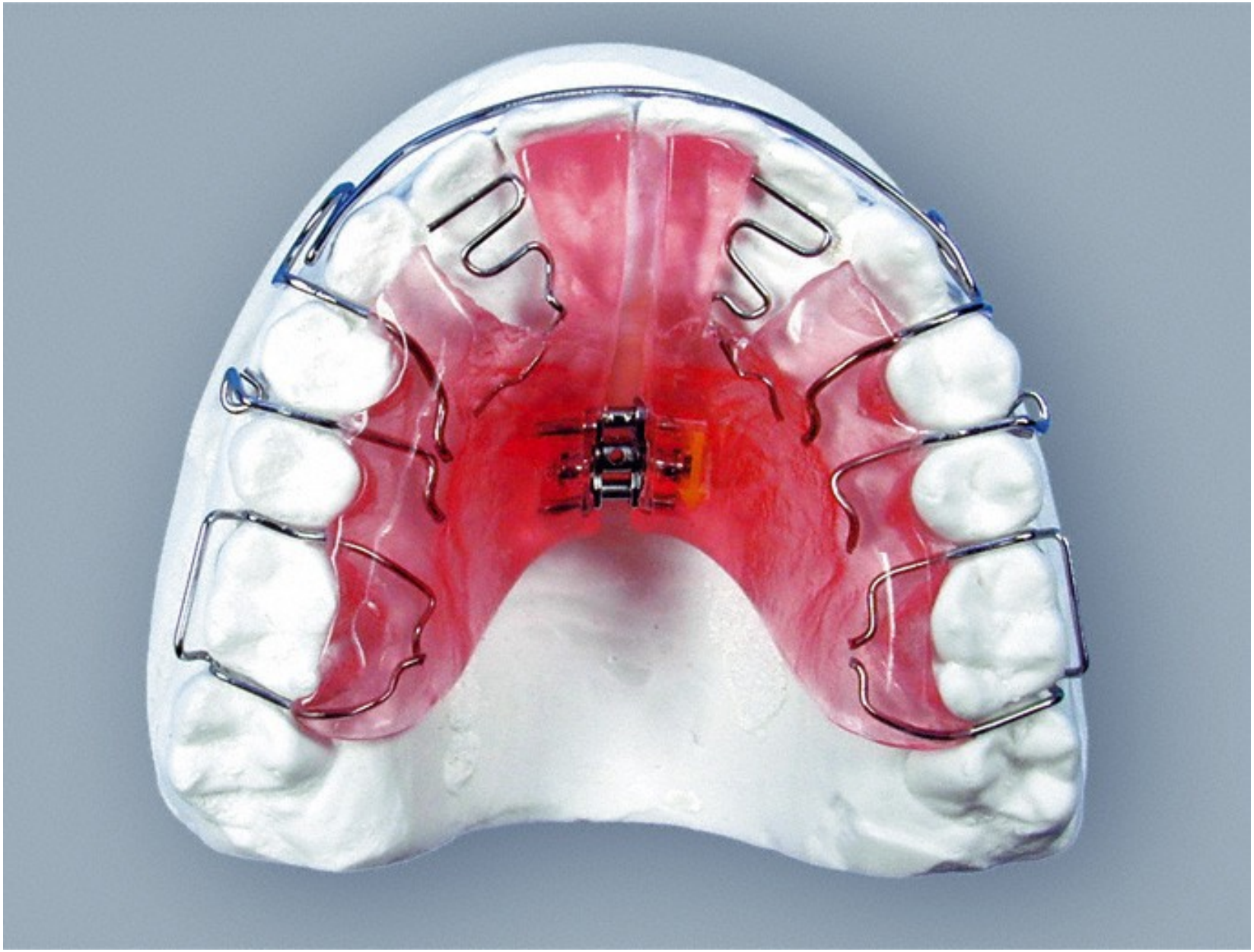




Labial bow: mechanism of action

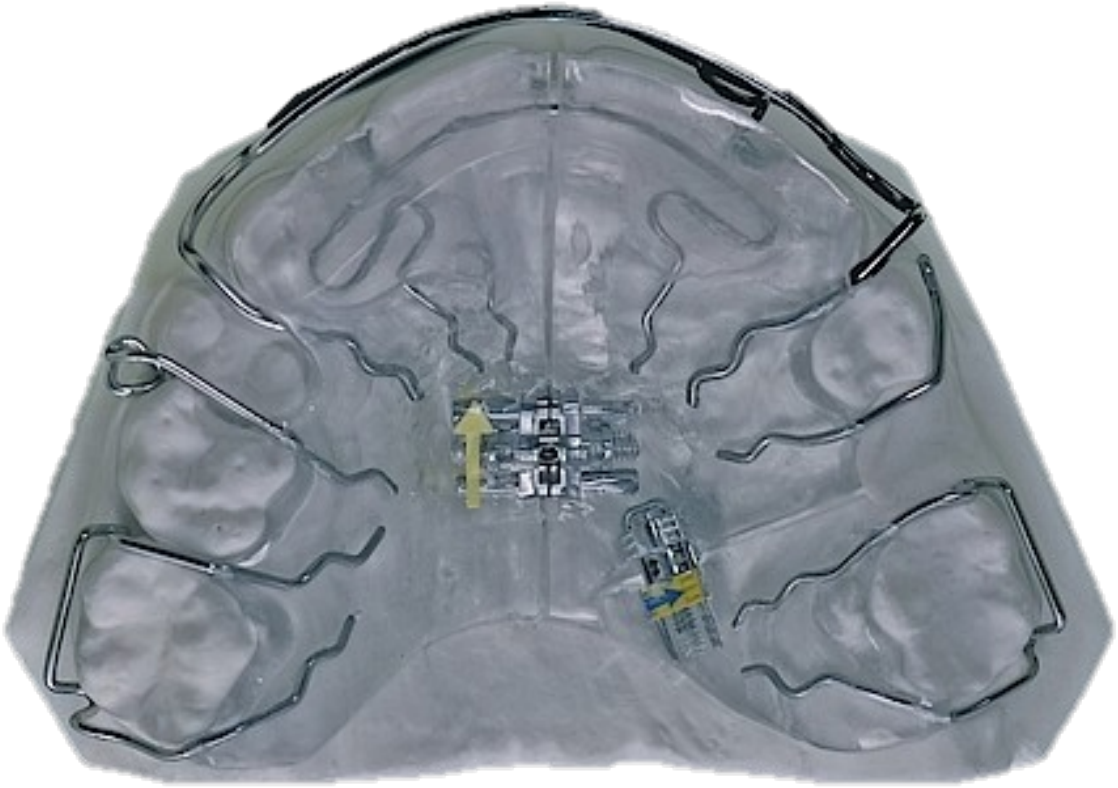
LABIAL ARCH

- is able to tilt the incisors backwards (retrusion)
- „U-loops” – canines.



Removable lower inclined plate

Removable upper inclined plate

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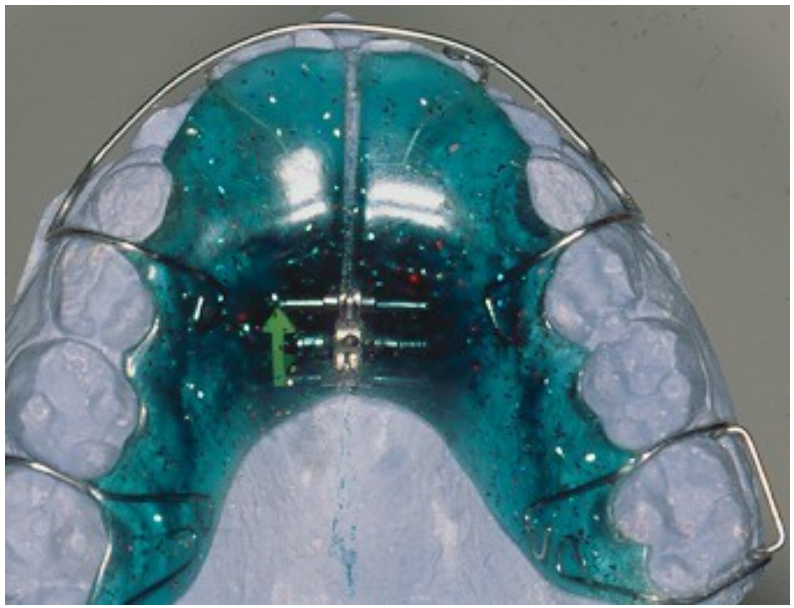
Distalizing device

Upper „Y” plate

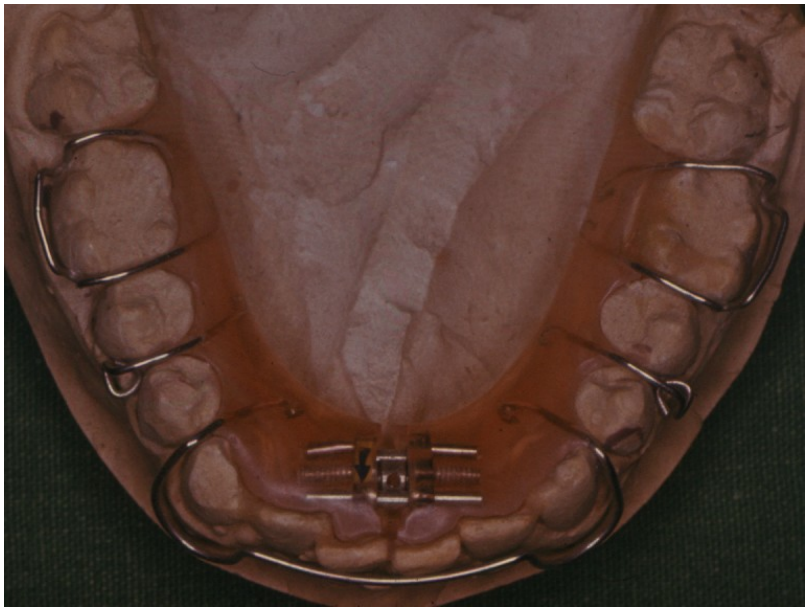
ACTIVE PLATES

Upper typical (symmetrical) active plate

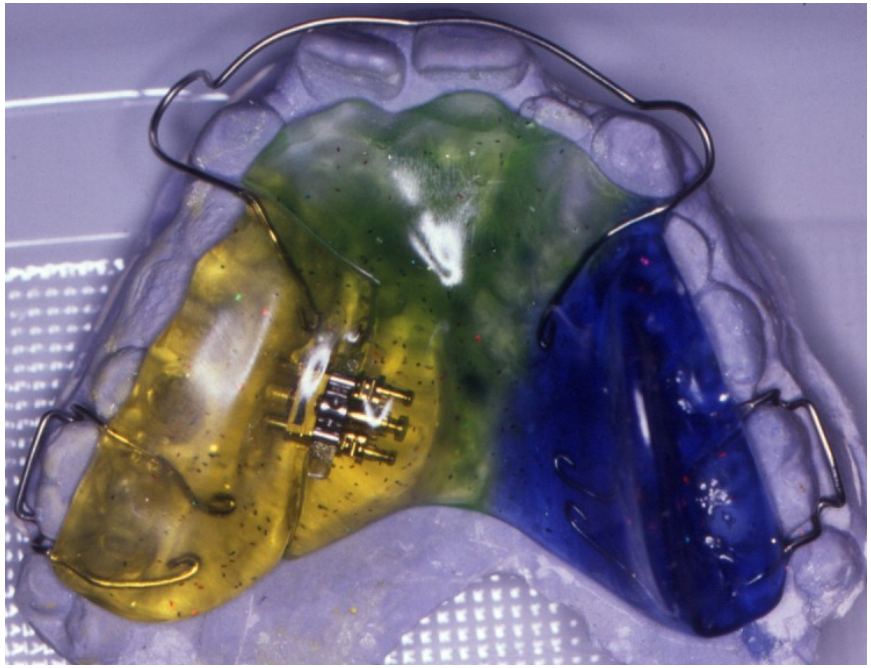
- the screw is in the middle of the appliance



Lower typical active plate



ATYPICAL ACTIVE PLATES



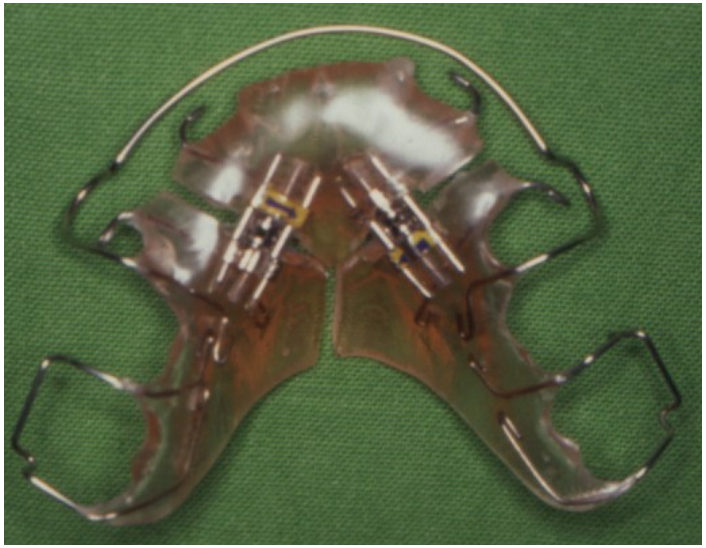
Upper atypical active plate with lateral bite raising

- for the treatment of the lateral crossbite

ACTIVE PLATES
Y-PLATE

Expansion: sagittally and transversally

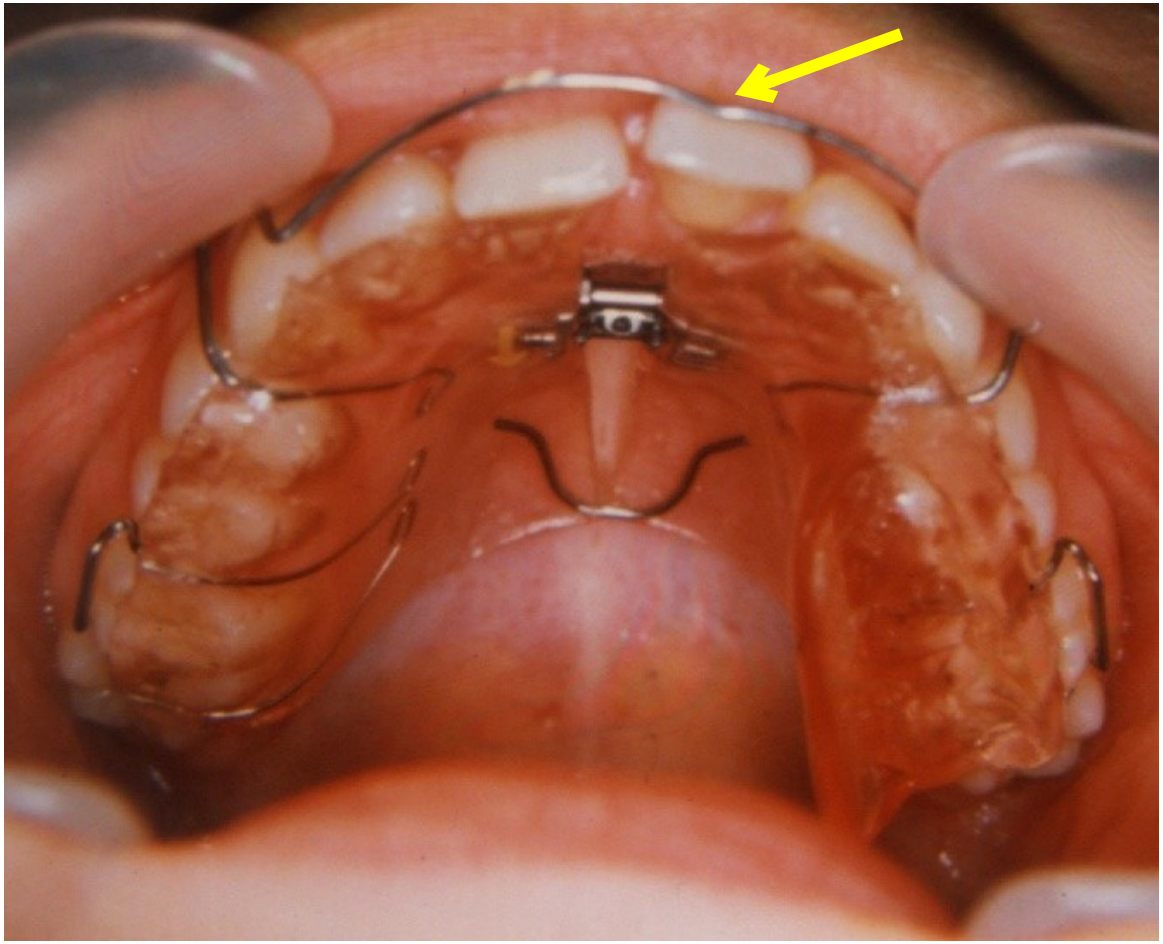
- Kiterjesztése
- Feladatai elhorgonyzás aktív fogelmozdítás



Upper Y-plate

Lower Y-plate

ACTIVE PLATE FOR ANTERIOR EXPANSION

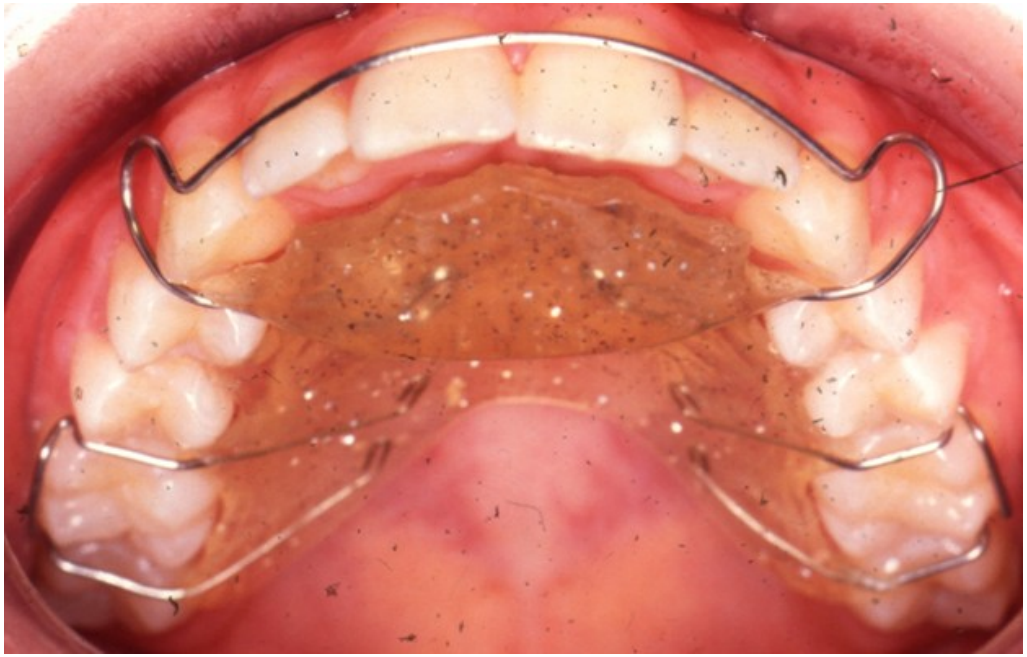


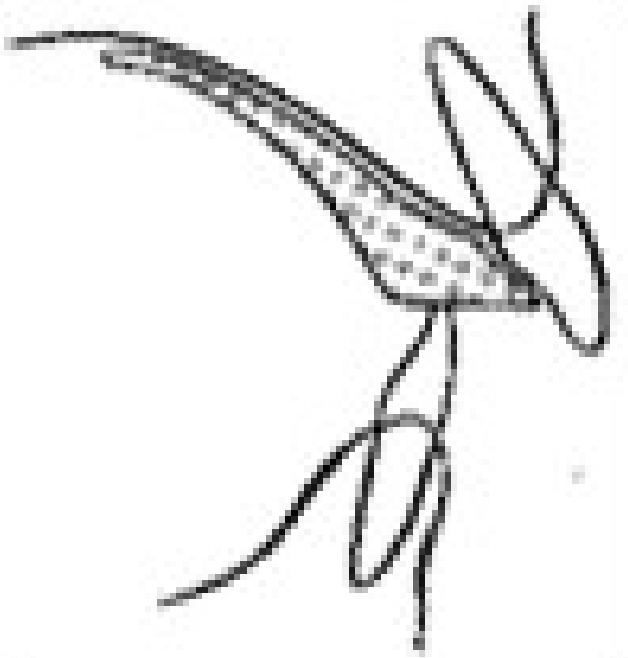
ACTIVE PLATE WITH „TONGUE BARS”

- Speech therapist !

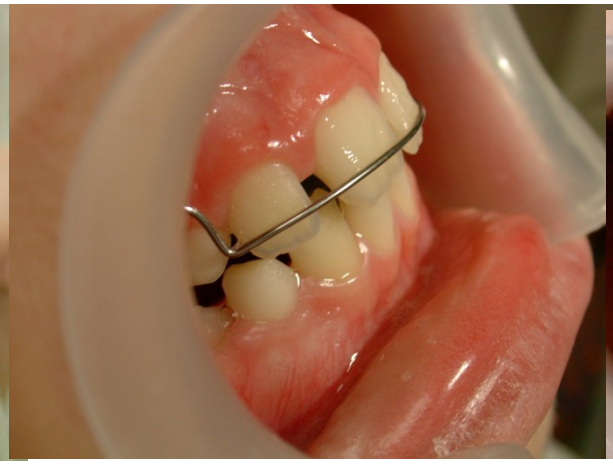
ACTIVE PLATE WITH BITE (RAISING) PLANE

The anterior part of the upper plate is thicker and the continuous contact between the
acrylic base and the lower incisors can cause the intrusion of the incisors.
There is a gap between the molars which can cause the extrusion of the molar area.

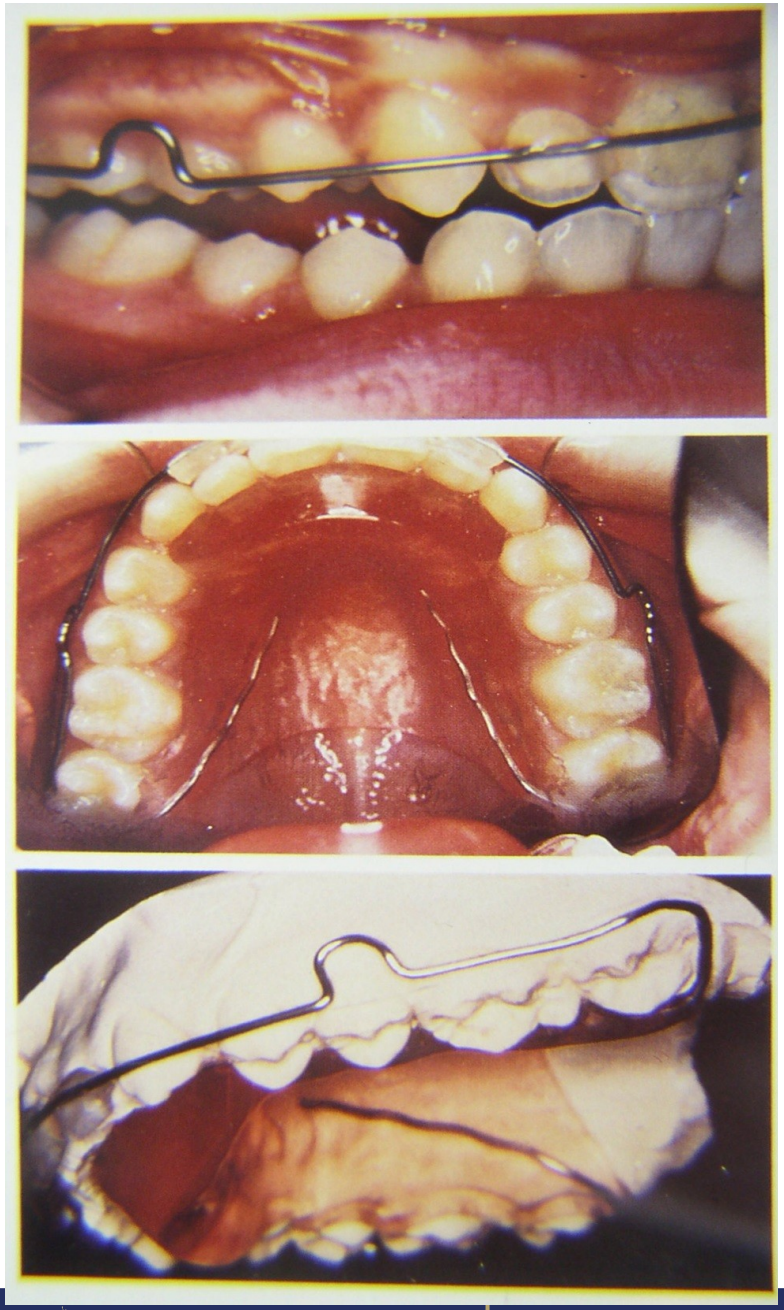




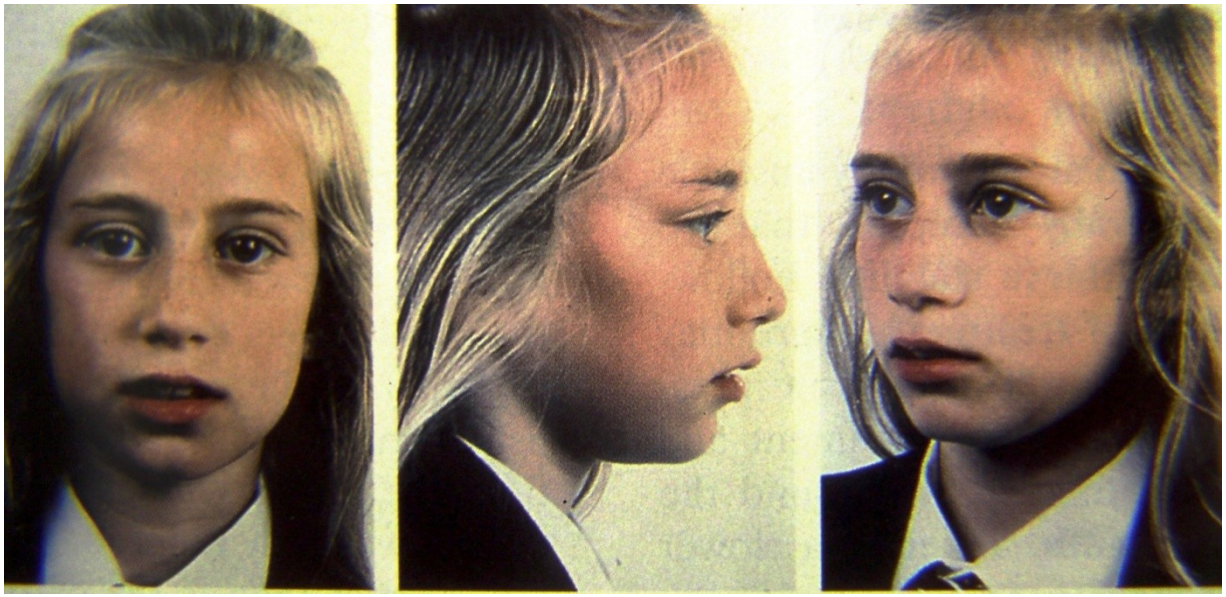
UPPER REMOVABLE APPLIANCE WITH BITE PLANE



REVERSED INCLINED PLANE



REVERSED INCLINED PLANE
for the correction of class II. anomalies



REVERSED INCLINED PLANE

FORCES FOR TOOTH MOVEMENT

- Single tooth movement: no more then 25-40 g per tooth;
- Applied to the cervical margin of the tooth to minimalize the tipping tendency;
- Springs: 0.5 to 0.7 mm wire for single tooth movement or for a group of teeth;
  - *Constructed in 18/8 austenitic stainless steel (SS);*
  - *The more wire incorporated, the greater the range of the spring and the lighter the force exerted.*

Force and deflection of stainless steel springs

$$F=k.d.r^4/I^3$$

k = stiffness of the wire (Young's Modulus)
d = deflection of the wire
r = radius of the wire
l = length of the spring

FORCES FOR TOOTH MOVEMENT

Force and deflection of stainless steel springs

$$F=k.d.r^4/I^3$$

k = stiffness of the wire (Young's Modulus)
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- Increasing the radius of the wire by 2 will result in the force applied increasing by 16 times;
- Increasing the length of the spring by 2 will reduce the force applied by 8 times;

PASSIVE REMOVABLE APPLIANCES
RETAINERS,
PASSIVE SPACEMAINTAINERS

SPLINT RETAINER

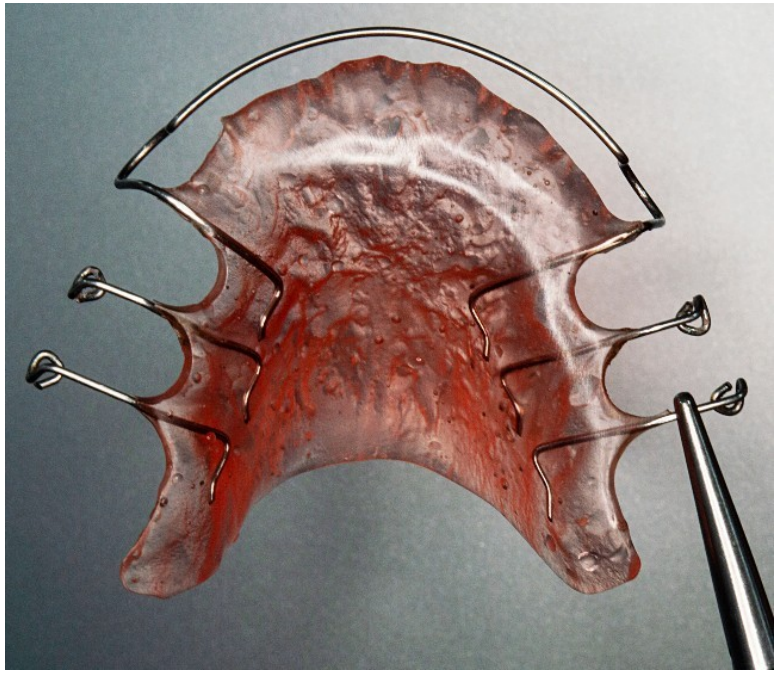
PASSIVE REMOVABLE RETAINER

THE „POSITIONER”

- Was developed by Kesling (USA): 1944;
- „rubber appliance”
- Introduced in 1945, as an auxiliary bimaxillary appliance;
- after MB-therapy for fine corrections, occlusal equilibration, **retention**, sport protector splint;
- Disadvantage: volume, discomfort for the patient, compliance;
- Silicon: Speed Positioner;
- thermoforming technique, 2-3 mm thick material

Passive retention plates

Hawley -retainer



Barrer- retainer

Thank You for Your kind attention!

Assoc. Prof. Rózsa Noémi Katinka,
DMD, MSc, PhD

SEMMELWEIS
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