Removable appliances II. Functional jaw orthopedics

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Classification of the orthodontic anomalies

1. Basal (skeletal)
2. Dentoalveolar (teeth, proc. alveolaris)
3. Basal and dentoalveolar
The character of the orthodontic anomalies

Normal, but disadvantageous face:
- most of the treated patients

Orthodontic anomalies:
- developmental
- other pathological process
- consequence of trauma
The reasons and character of the orthodontic anomalies

The reasons of the big variety:
- The face has several components
- Each of them has an own growth program
- The different tissues show different response after the forces turn up

The growth is altered by:
- Bad habits
- The muscular function
Bad habits frequently cause malocclusion

Bad habits:
- Finger-sucking
- Thumb-sucking
- Mouth breathing
- Swallowing problems
- Tongue-thrusting
- Speech defects
Aims of the modern orthodontic therapy

Balanced occlusion

Harmonic profile
The aims of functional therapy

Neuromuscular stimulation
Normalisation of the sagittal / relation
Expansion of the arches
Functional analysis

1. Profil
2. Lips
   (form, position)
3. Tongue
4. Airways
5. TMJ
Evaluation of the lateral cephalometric X-ray

1. Profile
Soft tissue analysis
Line of harmony
2. Lips
3. Tongue
The forms of tongue thrusting

Anterior
Posterior
Both
4. Airways

Evaluation of the adenoids
5. TMJ

Bilateral examination of TMJ
Myofunctional therapy

Early period: oral screening
myofunctional appliance
(ensures the normal function, helps the corrections of the functional problems and the dental anomaly)
The way of the functional therapy

Functional stimulation of the tissues, jaws, condyle and the teeth
**Functional appliances**

**Definition:**
Appliance that effects on the posture of mandible causing stretching the facial soft tissues, to produce a combination of dental and skeletal changes.

**Classification of appliances:**
- Tooth-borne or mucosa-borne
- Passive - e.g. bionator
- Active - if they carry active components like expansion screw
Use of functional appliances

Midline aligning

Arrangement of the horizontal relation and the vertical relation
History

Roux 1883. – functional stimulation
Wolf 1895.
Robin 1902.
Andresen-Häupl 1938.
Schwartz 1942.
Balters 1956.
Fränkel 1958.
Functional appliance

*Basis of its work:*

The grows of the mandible is guided (particularly in the anterior and vertical directions) but the grows of the maxilla is also affected.
Functional appliance

Mode of action

~ Works by posturing the mandible forwards, which causes soft tissue stretching. This generates Class II intermaxillary traction forces.
Functional appliances

Main effects of use:

- Correction of malocclusions in young patients by influencing on grows
- Elimination of functional disturbances
- Correction of tooth positions (retrusion or protrusion of lower or upper incisors)

Can’t solve the torque of teeth and very limited in improving rotations!
Functional appliances

Correction in overjet (as a result) produced by combination of tooth movement (70%) and skeletal movement (30%)

Effects of functional appliances:

Dentoalveolar changes - retroclination of maxillary incisors, proclination of lower incisors

Increased mandibular length – due to downward and forward translation of the condyle which may encourage backward compensatory growth

2-4 mm; great individual variation
Effects of functional appliances

- An increase in lower anterior face height (LAFH) – due to a combination of molar eruption and downwards mandibular grows (useful where there is a deep overbite)
- Forward remodeling of glenoid fossa
- Restraint of maxillary grows – due to the Class II traction forces acting on maxilla. Incorporation of headgear into functional appliance treatment increases this effect.
Functional appliances

Patient selection

Criteria and indications:

• Class II malocclusion (Class III malocclusion)
• Significant Class II skeletal discrepancy with mandibular retrognathia
• Growing patient (during the pubertal growth spurt) for maximum response (males: 14-16 year olds; females: 11-13 year olds)
• Compliant patient – difficult tolerancy; patient must attend for regular appointment

Motivation & cooperation!
Functional appliances

Contraindication:
disturbed nasal passages,
limited intraoral space – when
the patients are not able to keep the appliances in the mouth!
Types of functional appliances

1924 - Viggo Andresen (Norway) – activator - many modifications

The twin block appliance

For Class II cases with a reduced or normal vertical dimension

*mandibular and maxillary appliance:*

acrylic baseplate with midline expansion screw; Adam clasps (placed onto the first permanent molars - and first premolars)
The bite blocks cover the occlusal surface of the premolars and molars (labial bow for the retention and to aid the retraction of upper incisors)

Two-piece appliance
– it allows lateral mandibular excursions - may increase comfort and improve compliance
Twin block in the practice
Twin block in the practice II
Functional appliances

Balters

Klammt
Functional appliances

Andresen-Häupl

Fränkel

Hansa
Hansa appliance
Modified functional appliances
Diagnosis

- Anamnesis
- Clinical examination
- Model analysis
- Radiographic examination
- Cephalometric analysis
- Functional examination
- Photographs
Diagnosis and treatment plan

1. Type of face
   - prognath
   - orthognath
   - retrognath

2. Basal configuration
   - Sagittal
   - Vertical
   - Transversal
Functional appliances

When to start the treatment?

Optimally, *prior* to the loss of the primary second molars

(the difference in mesiodistal crown dimensions between the primary molars and correspondent teeth can be utilized for the correction of the distooclusion)
In which age should we use the functional appliances?

Ideal: 8-12 yrs

During growing

Wearing time?

12-15 hrs daily
Functional appliances

How to start?
What we need?

Recent set of dental cast
Construction bite/
bitewax
Construction bitewax

Edge-to-edge
Construction bite

Two thirds of a red wax sheet is warmed by a flame/in hot water

The soft wax is rolled and fitted on the recently obtained mandibular dental cast
The patient occludes in the wax roll, positioned at the mandibular teeth – anterior position! (under guidance)
Construction bite
Summing up (aims and results of...)

- Profiting the growth period
- Neuromuscular stimulation
- Cancelling the dysfunction
- Rebuilding the TMJ
- Pretreatment before MB appliance
Effects...

Before treatment...

After

(9 months later)
Thank you for your attention!