

Removable appliances II. Functional appliances

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Orthodontic appliances

1. Extraoral:

Chin cap



2. Extra-intraoral:

Headgear



Delaire Maske/reverse headgear



3. Intraoral

3. Intraoral appliances

A) Removable appliances:

- Active plates
- Passive plate
- Functional, bimaxillary appliances

B) Fix appliances:

- Multiband appliances
- Palatal expanders
- Functional appliances
- Others



Removable appliances

- Active plates
- Passive plate
- Functional, bimaxillary appliances



(To improve the relationship between the upper and lower jaw in the mesiodistal, transversal and vertical dimensions)

Frankel, Hansa, Bionator, Aktivator, Twin Block

Treatment options with removable orthodontic appliances

- Passive plates



Treatment options with removable orthodontic appliances

- Active plates

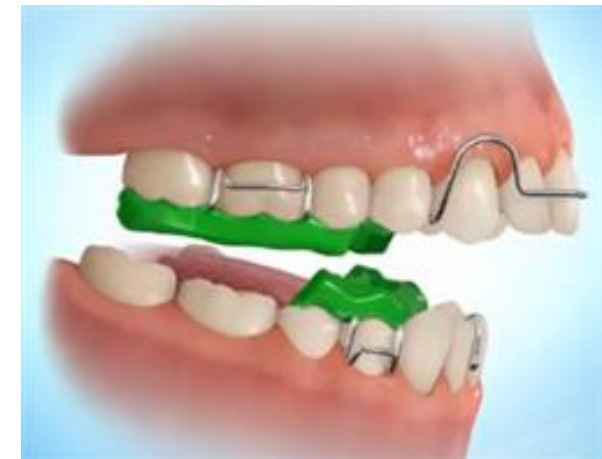


Treatment options with removable orthodontic appliances

- Functional, bimaxillary appliances



(Frankel, Hansa, Bionator, Klammt, Rehák, Activator, Twin Block, Trainer)



Advantages of the removable appliances

- It can be easily removed from the mouth
- Easy to use (patient, doctor)
- Light forces work => less tissue damaging
- Better oral hygiene=> less caries
- Removable appliances used mainly in mixed

dentition

Disadvantages of the removable appliances

- Patients don't wear their appliances as much as it would be necessary (14-16 hours a day)
- Longer treatment time (weak forces)
- Not esthetic, sometimes inconvenient, Bodily movement and torque are not possible (only tilting and rotating)
- Patients sometimes loose their appliances, it can fell out from the mouth, breaks, retools, it can be disturbing during dentition
- Removable appliances influence the speech

Functional jaw orthopaedic appliances

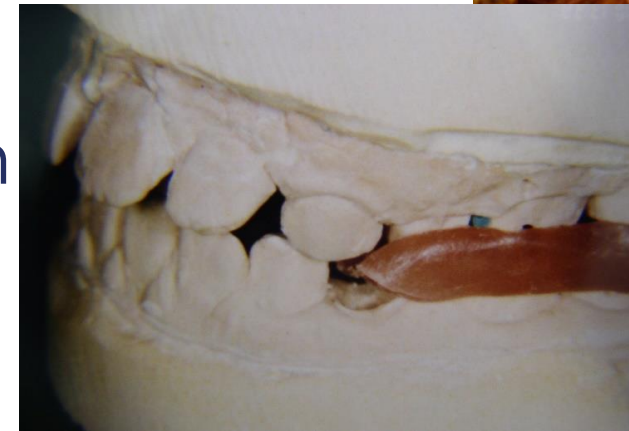
- Wikipedia: Dr. Fränkel developed an approach which allowed the maxillary and mandibular muscles to play an important part in the treatment of developmental and positional anomalies of the jaws.
- Functional regulator appliances train and reprogram the musculature around the mouth=> biological natural forces=> tissue saving physiological effects
- Treatment is **longer**, but the outcome is more **stable** if the functional deviations of muscles are also corrected along with the development of jaw relations and the dentition => less relaps, less recidivism
- Restructuring of TMJ, dentoalveolar area, new muscle balance
- Force is distributed on the whole base of the cranium=> lower tension in the bone structures

Functional jaw orthopaedic appliances

- Mixed dentition (bone structure biological elasticity); best advisable: during the phase of active growing/ pubertate
- Angle II. (Eu), Angle III., Angle I.
- Headgear combinations
- Construction bite, special wax bite:
 - Mand. (max.7-8mm) => protraction in the sagittal dimension=> muscle activation
 - Opening in the vertical dimension (max.2-4mm) => these 2 should be accommodated to each other
- How the appliance works?:
 - Apply on the Maxilla > ask for biting =>
 - Manibula constrained position => muscle tension =>
 - pull the mandibule back in its original position, but the appliance doesn't allow >
 - New TMJ position (cond., fossa) > optimal growing direction> basal jaw relations change

Functional jaw orthopaedic appliances

- Construction bite - set of anteroposterior and vertical relationship of the jaws and transversally positioned => midline!
- Anterior occlusal position/ edge to edge contact of the incisors
=> orofacial muscle activation
- OJ more than 1cm => 2 appliances
- Vertical opening must correlate with the planned sagittal movement

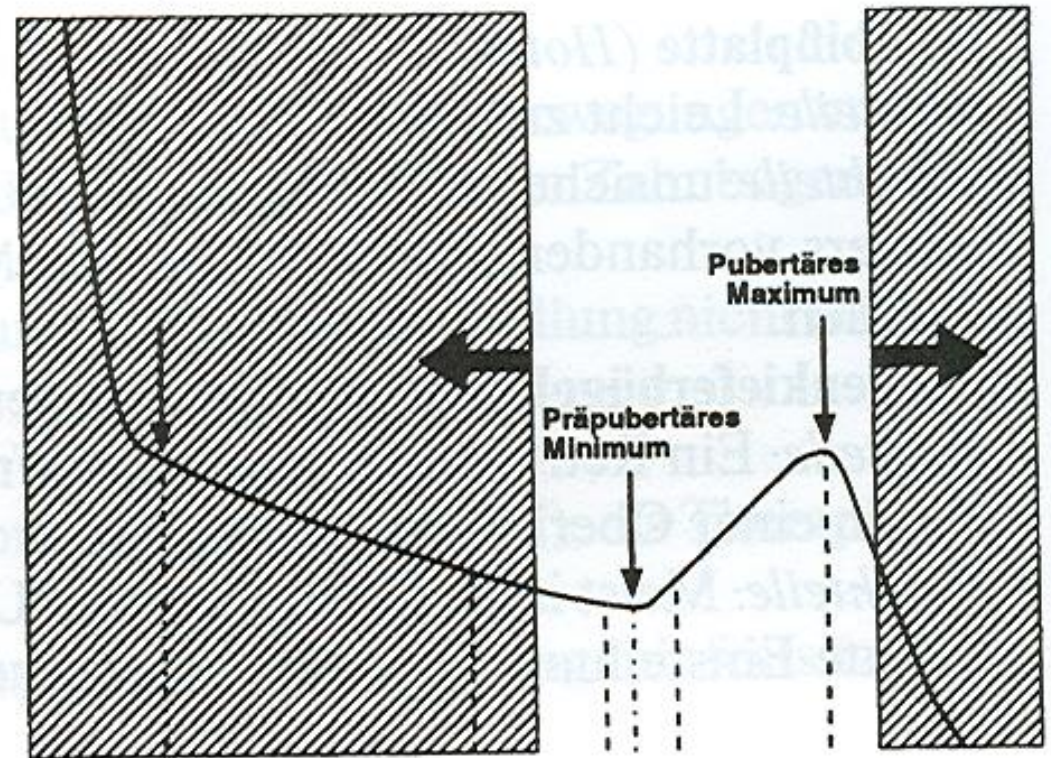
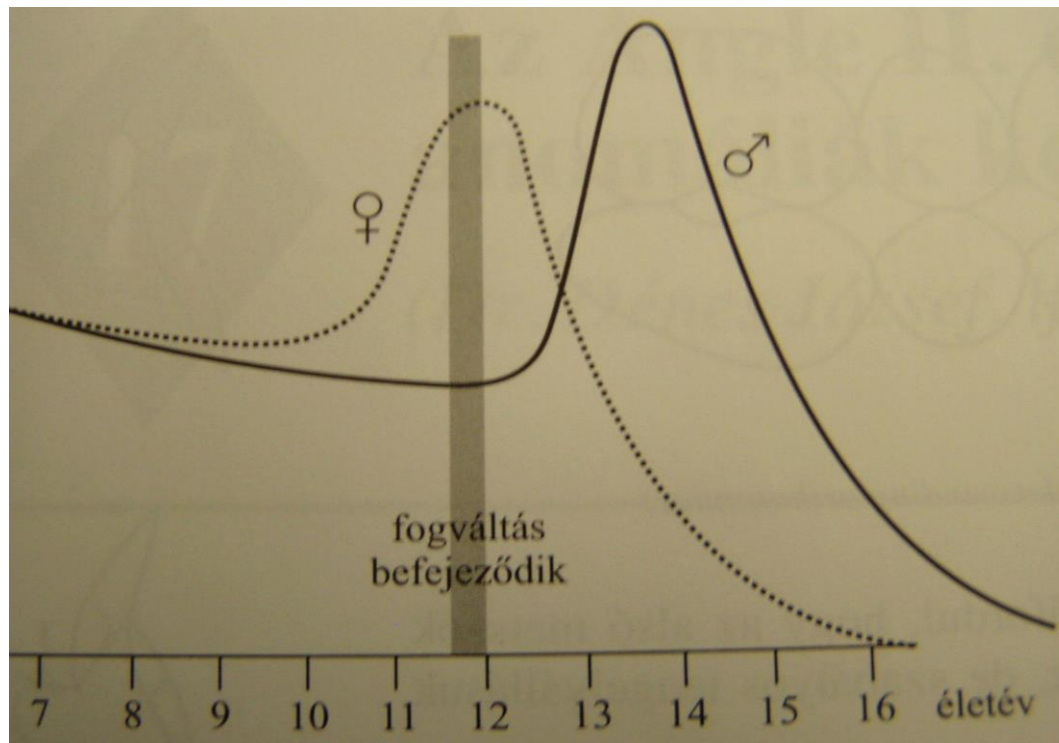


Functional jaw orthopedic appliances

- Sit on 2 jaws
- Treatment of both sagittal & vertical discrepancies (st transversal also)
- Thanks to the tissue forming effect: TMI-/ DA-/ PARO- remodeling = form of the condyles and the sutures change
- Balance of the muscles is to be reached
- Natural ,biological structures (muscle, eruption, growth) active work, not the active elements, but the whole chewing apparatus => orthopedic force => teeth, alveolus, condyle, suture => orthopedic effect:
 - 1. primer: stop bad functions
 - 2. secunder: help and guide the normal growth and development
 - Basic idea: Function => tissue, growth development => limit: developemental and functional disorders

Optimal timing

used in the active growing period, at the beginning of the puberty



1. Activator



- Andresen and Haupl 1940
- Not anchored mobile appliance => neuromusc. sys. act. => more mand. movement
- => intermittent F on the teeth and alveolus (direction, magnitude is determined after grinding)
- => rigid acrylic rampart determines the relation between the jaws

- Not anchored mobile appliance => neuromusc. sys. act. => more mand. movement
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Angle II., III., deepbite, openbite, protrusion, retrusion, eruption



Functional jaw orthopaedics



Set of vertical relationship
Grinding of appliance

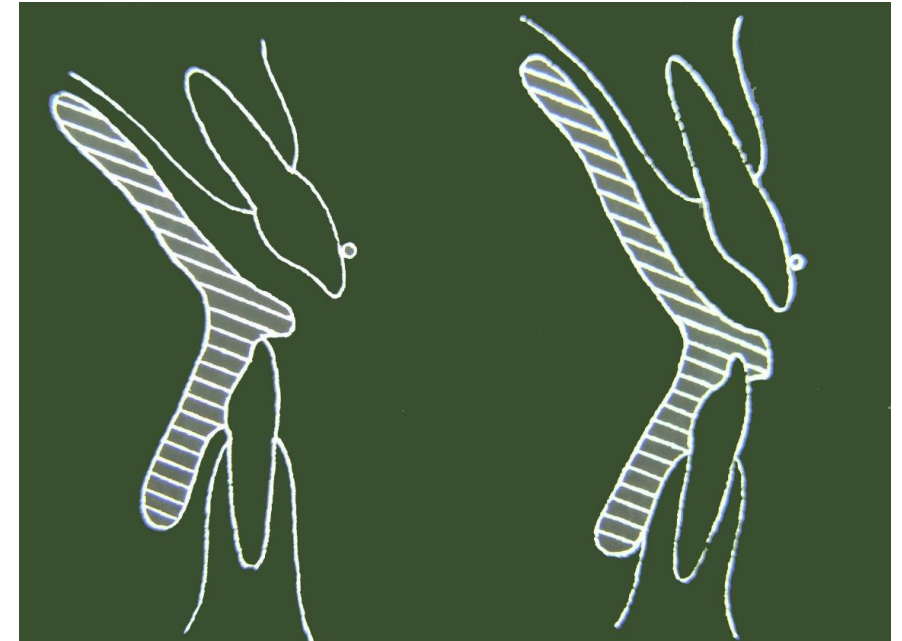
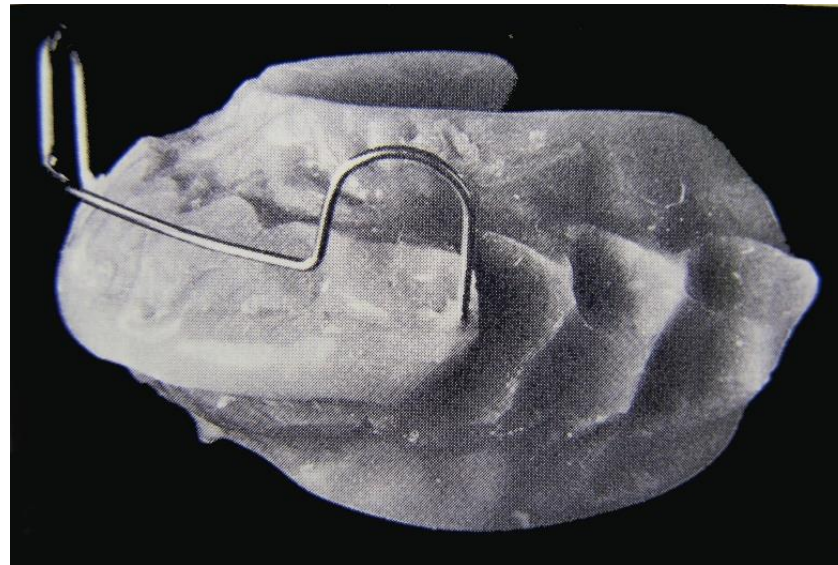


Sagittal grinding

Front protrusion: lingual surface enwrapped, labial arch doesn't touch the teeth

(by lower teeth it is a side-effect; against we work with: ...)

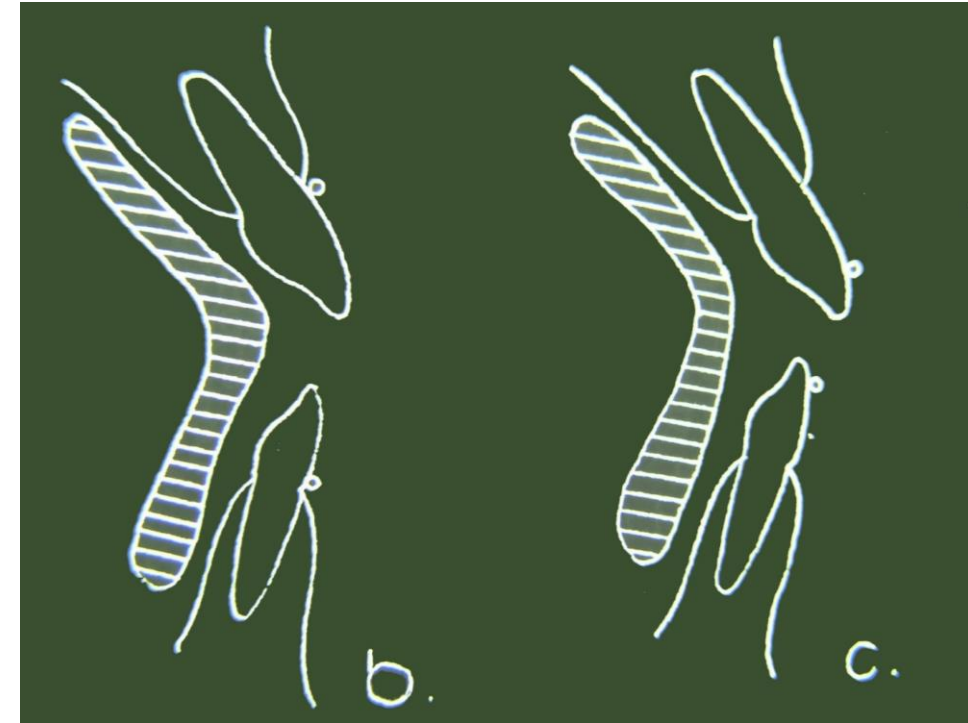
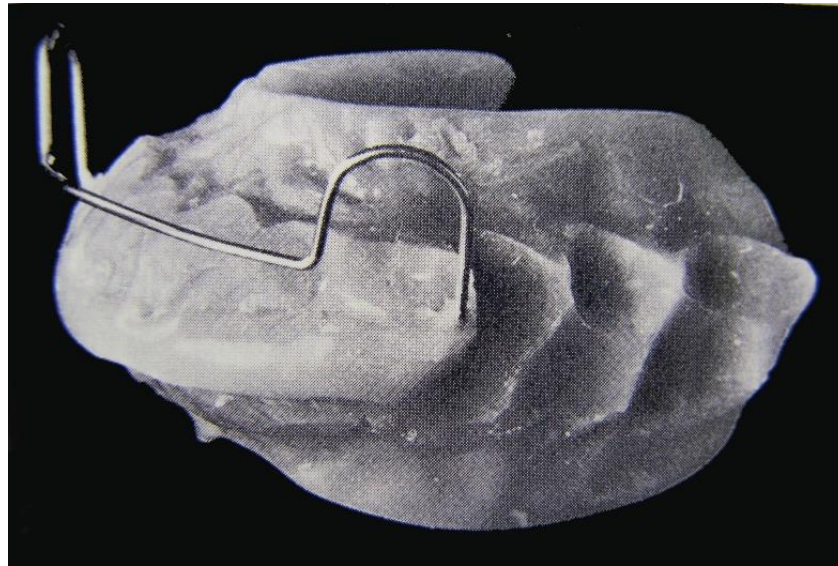
Angle II.: grinding from upper distopalat., lower mesioling. surface => moves to U dist., L mes.

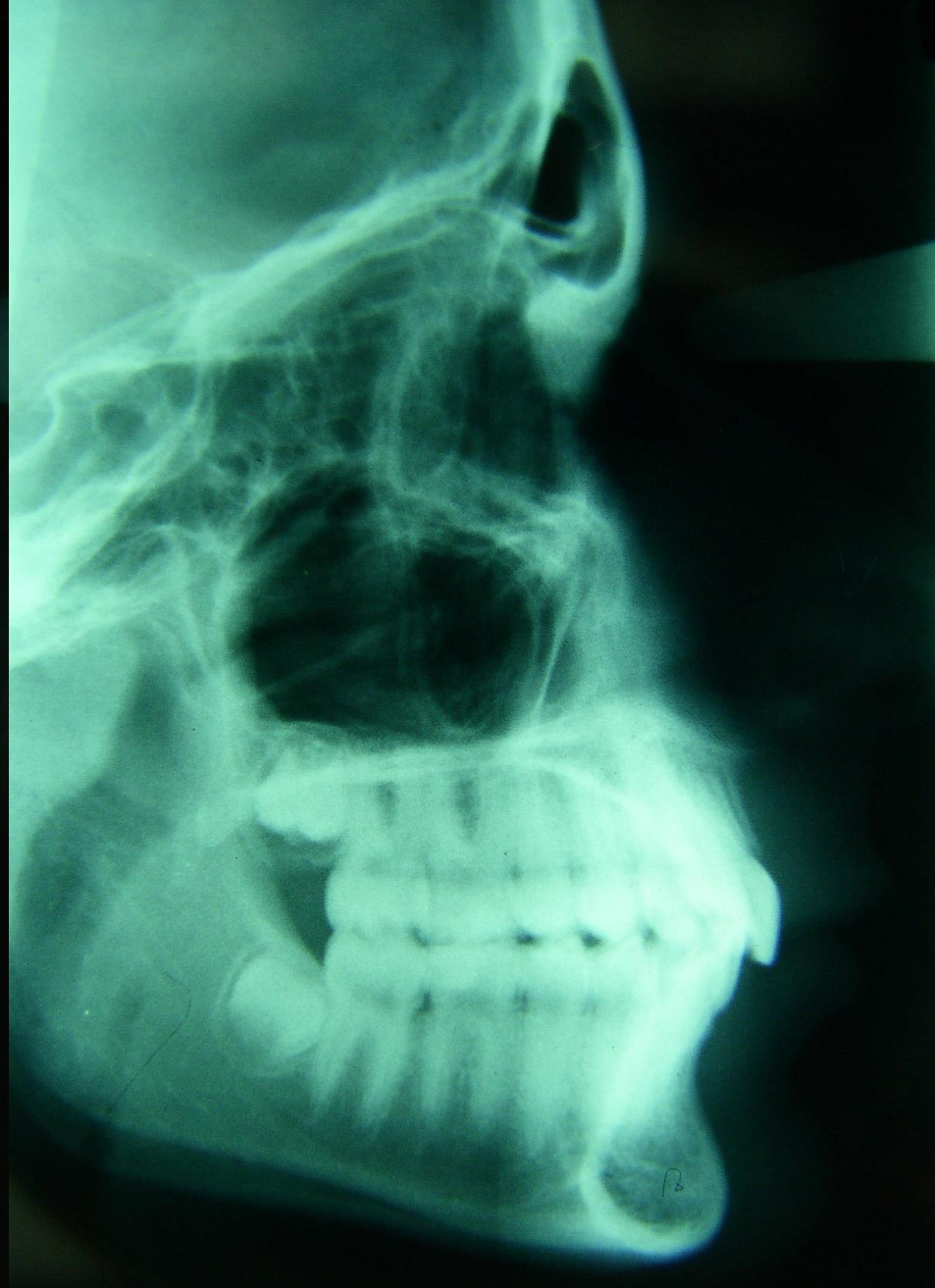


Sagittal grinding

Front retrusio: grinding from the ling. surface of the teeth & alv., labial arch touches the crown or acrilate

Angle II.: grinding from upper distopalat., lower mesioling. surface => moves to U dist., L mes.





Vertical grinding

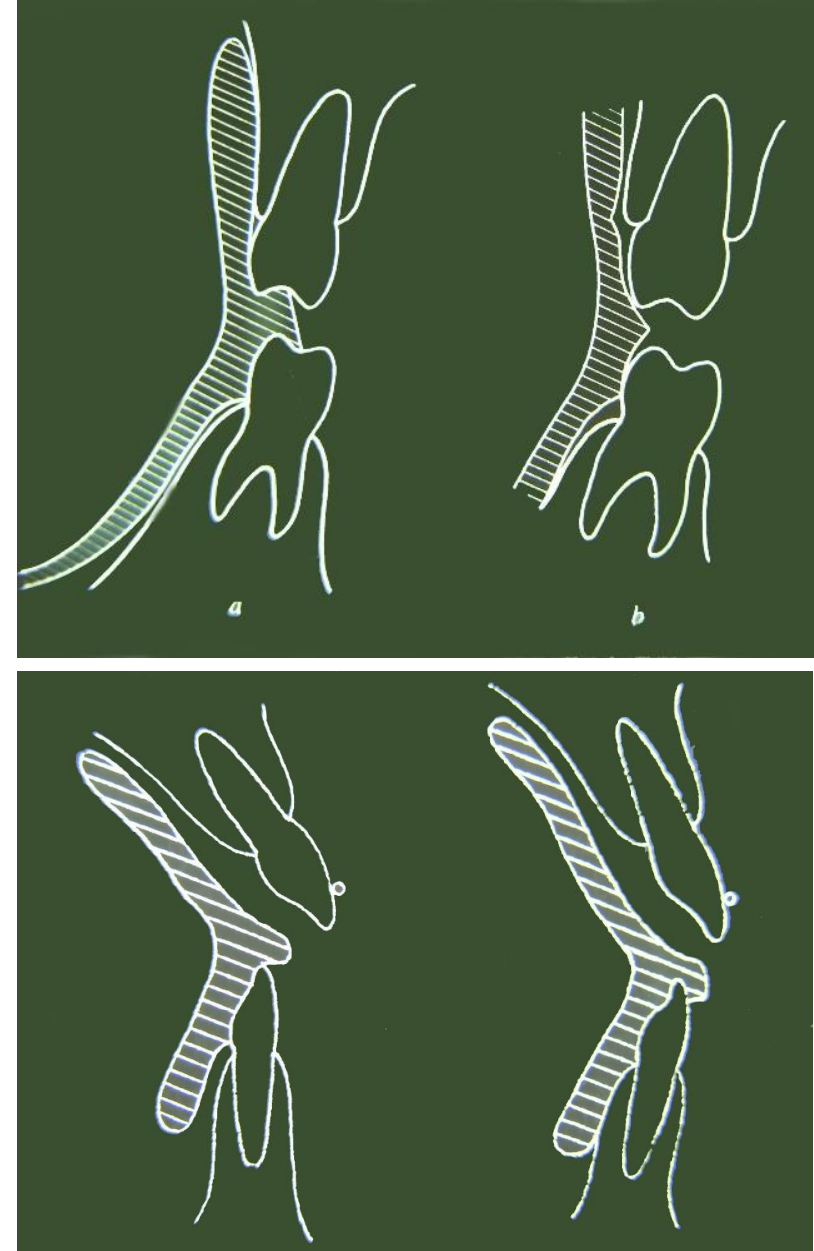
- Height of bite
- Stable occlusion
- Opening the bite:
Guidens fissures:

U: distal + buccal

L: mesial + buccal

Intrusion: acriate touches the occlusal surface, labial arch is incisal to the biggest equator of the tooth

Extrusion: acriate is ging. to the biggest equator, labial arch is in the ging. 1/3



Eruption

skull grows

- > max.-mand. distance changes
- > bucc. teeth grow(U:down & forward; L:up)
- > functional occl. plane evolves
- > determination of anteropost. jawrelation

Angle II. : U: block , L: stimulate => funct. occl. plane is higher =>
occl. position more mesial

Angle III. : vice versa

Twin-block

2 acrylate planes

U: expansionscrew + occl. acrylaterampart

L: anchore + acrylaterampart

therapy of Angle II.

=> 70° surface brings the mand. forward



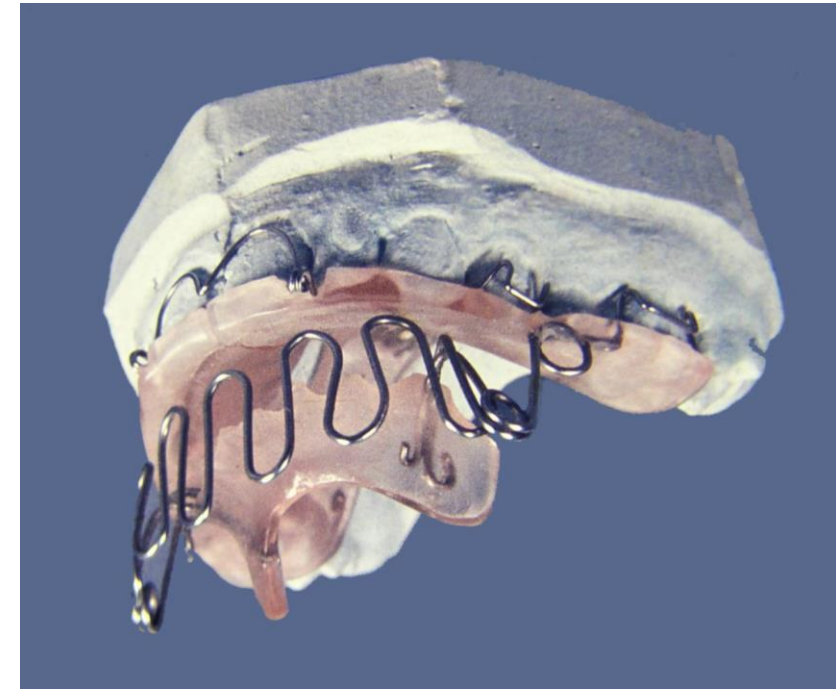
<https://www.youtube.com/watch?v=dMMVTkwf7RU>

Hasund Hansa



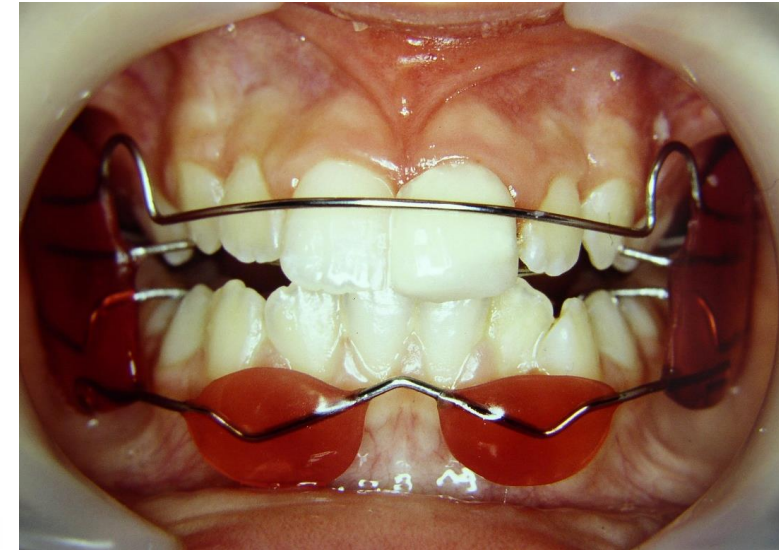
Hasund Hansa

- Upper plate set on the palatum with screw
=> expand
- Surfaces: palat., incis., vestib. torque spring
- Constructions bite
- Labial retractor & Lingual plate: Mand. protr. with active force
- mand. forward => transmits the force of act. muscles to the maxilla
- with the grinding of L 6 the development of the mand. becomes free => guide of growth

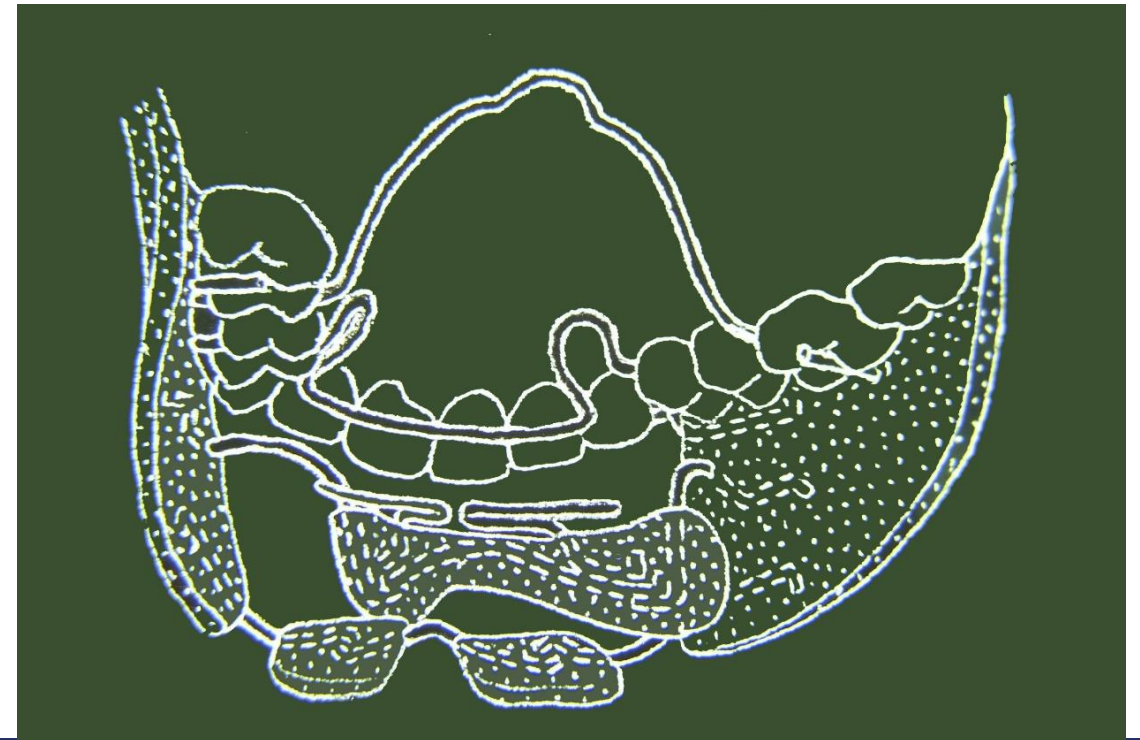
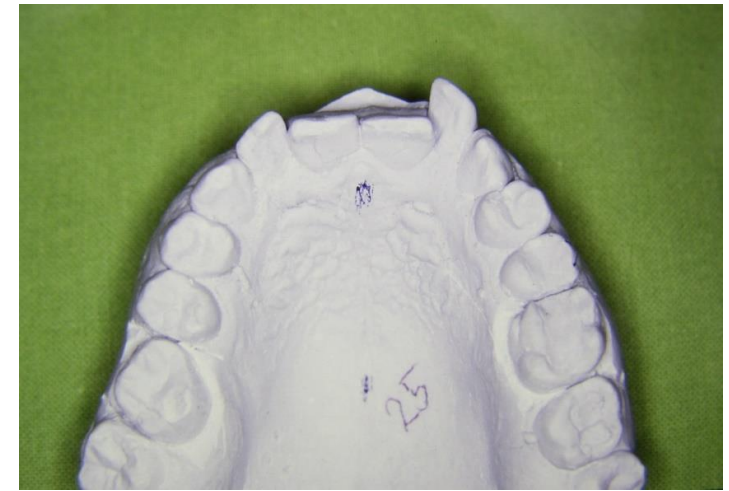


Frankel functional appliance

- fix on the U dental arch > L molars eruption free, vertical
- lingual part: proprioceptive reflex postures the mandible forward (Fr. II.)
- construction bite: max. 3mm sagittal, vertical discrepancy
- doesn't need to activate, but it's changeable by the technic in case
- works slow (years), 20 hours of wearing a day
- Angle I.(Fr.I), II./1(Fr.I v. II), II/2(Fr.II), III.(Fr.III), openbite, bimaxillary protrusion(Fr.IV), Fr.&HG



Frankel Angle II/2: Protrusionspring palatinal



Klammt elastic Activator



- 2 side acrylate block => Coffin-spring
- 2 labial arch » retract the lip, guides the front teeth



Angle I., II., III.,
front sagittal, vertical, rotation
(protr./retr./extr./intr.)

Bionator

- Reduced plate, activator
- 2 sides acrylic block
- Coffin-transpalatinal arch
- Az acrylic on the lingual surfaces of lower incisors



Balters Bionator

- Opend, reduced activator
- (smaller, doest narrow the room of the thonge, it pressure on the acrylate> elastic, convenient for daily use)
- Coffin-spring
- Balters: thonge & mimi muscle balance => form of the dental arch
- Angle II./1, II./2 , III., openbite



https://www.youtube.com/watch?v=Fs0I_9ApDZY

Rehák 2-block dynamic appliance

U teeth & alveolus acrylic > sits fix > Coffin-spring,
palat.-spring, labial arch

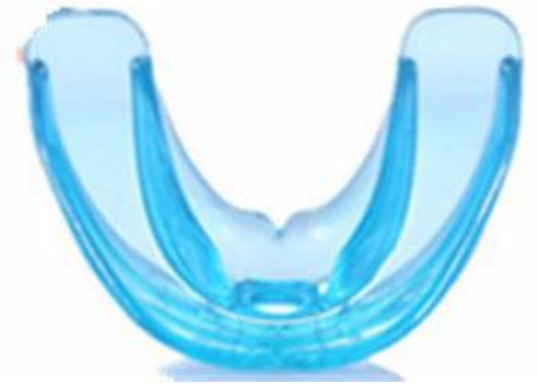
Wings dynamic: grinding from the acrylic » sits
loosely
> functional effect

Doppel- Platte



Myofunctional appliances/ Trainerek

- prefabricated
- simple, cheap
- „pre-orthodontion appliance”



Thank you for your attention!

