ORTHODONTICS

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ORTHODONTICS

Stomatological specialisation dealing with prevention, diagnostics and therapy of irregular tooth position, relationship of tooth arches and jawbones

MALOCCLUSION is a manifestation of genetic and environmental interaction on the development of the orofacial region

GOALS OF TREATMENT:

- Ideal functional occlusion
- Ideal soft tissue proportions and adaptation
- Ideal jaw, skeletal and dental relationship

Ideal occlusion

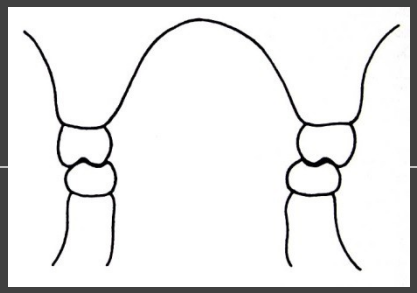
correct relationship of molars

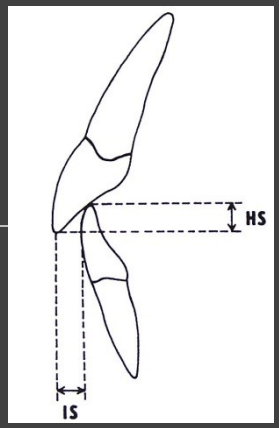
correct overjet and overbite

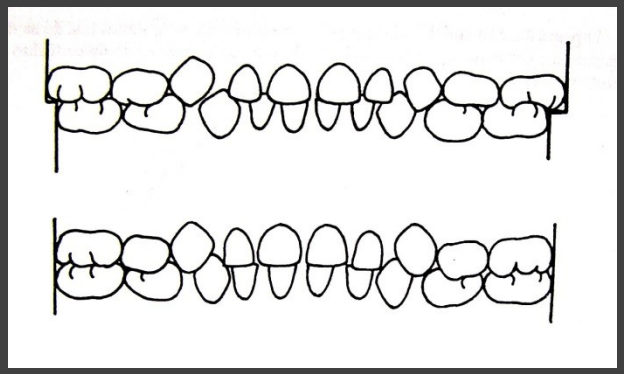
Correct intercuspidation of teeth

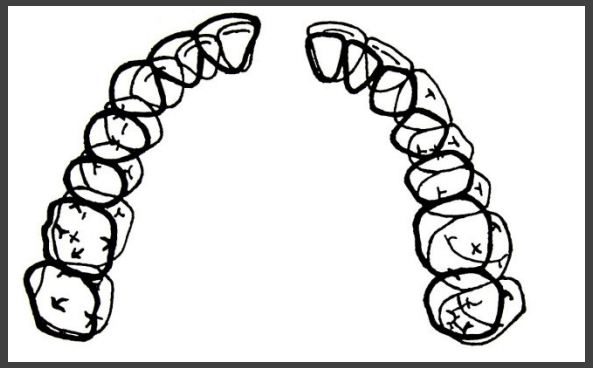
Points of contact are lined in an regular arch

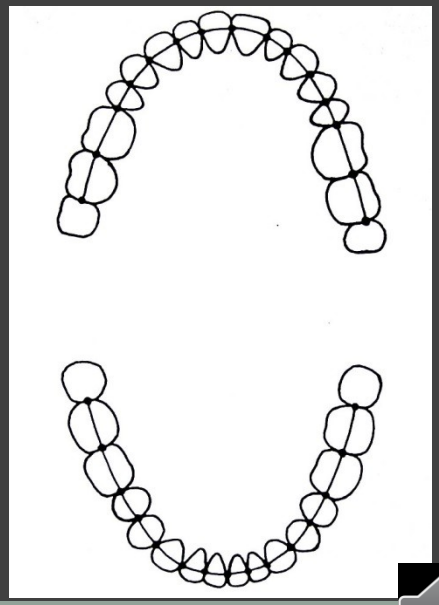
Deciduous dentition is ended either by a small step or the posterior teeth facets are aligned











Correct dentition has 6 keys of correct occlusion- Andrews

Ideal occlusion

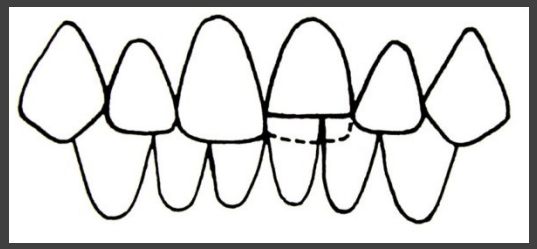
Classification of orthodontic anomalies

1. Anomalies of single tooth

Inclination – tooth tipping mesially,distally,

vestibular =protrusion, oral=retrusion, vestibular, lingual, palatal eruption

Vertical anomalies - supraocclusion, infraocclusion



rotation

Classification of orthodontic anomalies

1. Anomalies of single tooth

Nonocclusion – buccal, lingual, palatal

upper teeth are not in contact with lower teeth

Transposition – change of sequence of teeth in one arch, eg. the canine and first premolar or canine and lateral incisor

Classification of orthodontic anomalies

1. Anomalies of single tooth

Rotation - mesial, distal

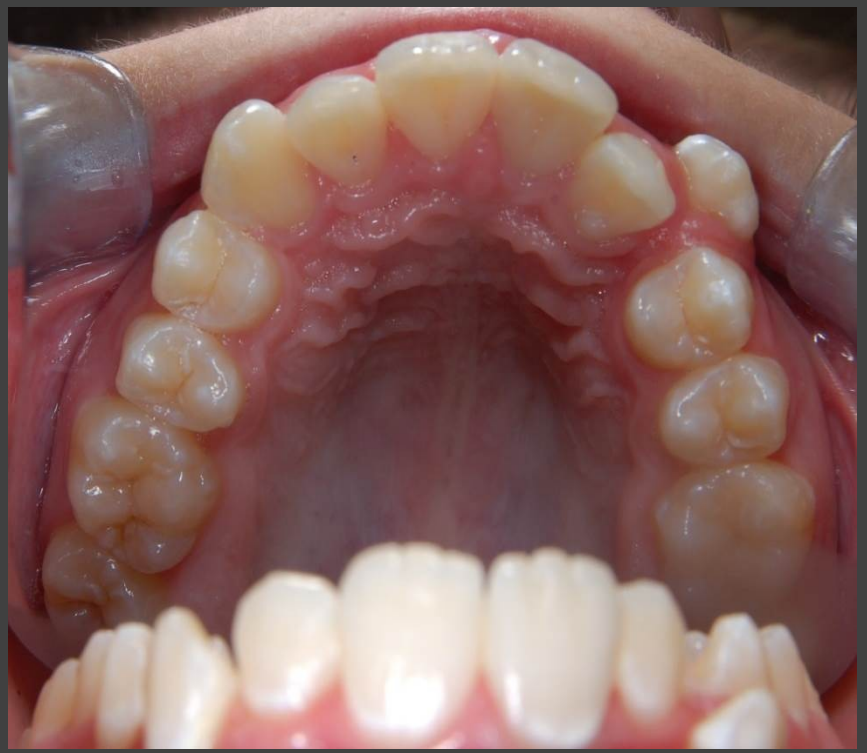
Retention – the teeth is developed, but not erupted, most often: wisdom teeth, upper canine

Ankylosis, reinclusion

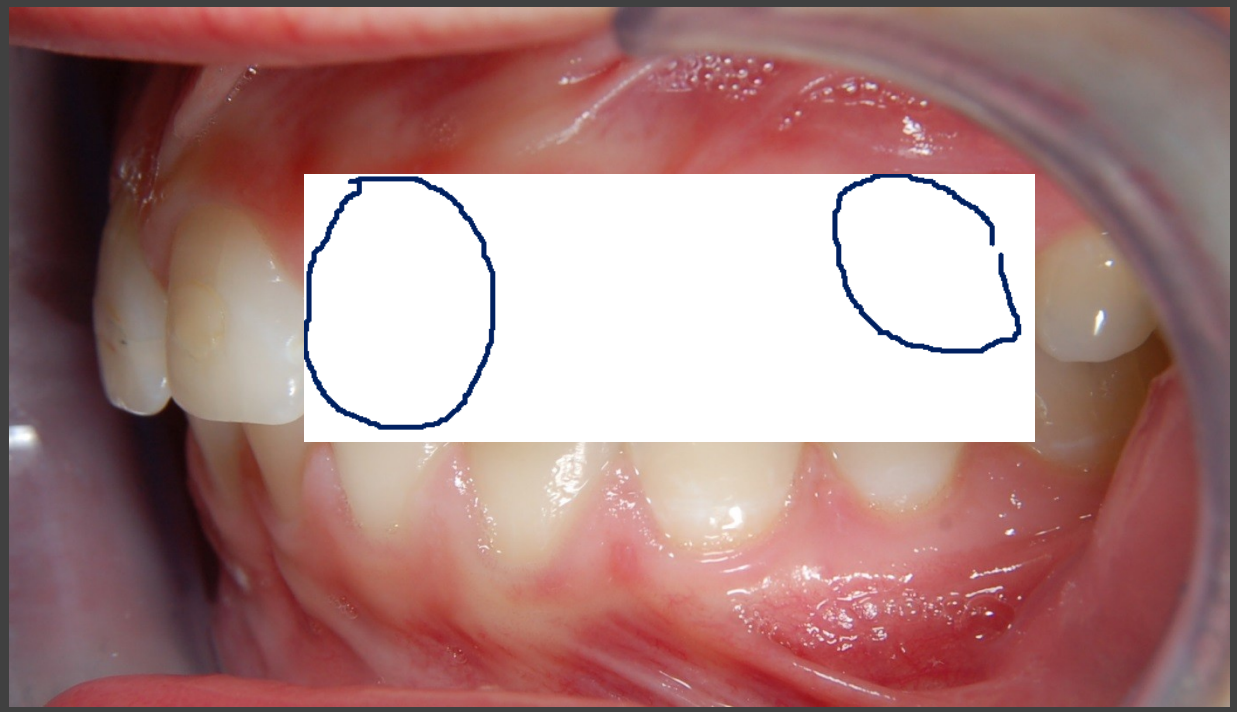
Hyperodontia – the number of permanent teeth is higher [supernumerary teeth, most frequently- mesiodens, upper incisors]

Hypodontia – the correct number of teeth is reduced because some teeth are absent due to agenesis of their germs [most frequently- upper lateral incisors, third permanent molars, premolars]

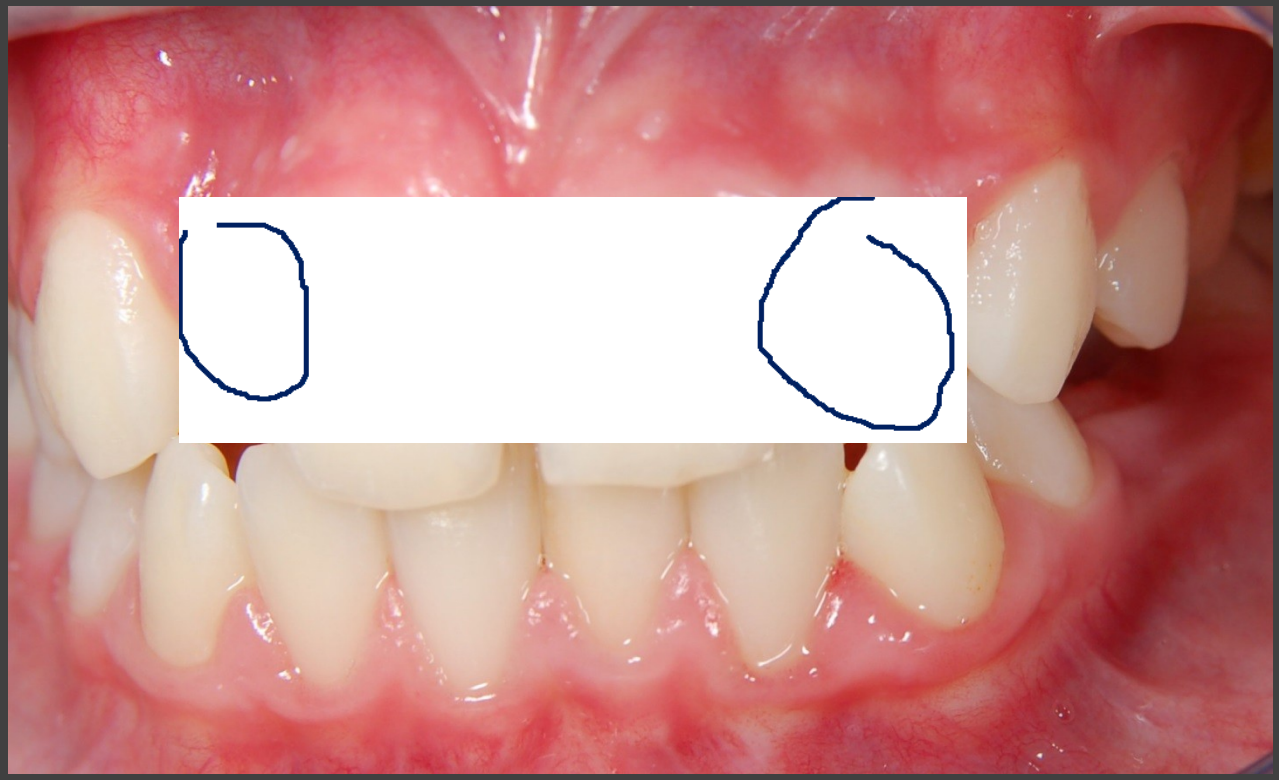
Hypodontia



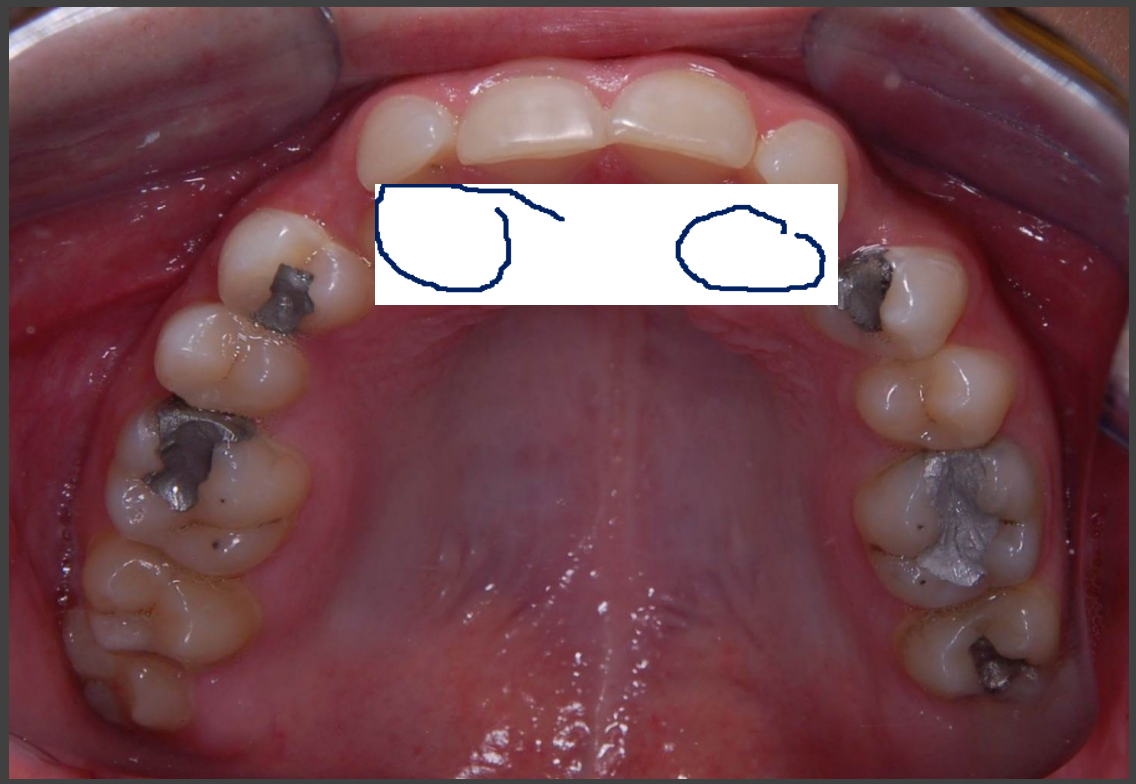
Anomalies of the shape of teeth



Palatal eruption

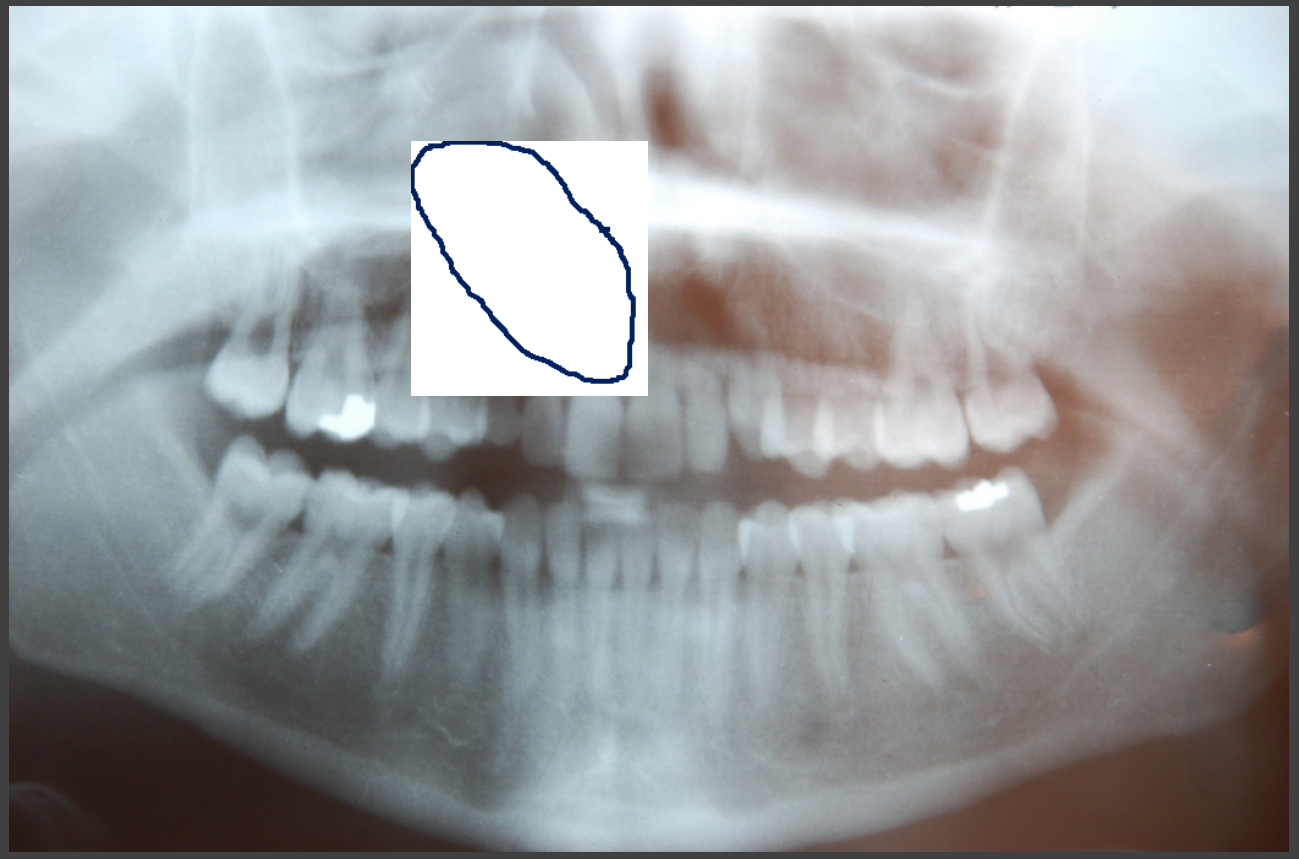


Palatal eruption



Retention of canine

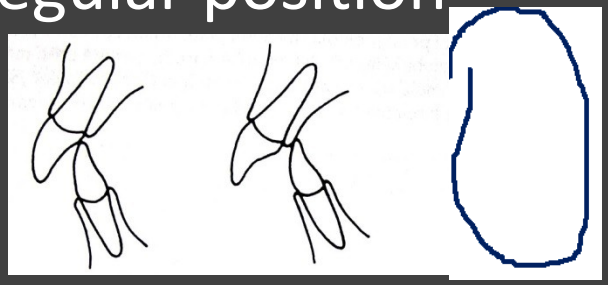
Retention of canine



Classification of orthodontic anomalies

2. Anomalies of groups of teeth

-groups of teeth are in irregular position



Protrusion, retrussion

Inverted bite – is in the frontal part – lower tooth is more anteriorly than the upper tooth

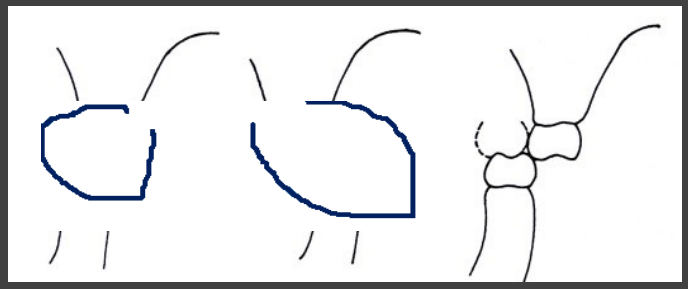
Protrusion with deep bite

Inverted bite

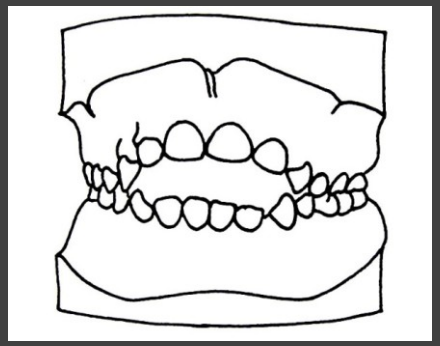
Classification of orthodontic anomalies

2. Anomalies of groups of teeth

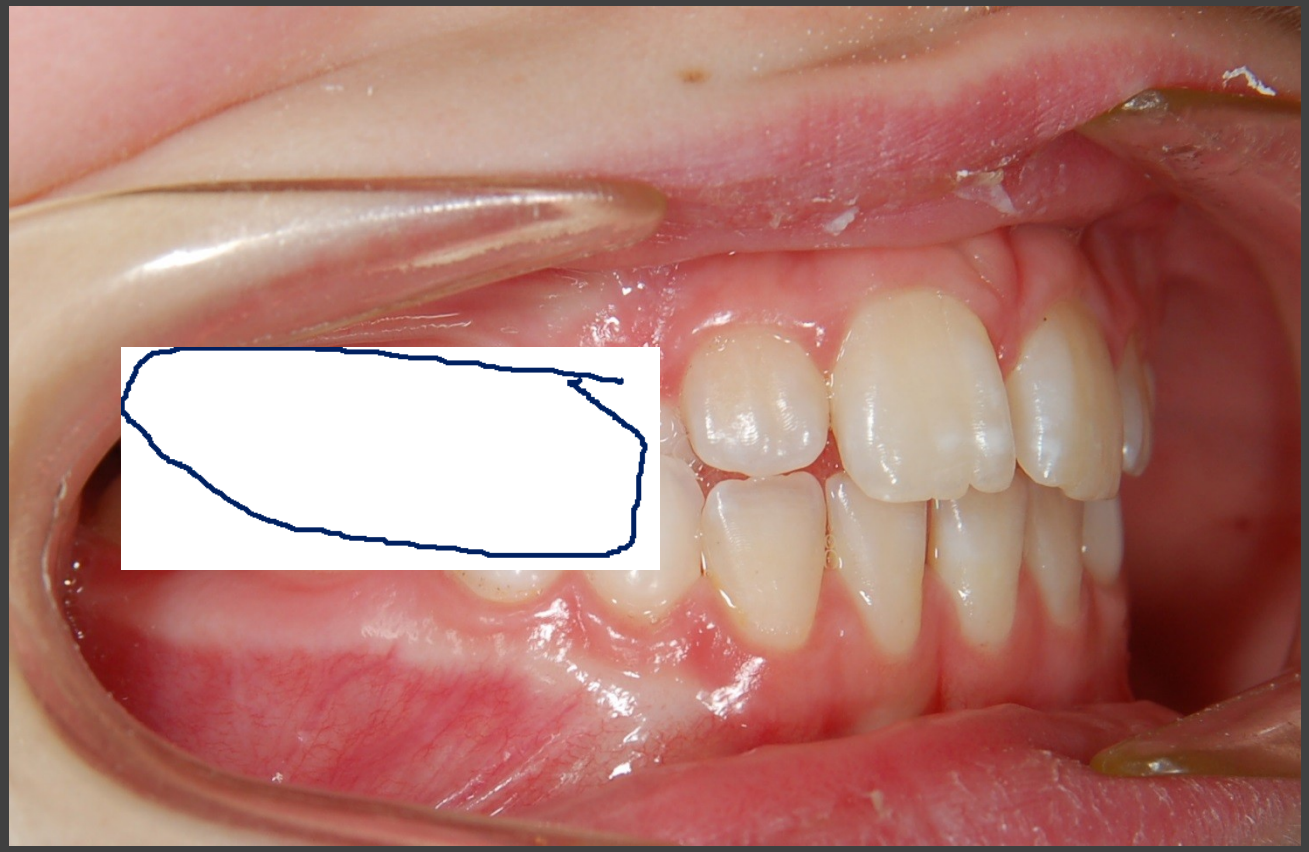
Cross bite – in lateral part the buccal cuspids of lower molars are more buccaly than the in the intercuspidal line



Open bite - negativ overbite



Cross bite



Open bite

Classification of orthodontic anomalies

2. Anomalies of groups of teeth

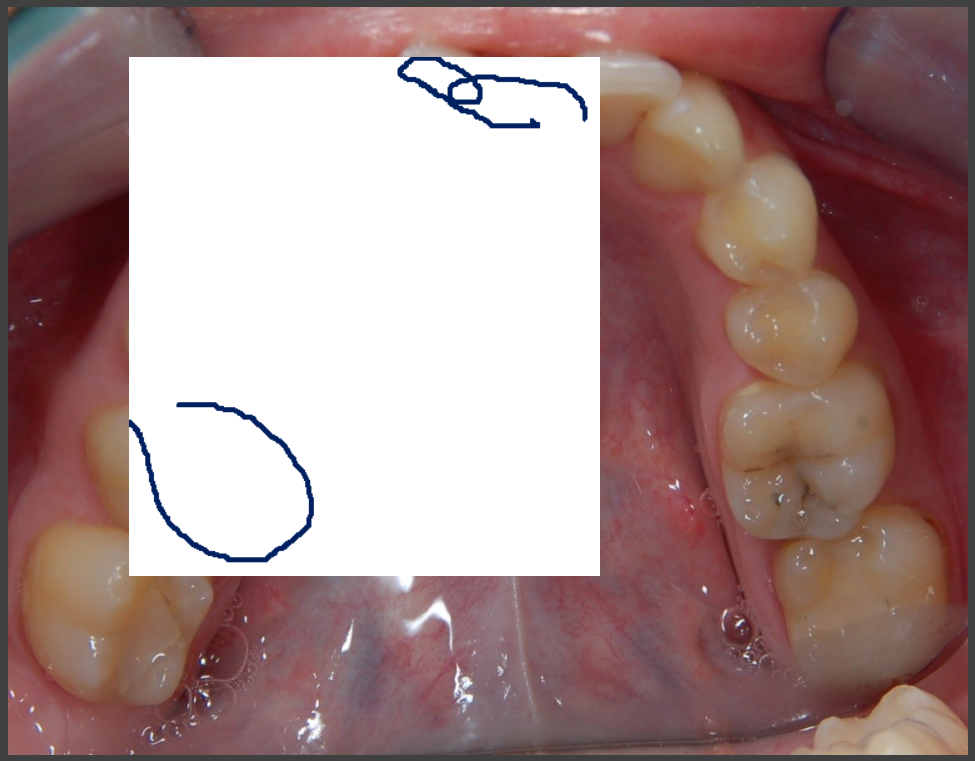
Deep bite – the overbite is increased, the upper incisors cover more than the incisal third of the lower incisors

Spacing, diastema

Crowding – primary, secondary, tertiary

Deep bite

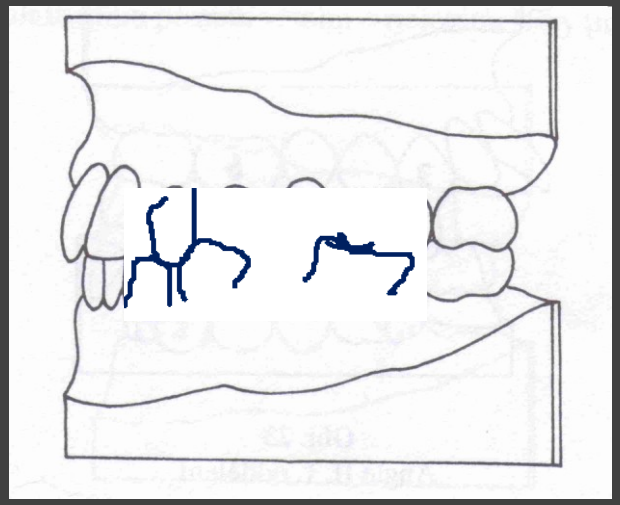
Crowding



Classification of orthodontic anomalies

3. Anomalies of the relationship of dental arches = Angles classification

Class I . normoocclusion



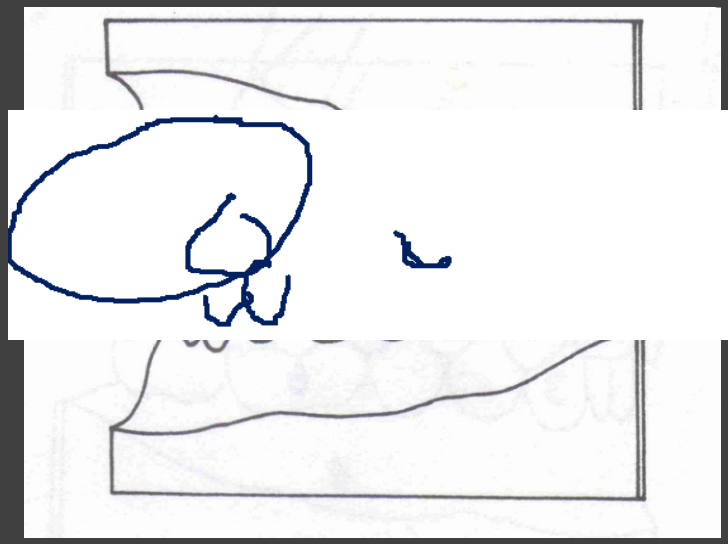
Angle I

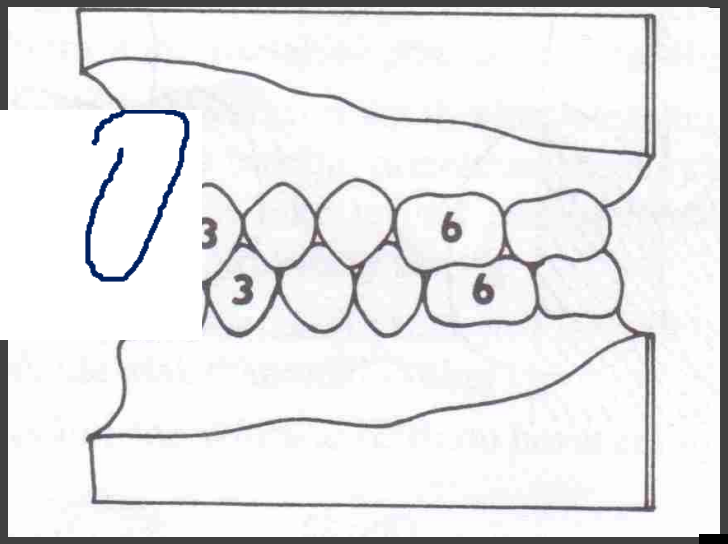
Classification of orthodontic anomalies

Class II : distal occlusion

- with protrusion of upper incisors

- with retrusion of upper incisors

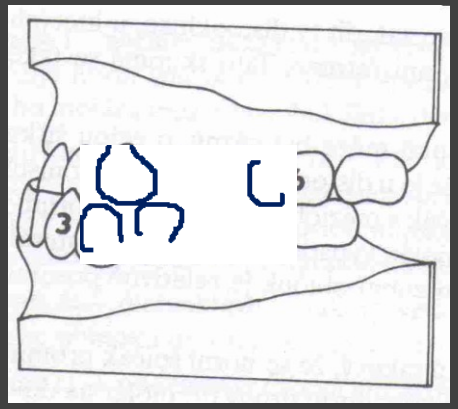




Angle II

Classification of orthodontic anomalies

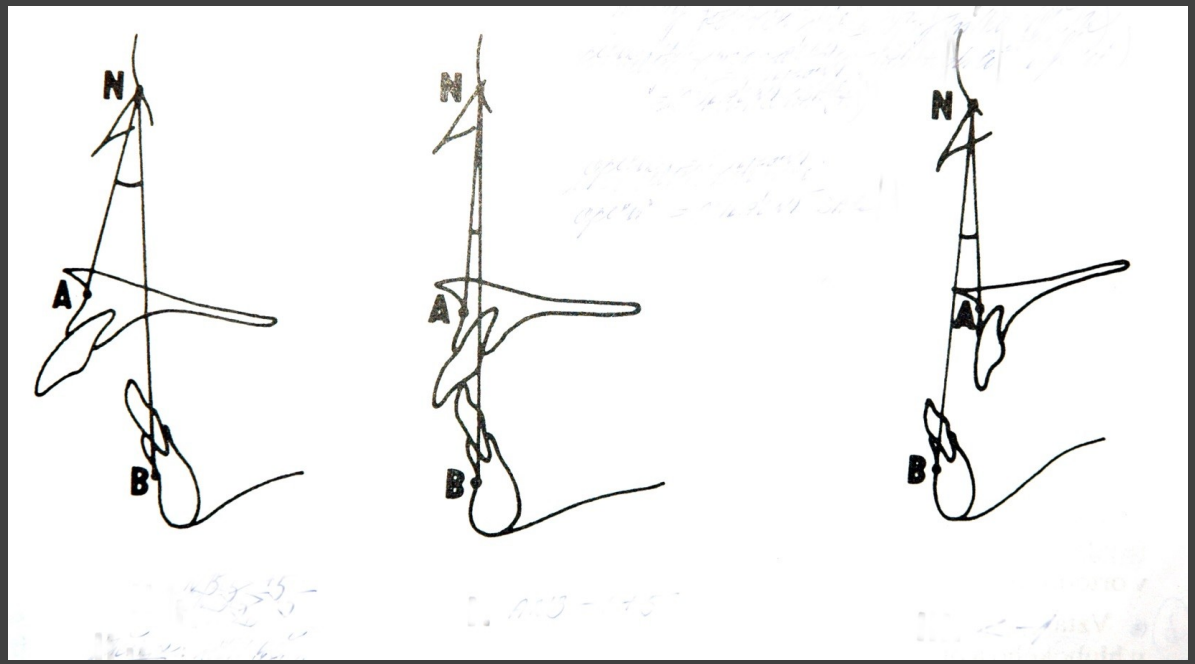
Class III : mesial occlusion



Angle III

Classification of orthodontic anomalies

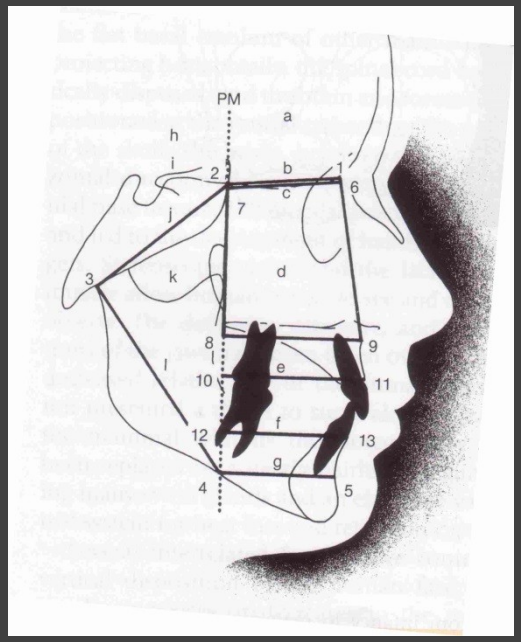
4. Anomalies of position, size and relationship of the jaws-bones



Classification of orthodontic anomalies

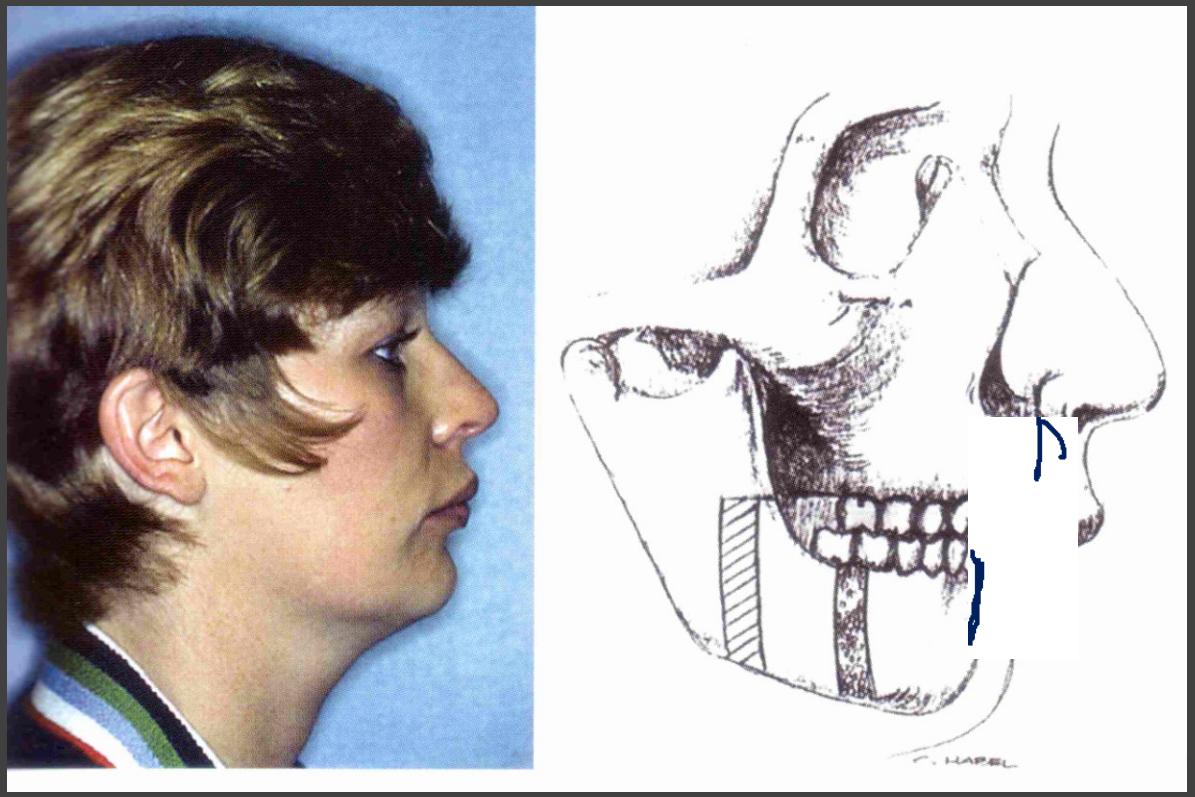
4. Anomalies of position, size and relationship of the jaws-bones

Skeletal class I : relationship of jaws without any deviation



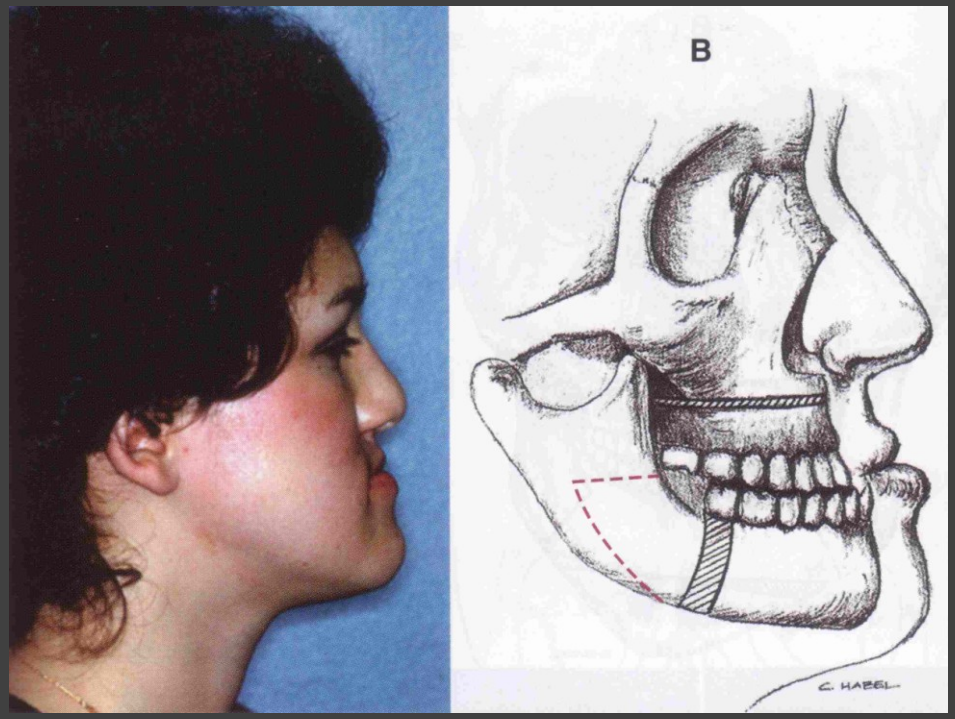
Classification of orthodontic anomalies

Skeletal class II : the lower jaw is more distally to the upper jaw (small lower jaw, large upper jaw)

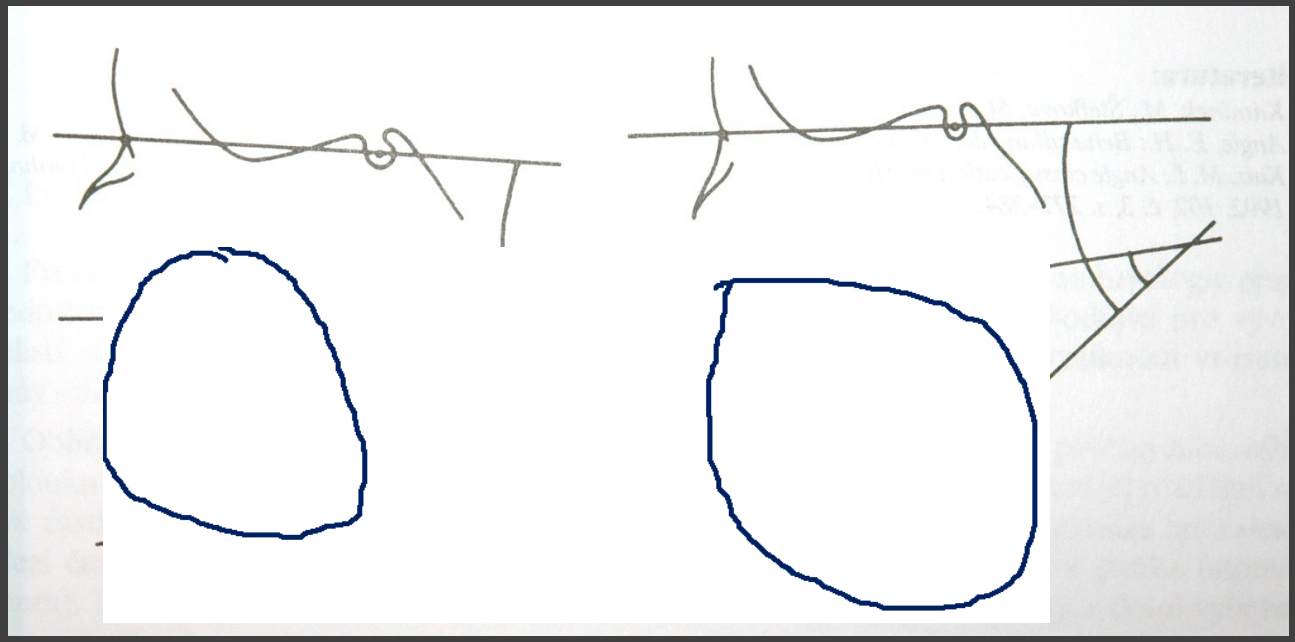


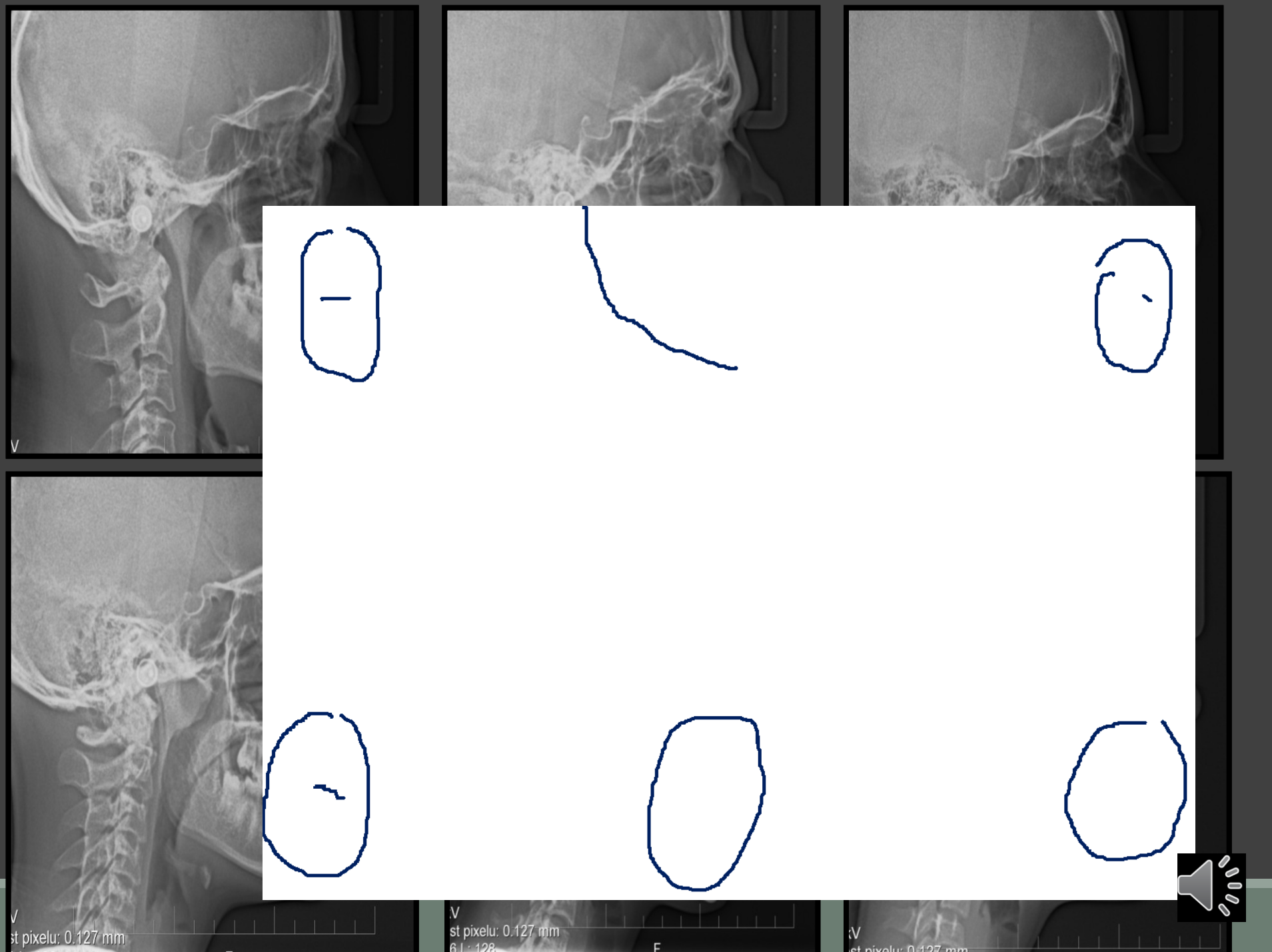
Classification of orthodontic anomalies

Skeletal class III：the lower jaw is ventral to the upper jaw
(progenia – large mandible,pseudoprogenia – small maxilla)



Classification of orthodontic anomalies

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Diagnostic examination

1. ANAMNESIS

a] Family anamnesis

- dental problems of parents
- orthodontic anomalies of parents
- genetic health problems

Diagnostic examination

1. ANAMNESIS

b] health anamnesis of the patient

- medicaments
- allergy
- facial and dental injury
- contagious disease

Diagnostic examination

1. ANAMNESIS

c] special anamnesis of the patient

- frenulectomy
- adenotomy
- habits
- mouth breathing

Diagnostic examination

2. CLINICAL EXAMINATION

a] extraoral examination

- profile [convex, concave, straight]
- face symmetry
- temporomandibular joints

Diagnostic examination

2. CLINICAL EXAMINATION

b] intraoral examination

- Status of dentition, caries, fillings
- Anomalies of the relationship of dental arches – Angles classification
- Overjet, overbite
- Status of oral soft tissues, frenulum
- Functional examination, centric occlusion
- hygiene

Diagnostic examination

3. MODEL EXAMINATION

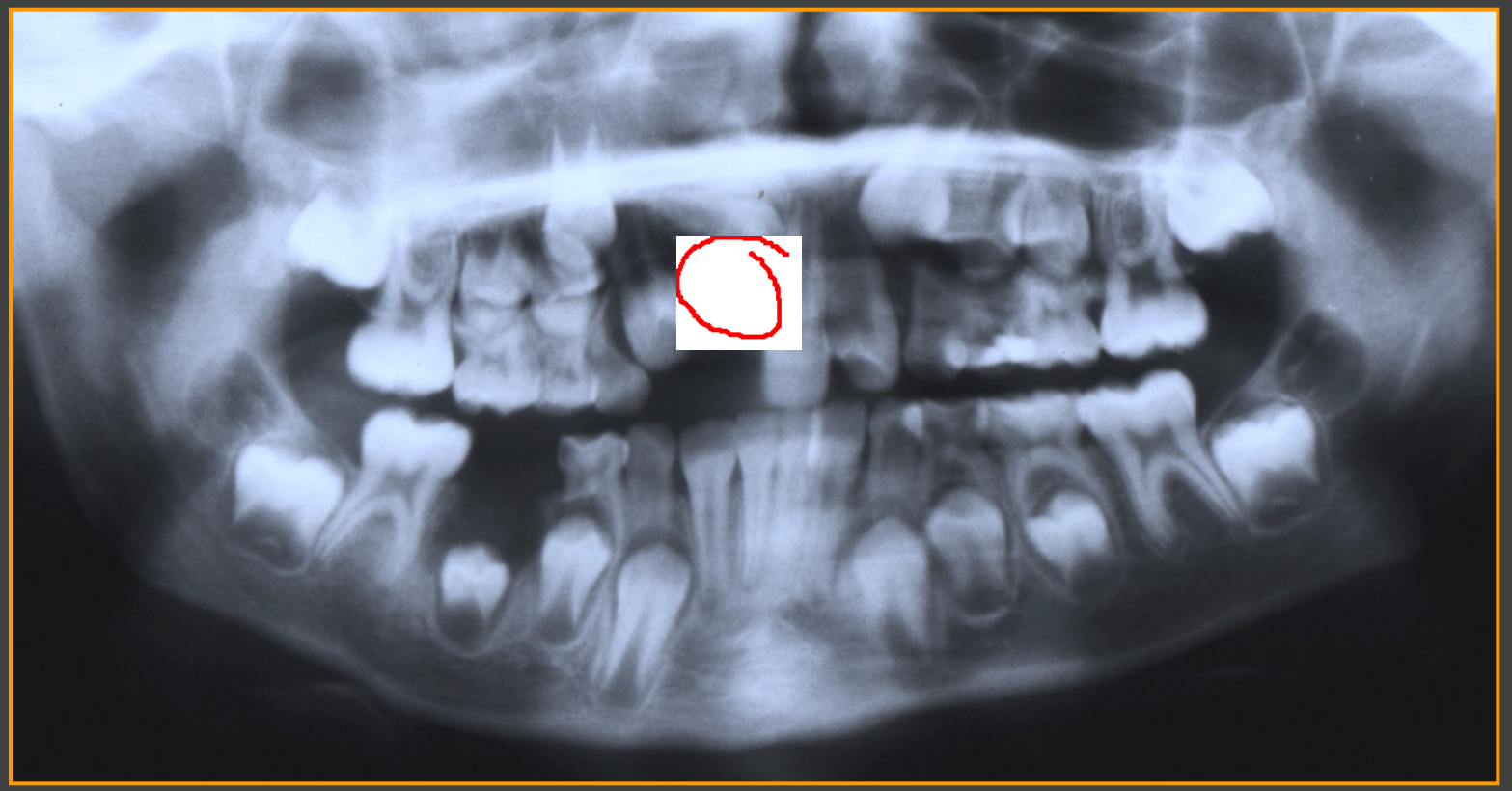
- space analysis, discrepancy
- arch form
- dental anatomy
- intercuspidation

Diagnostic examination

4. RADIOGRAPHS

a] Panoramic

- detection of congenital absences of teeth
- detection of supernumerary teeth
- evaluation of the dental health of the permanent teeth
- assessment of trauma to the teeth after injury
- determination of dental age of the patient
- calculation of root resorption
- condyles



Diagnostic examination

4. RADIOGRAPHS

b] Cephalometric radiographs

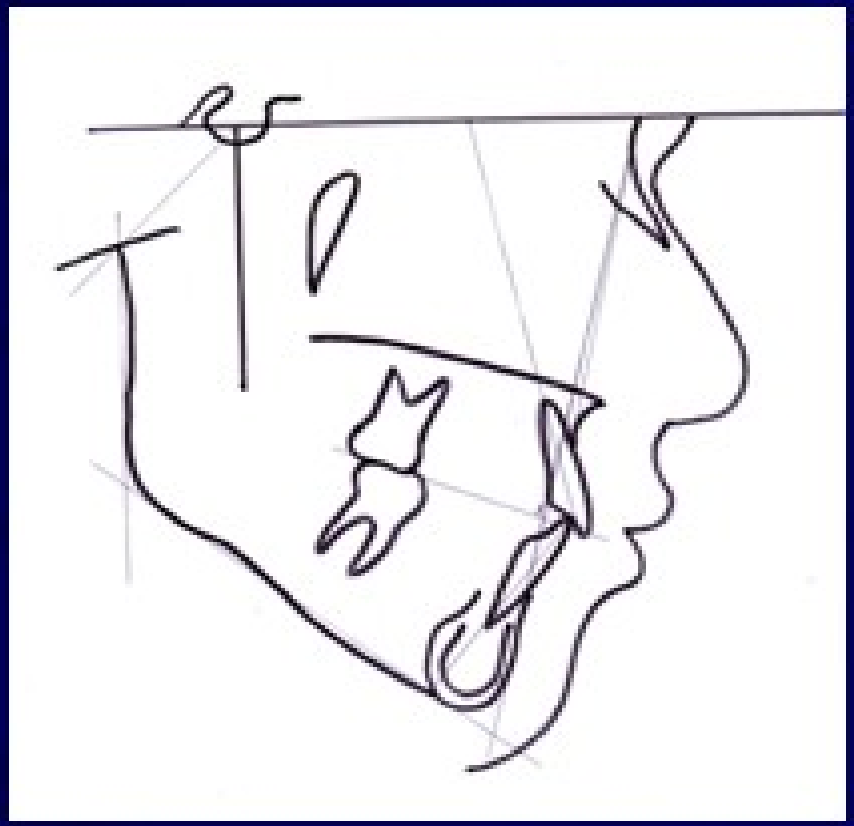
-evaluation of craniofaciodental relationship

-assessment of the soft tissue matrix

-determination of mandibular position

-prediction of growth and development

-detection of skeletal age



N - nasion (1)

S – sella (2)

a – articulare (3)

Me – menton (6)

Po – pogonion (7)

SpA – spina nasalis ant. (9)

SpP – spina nasalis post. (10)

A – bod A (11)

Is´- apex (12)

Is – incisale superius (13)

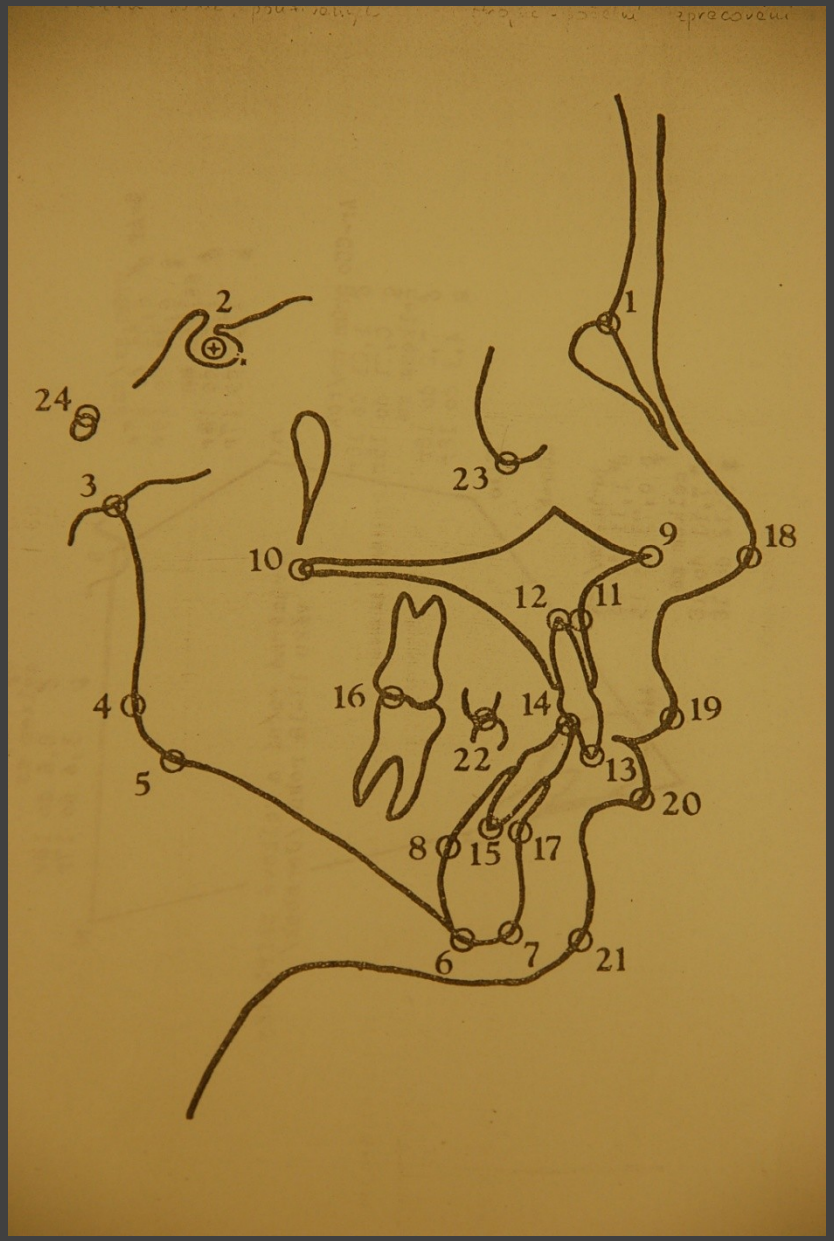
Ii – incisale inferius (14)

Ii´- apex (15)

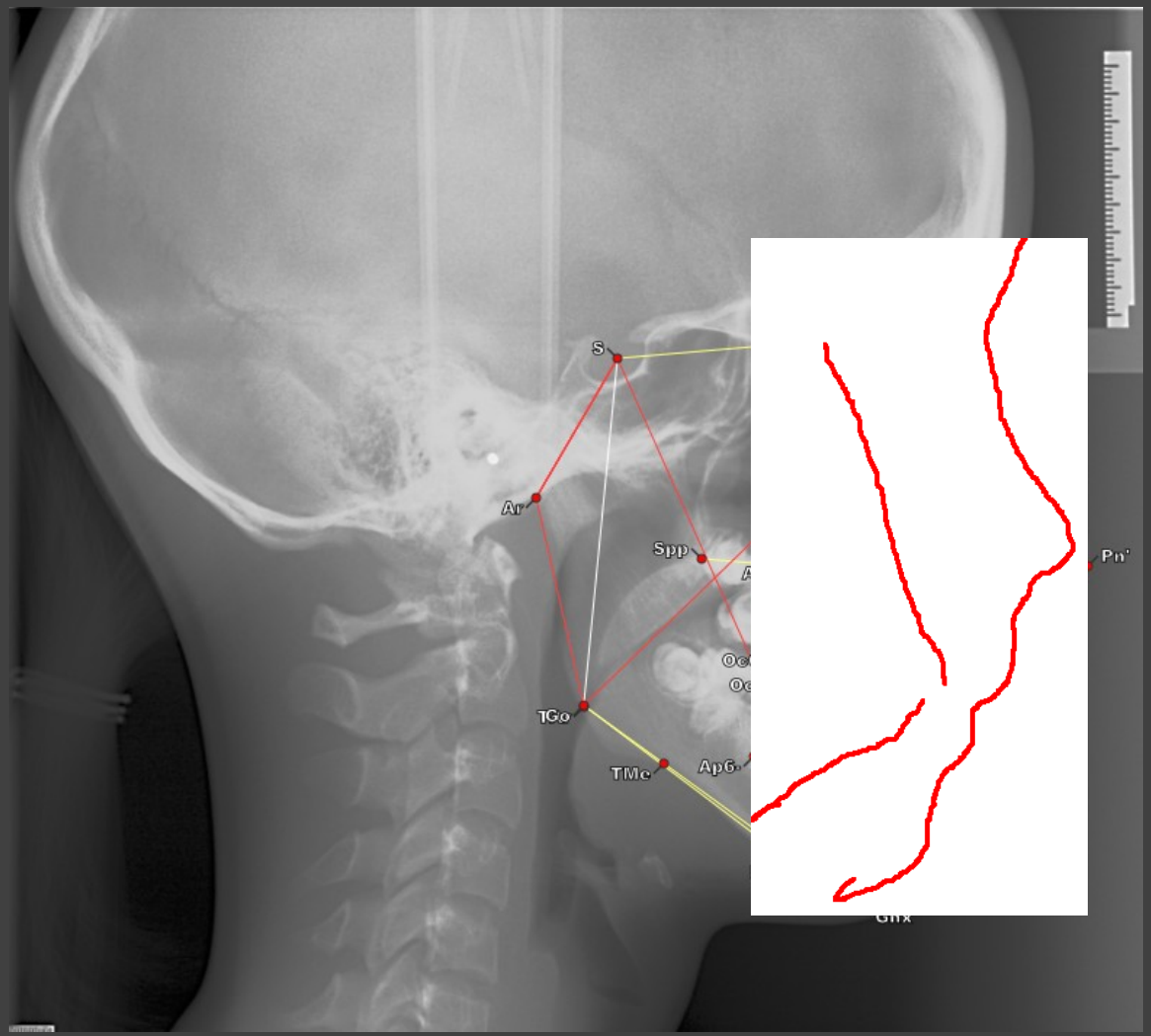
B – bod B (17)

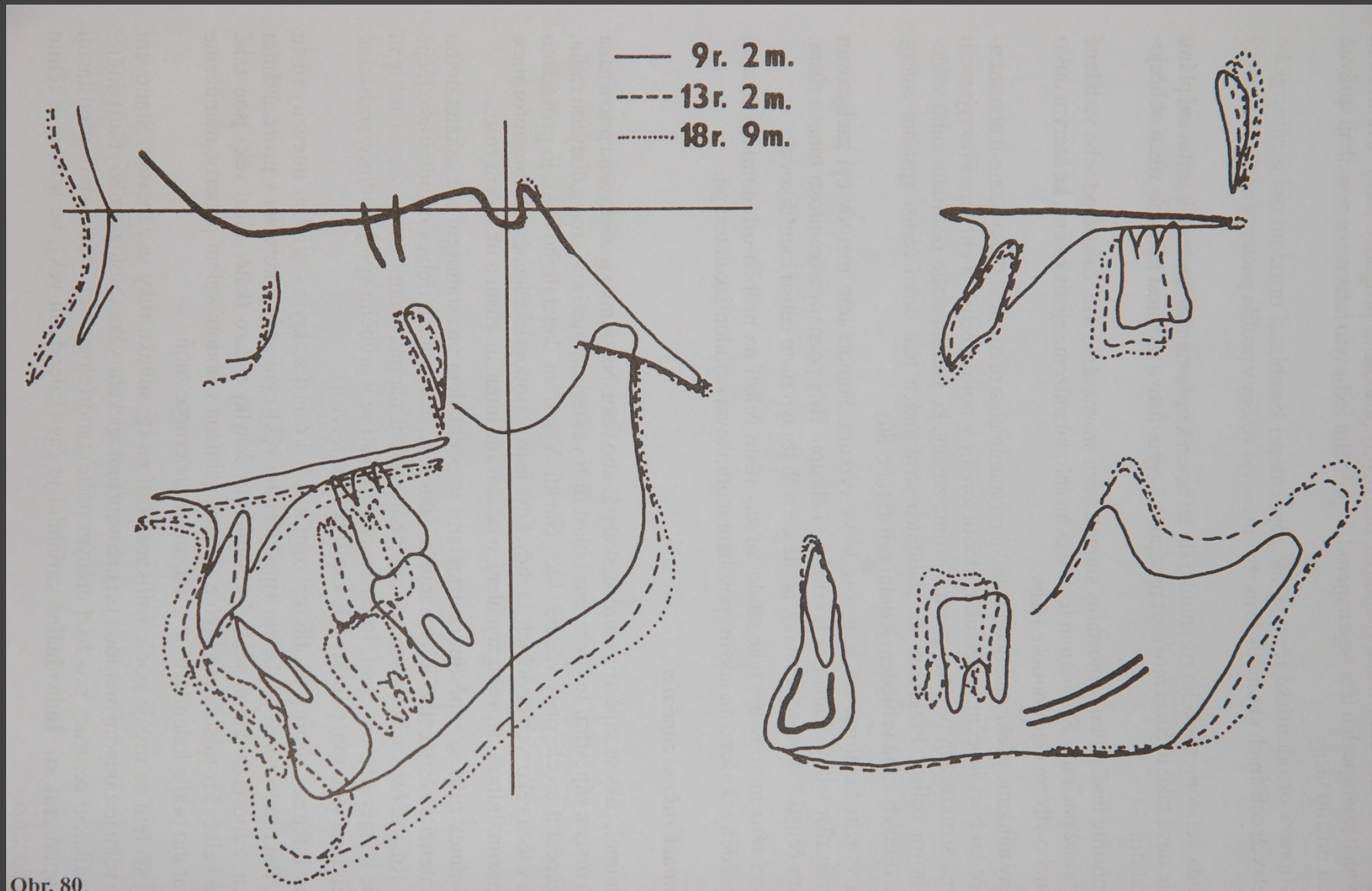
Go – gonion (kontr. bod: 1. a-4, 2. ML)

Gn – gnation (konstr. bod: 1. N-Po, 2. ML)

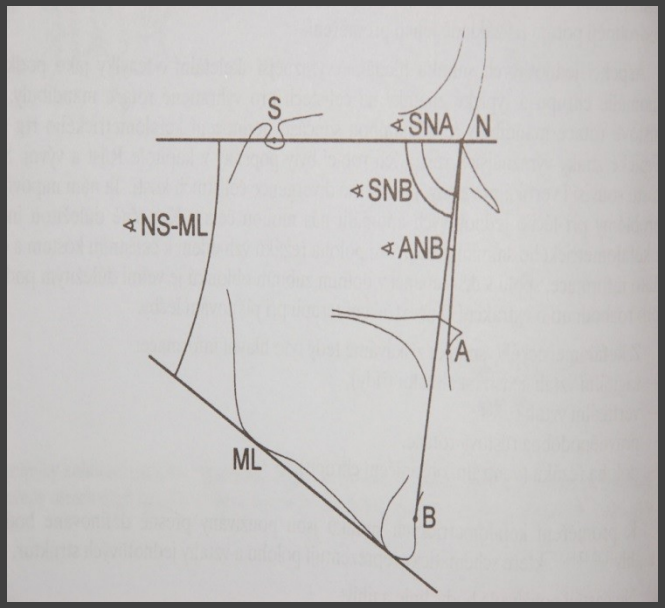


Cephalometric analysis



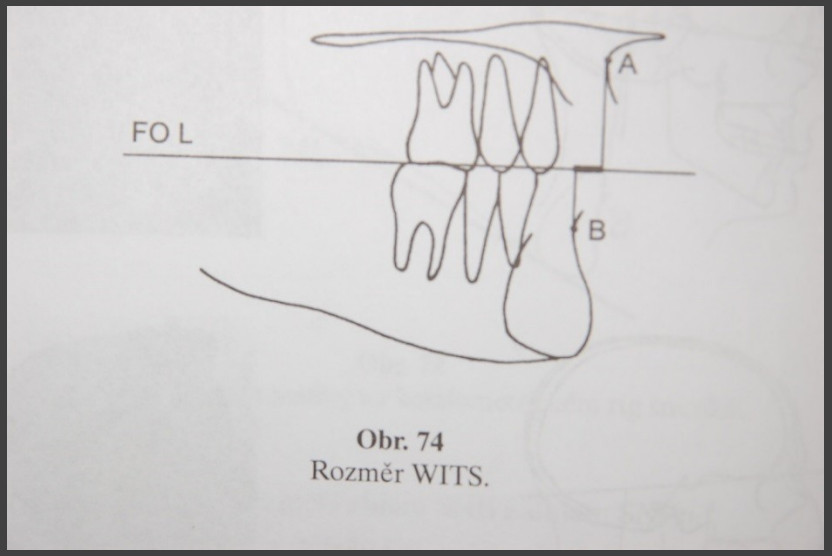


Obr. 80



skeletal analysis

ANB (-1° to +5°)



Obr. 74
Rozměr WITS.

WITS (-2 to +2mm)

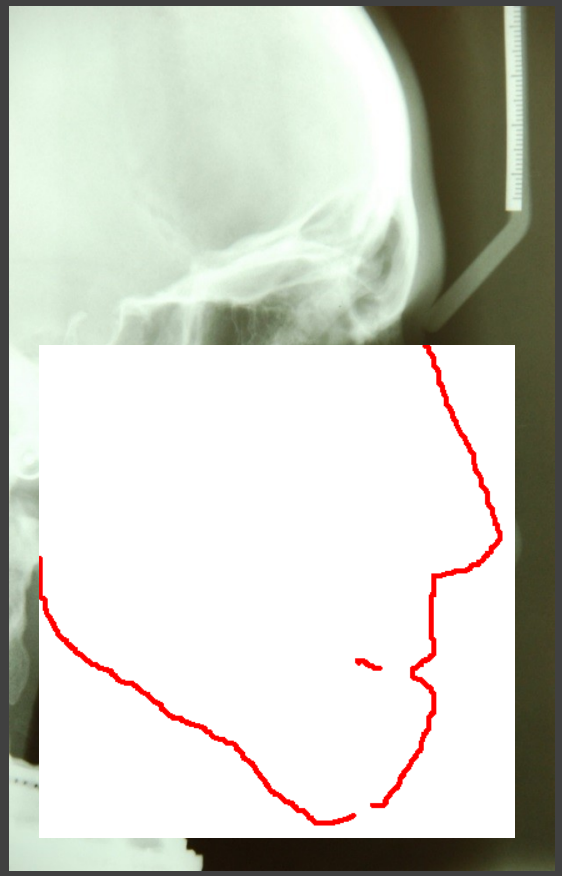
Skeletal class I

Skeletal class II

with protrusion of incisors

with retrusion of upper incisors

Skeletal class III

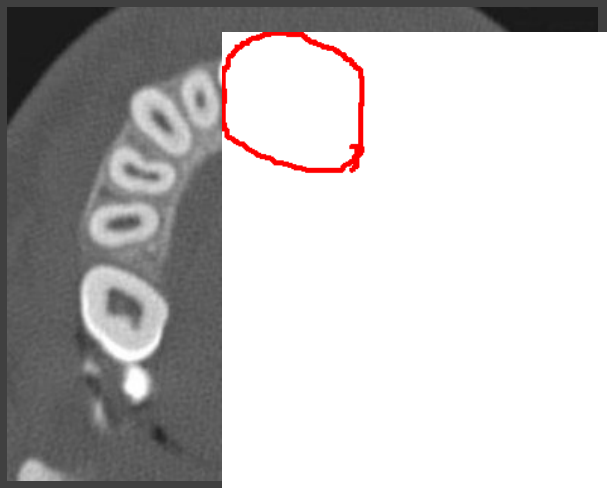


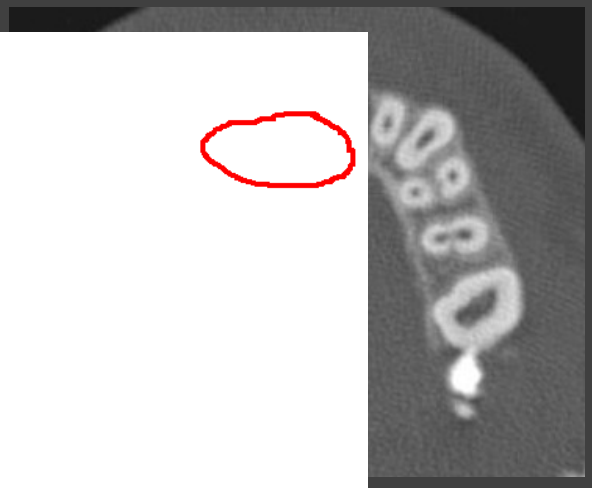
Diagnostic examination

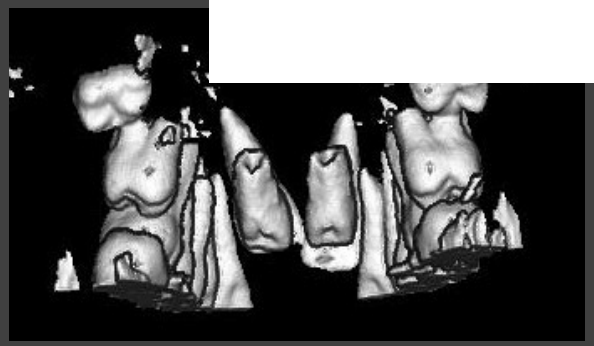
4. RADIOGRAPHS

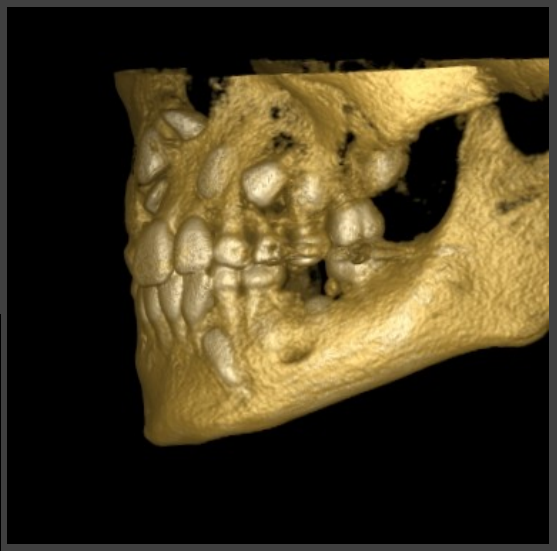
c] Other radiographs

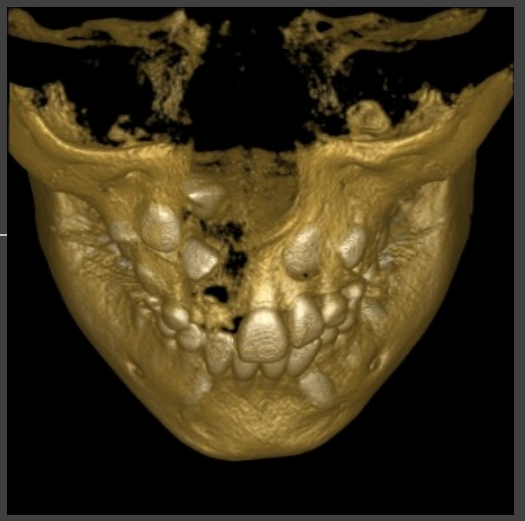
- Bitewing – caries detection
- Hand wrist – detection of skeletal age
- Computer tomography –CT scan [impacted tooth, ankylosed tooth, difficult skeletal anomalies
- Digital imaging – computer generated model reconstructed from the initial imaging data











Diagnostic examination

5. PHOTOGRAPHS

- extraoral photographs - frontal
- profile
- smile
- Intaoral photographs - frontal teeth
- right and left side
- upper and lower arch

Etiology of orthodontic anomalies

Ideal set of teeth can be seen in aprox. 25% of population

40% need treatment

Etiology of orthodontic anomalies

Malocclusion is a manifestation of genetic and environmental interaction on the development of orofacial region

Etiology of orthodontic anomalies

The etiological factors:

1. genetic influences
2. prenatal factors
3. postnatal, environmental influences

Etiology of orthodontic anomalies

Hereditary are mainly:

- Shape and size of tooth
- Teeth number
- Shape and size of jawbones
- Time of teeth eruption
- Time and type growing jawbones

Etiology of orthodontic anomalies

Mainly hereditary anomalies:

- True mandibular progenia
- Skeletal open bite
- Skeletal deep bite
- Primary crowding
- Skeletal class II and III
- Hypodontia, hyperodontia
- Deep bite with retrusion of incisors
- Retention or impaction of teeth
- clefts

Etiology of orthodontic anomalies

Mainly hereditary anomalies- mandibular prognatism in the Hapsburg family

Etiology of orthodontic anomalies

Mainly hereditary anomalies – skeletal class III

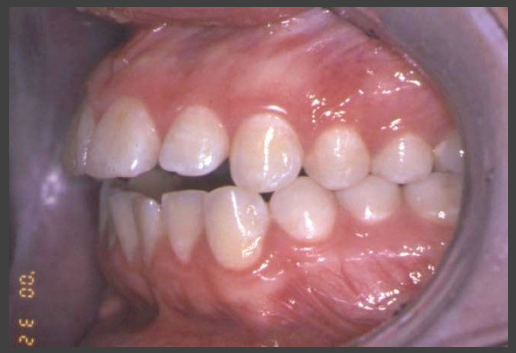
Etiology of orthodontic anomalies

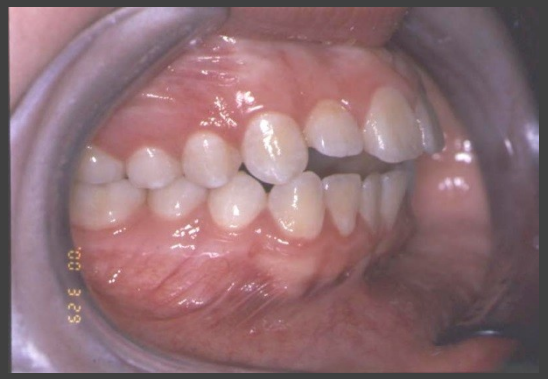
Etiology of orthodontic anomalies

Mainly hereditary anomalies – skeletal deep bite

Etiology of orthodontic anomalies

Mainly hereditary anomalies- skeletal open bite





Etiology of orthodontic anomalies

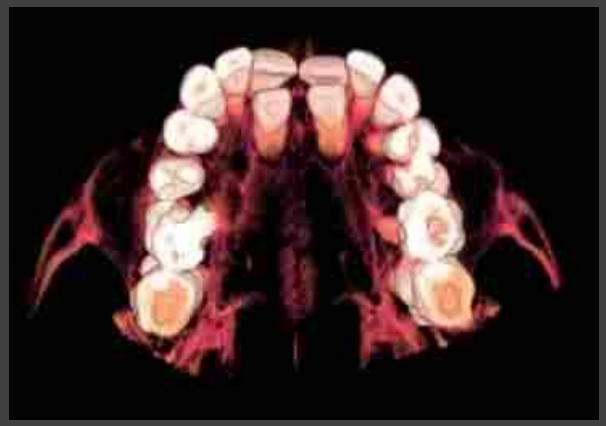
Mainly hereditary anomalies – primary crowding

Etiology of orthodontic anomalies

Mainly hereditary anomalies- hypodontia

Etiology of orthodontic anomalies

Mainly hereditary anomalies- hyperodontia



Etiology of orthodontic anomalies

hyperodontia

Etiology of orthodontic anomalies

2. Prenatal factors

A.- teratogens

influence of physical, chemical and infectionals effects during gravidity- if acting in critical time

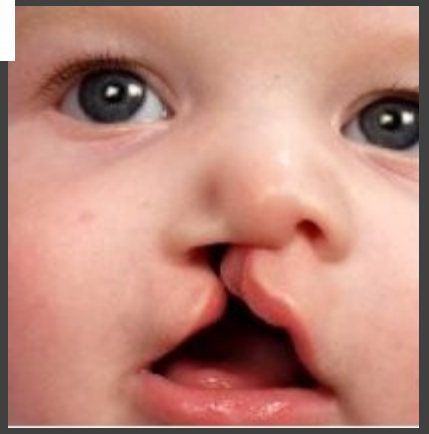
Etiology of orthodontic anomalies

A.- teratogens affecting dentofacial development

Teratogens	Effect
Aspirin, Valium	cleft lip and palate
Cigarette smoke[hypoxia]	cleft lip and palate
Cytomegalovirus	microcephaly, hydrocephaly
Ethyl alcohol	central mid-face deficiency
6-Mercaptopurin	cleft palate
Rubella virus	microftalmia, cataracts
Thalidomide	hemifacial microsomia
Toxoplasma	microcephaly, Hydrocephaly
X-radiation	microcephaly
Vitamin D excess	premature suture closure

Etiology of orthodontic anomalies

Clefts lip and palt



Etiology of orthodontic anomalies

Syndromes – Pierre Robin syndrome

Etiology of orthodontic anomalies

3. Postnatal influences

- Trauma – undiagnosed fractures of the mandibular condyles can cause disorders of the growth of the mandibular ramus =asymmetry
- Hormonal disorders – growth hormone deficiency, thyroid hormone deficiency – can contribute to the origin of acquired anomalies

Orthodontic treatment
Objectives of orthodontic treatment

Aesthetics

Treatment of impacted teeth

Prevention of dental injuries

Before prosthetic treatment

Decay prevention

Prevention and treatment of chewing malfunction and jaw joint disorders

Methods of orthodontic treatment

Orthodontics movement of teeth

Orthopedic movement – effects of growth

Myofunctional therapy

Serial extraction, controlled extraction

Ortho – prosthetic treatment

Ortho – surgical treatment

Orthodontic treatment

1. Orthodontic treatment by infants

- clefts

- syndromes and defects that complicate nutrition and breathing

We use - individual removable plates

Orthodontic treatment

2. Deciduous teeth

We treat - bite defects

inverted bite

cross bite

- bad habits

We use – removable appliances

Orthodontic treatment

3. 6-9 years [1. phase of mixed dentition]

The best time for treatment :

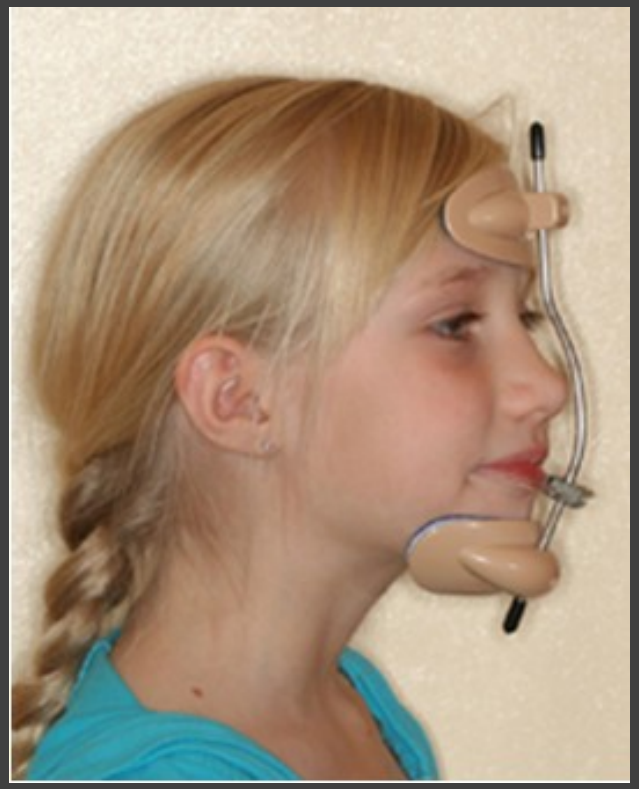
- cross bite
- inverted bite
- impacted incisors
- diastema more than 3 mm
- big primary crowding

We use : removable appliances

small fixed appliances

face mask for inverted bite by class III

Face mask



Orthodontic treatment

4. 9-12 year [second phase of mixed dentition]

- Large forming ability of the tissues
- We can use and influence the growth
- Growth mandible from the joints

We treat: - previous untreated anomalies

- crowding
- Angle class II – div. 1 and 2
- overjet more than 5 mm
- deep bite
- movements teeth after the early loss of teeth and anodontia
- Controlled tooth eruption
- Suspected retention of canines, premolars

The best time for functional appliances

- removable appliances
- - Small fixed appliances
- - Headgear appliance

headgear

Orthodontic treatment

5. Permanent teeth

We treat:

- All anomalies, previous untreated anomalies,
- Angle class III
- Crowding
- Open bite, deep bite
- Impacted tooth
- Skeletal anomalies

Adult therapy – periodontics problems, preprosthetic therapy

- problems with TMJ
- bruxism

We use : fixed appliances

extraction

surgical treatment by big skeletal anomalies

Othodontic treatment

Removable appliances:

1. Active
2. Passive
3. Functional

Therapy of ortodontical anomalies

Conservativ

orthodontical appliances :

removable

fixed

Surgical

extraction of teeth

surgical expositions of crowns of retined tooth

surgical movements of maxila, mandible

Active removable appliances

-Treatment of anomalous position of teeth [inclination, rotation of incisors]

-Treatment the dental arch shape

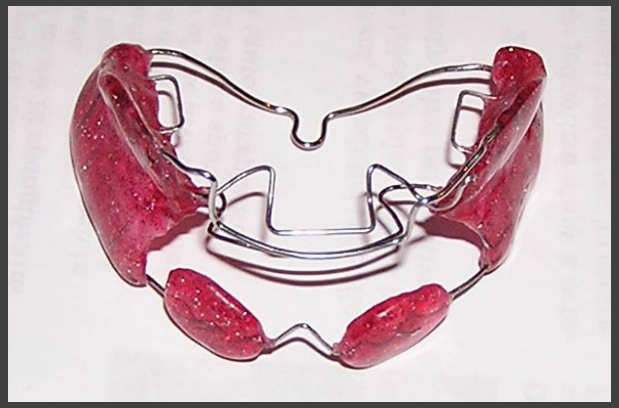
-Individual resin plates

-Active elements : springs, screws, wire bows

Removable active appliances

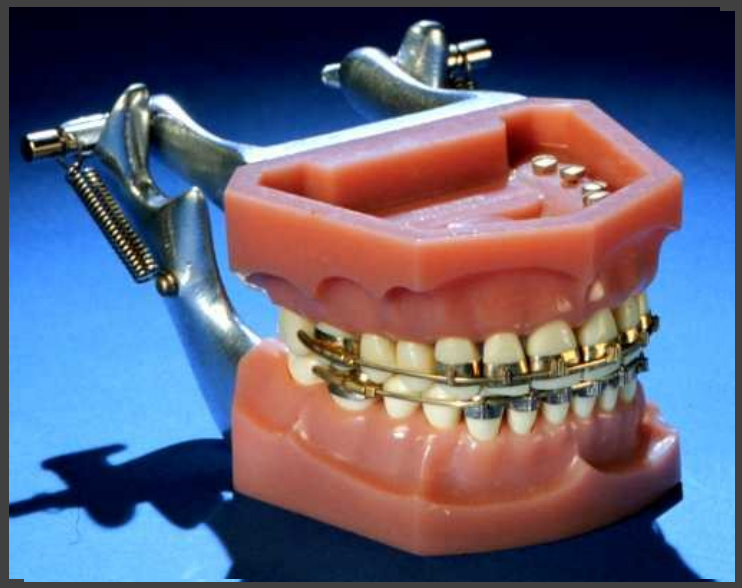
Removable appliances - active

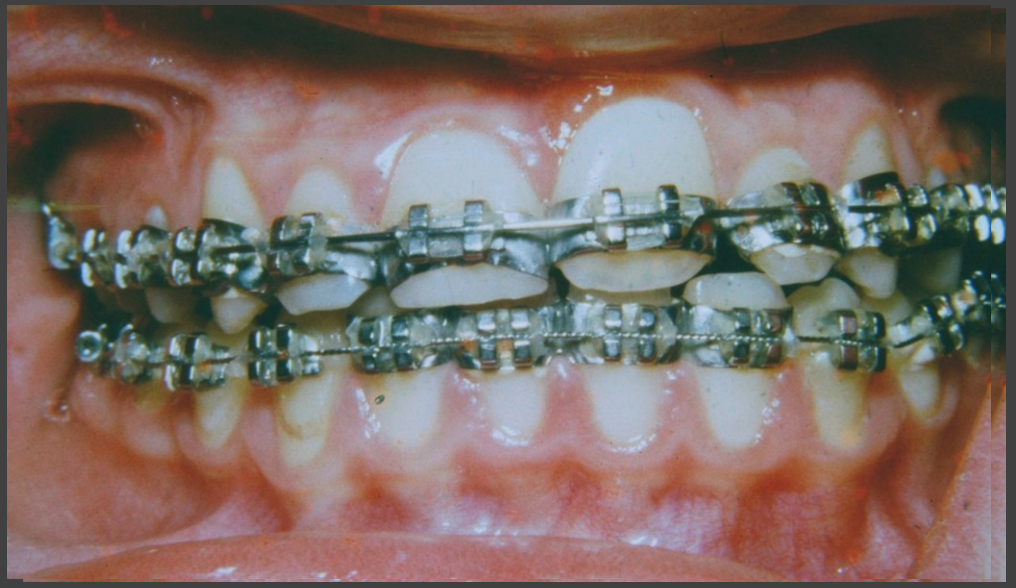
Removable functional appliances



Removable appliances- passive

Fixed appliances
-History





Orthodontics brackets

Stainless steel brackets

Advantages

- strong, do not crack
- smooth, low profile
- recyclable
- low friction
- price

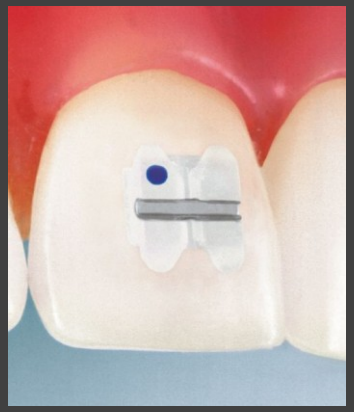
Disadvantages:

- Aesthetic

Stainless steel brackets

Orthodontics brackets

Ceramic brackets



Advantages:

- Aesthetics

Disadvantages:

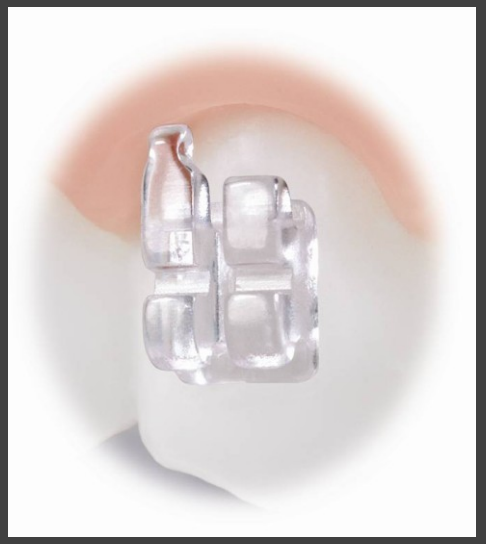
- repeated bonding problem
- robust
- crack
- higher friction (avoid metal slot)
- price

Ceramic brackets

Ceramic brackets

Orthodontics brackets

Sapphire brackets



Advantages

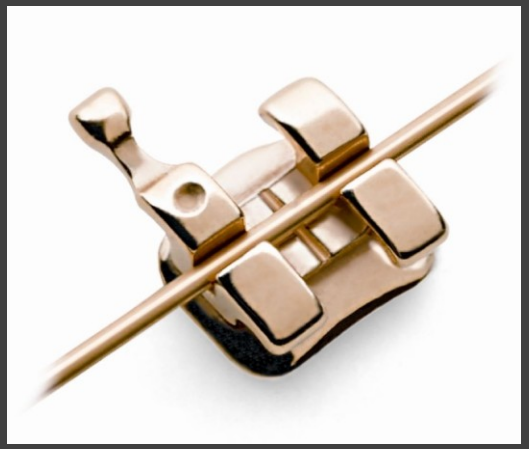
- aesthetic

Disadvantages:

- repeated bonding problem
- robust
- crack
- higher friction (avoid metal slot)
- price

Orthodontics brackets

Gold-coated brackets



Advantages:

- suitable for allergy sufferers
- strong, do not crack
- smooth, low profile
- recyclable
- Low friction
- Aesthetics

Disadvantages:

- price

Orthodontics brackets

Selfligating brackets – metal and ceramic

Advantages:

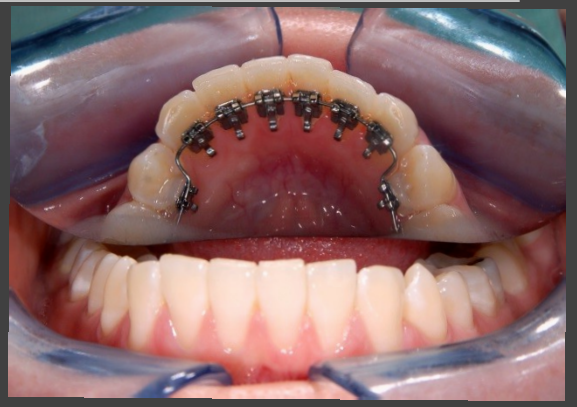
- minimum friction
- low power
- faster treatment
- Fewer office visits

Disadvantages:

- not suitable for all types of defects

Orthodontics brackets

Lingual brackets – 2D,3D



Advantages:

- Aesthetics

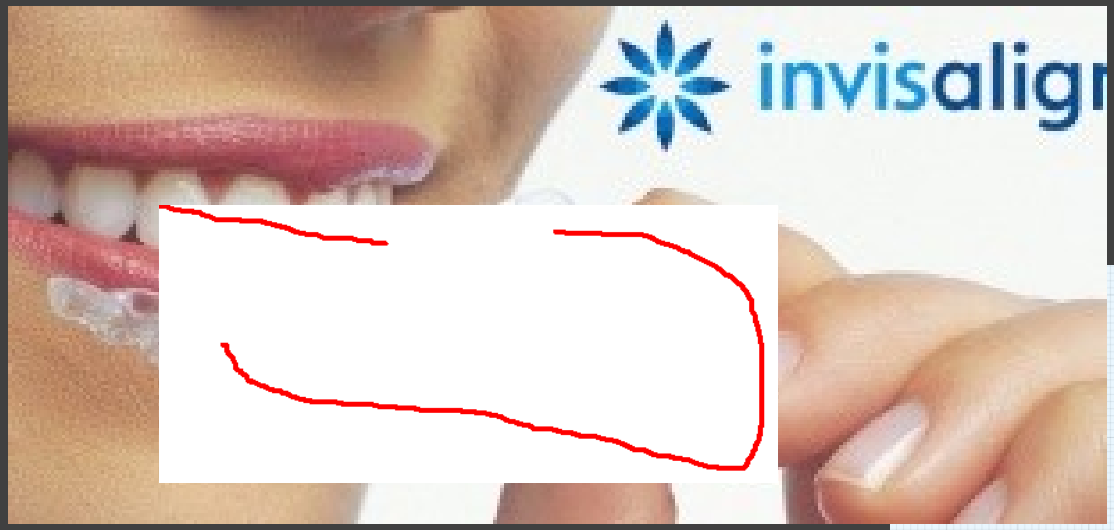
Disadvantages:

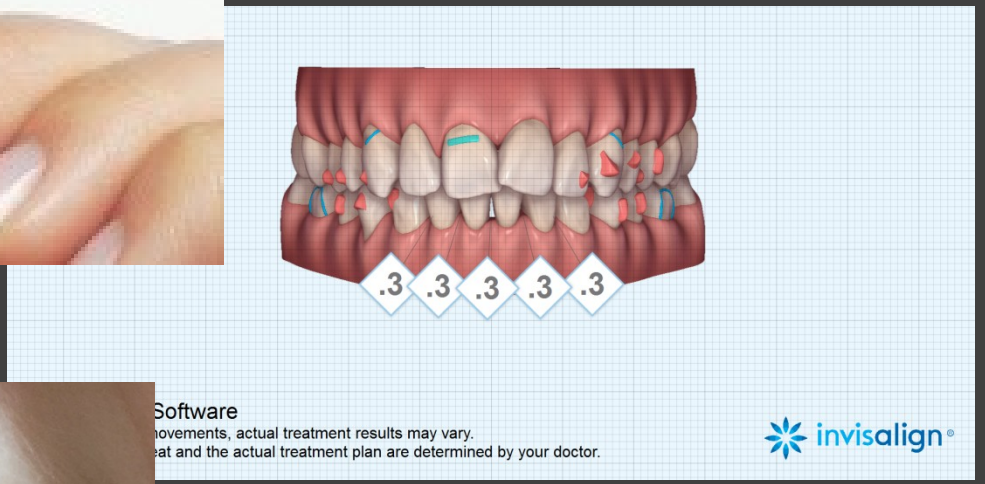
- unsuitable for all types of defects
- Difficulty hygiene
- (patient discomfort)

Lingual bracket

Orthodontics brackets

Decorative brackets


invisalign


.3
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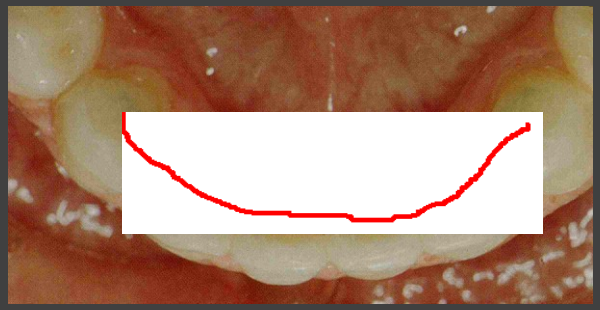
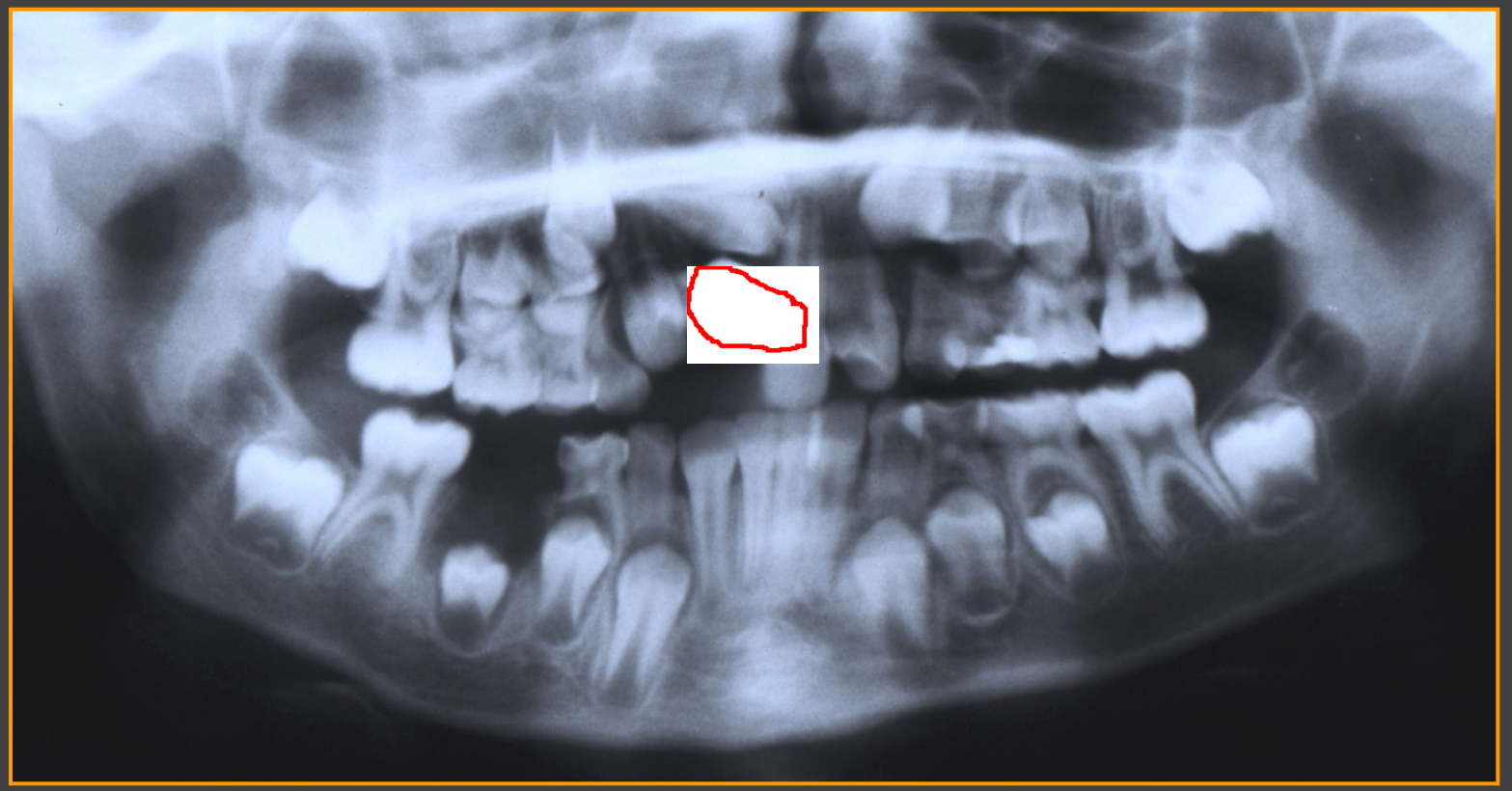
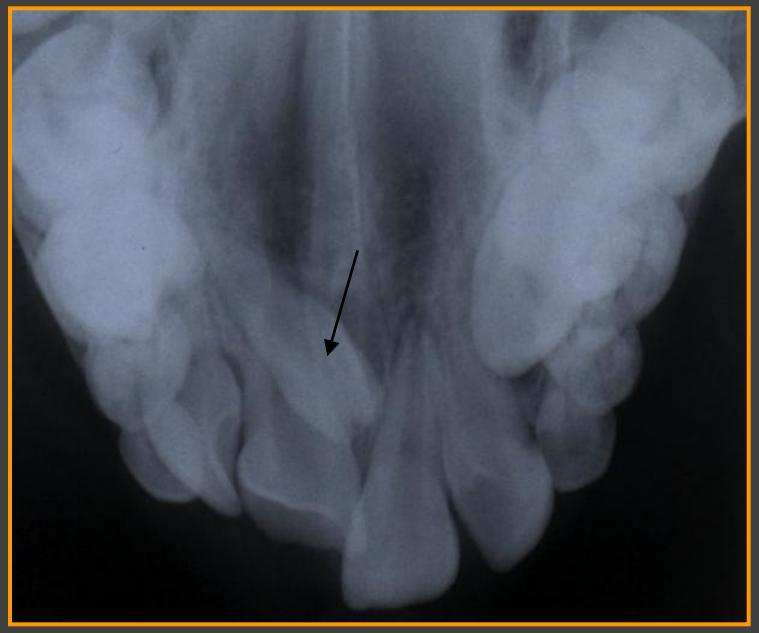
Software
ovements, actual treatment results may vary.
at and the actual treatment plan are determined by your doctor.
invisalign

Fixed lingual retainer



Case 1 – hyperodontia - supernumerrary incisor, cowding










Case 1

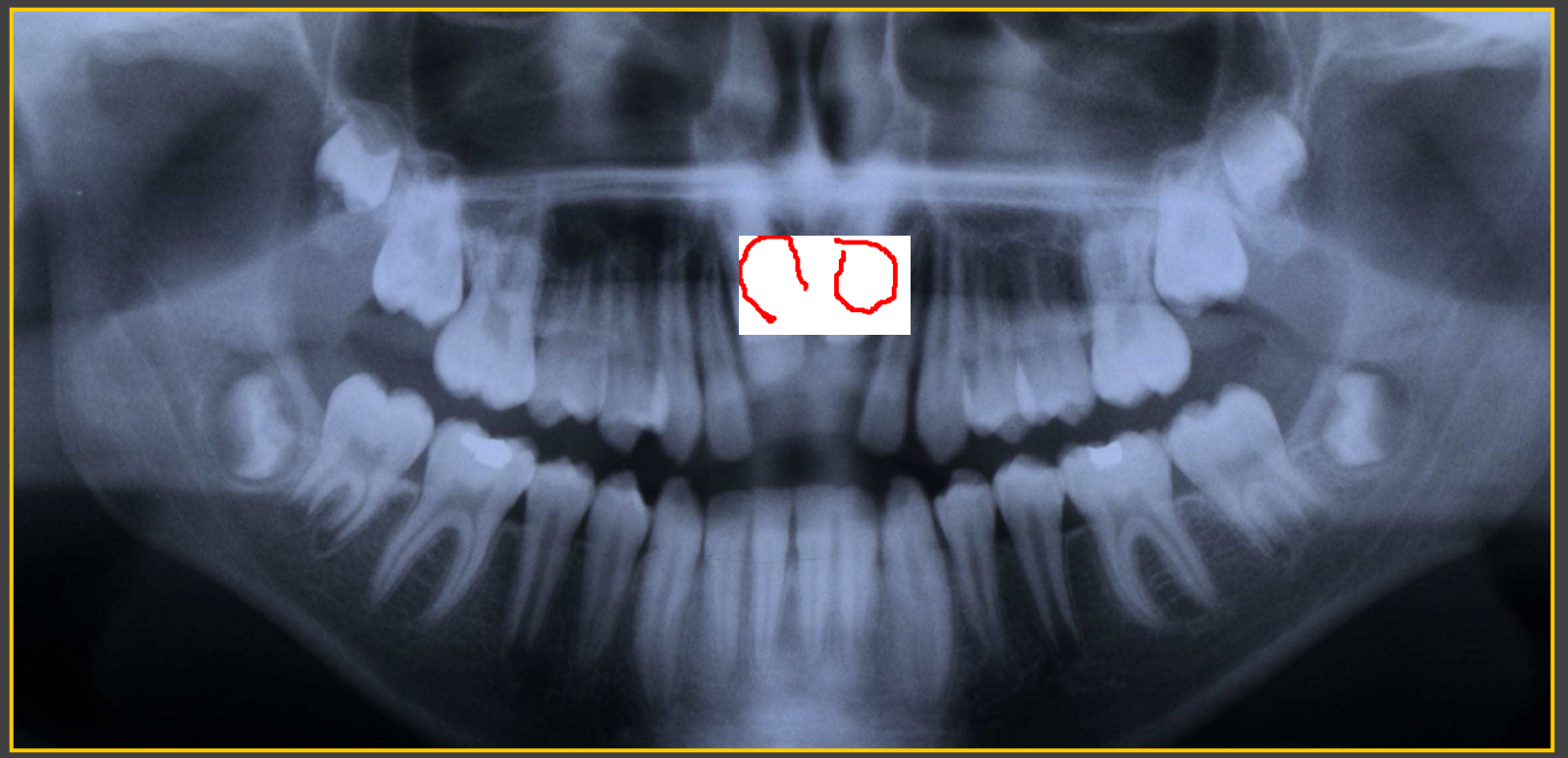
before

after treatment

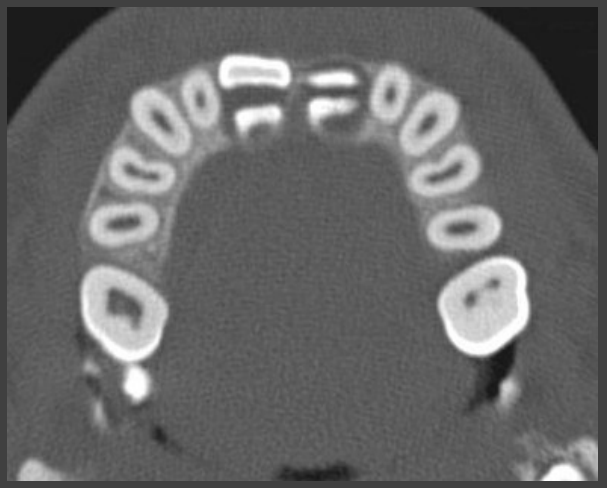
Treatment – fixed appliance – 11 months

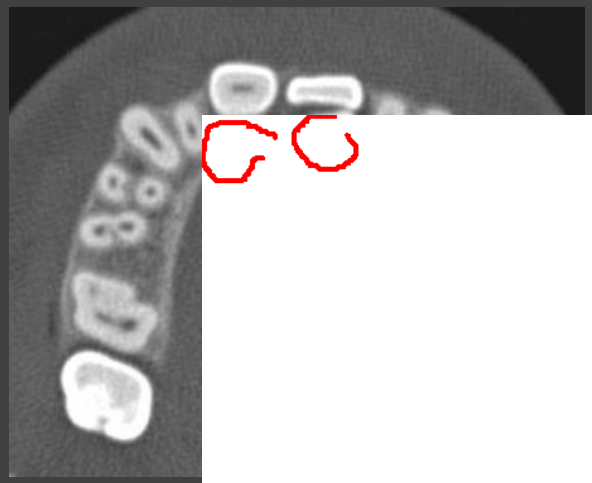
Retention – removable appliance

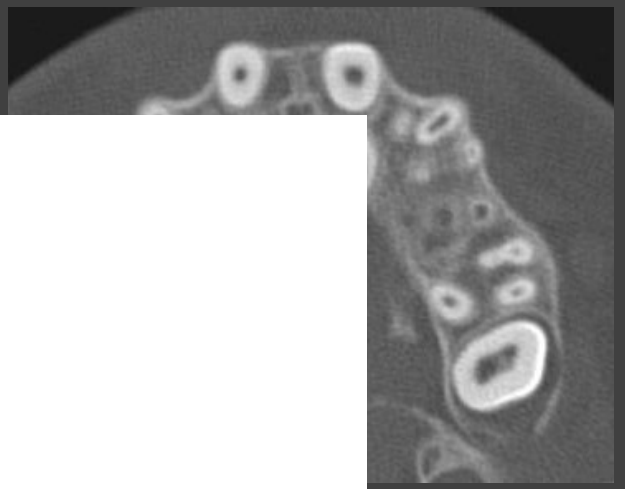
Case 2 – hyperodontia – supernumerrary 2 incisors

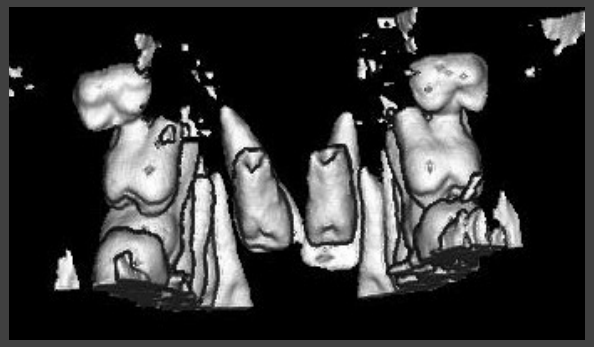


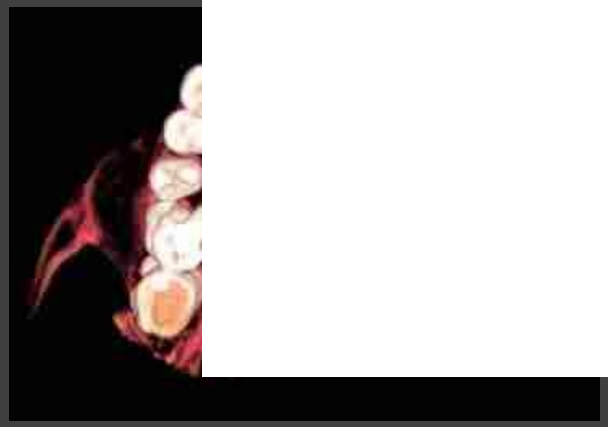
CBCT



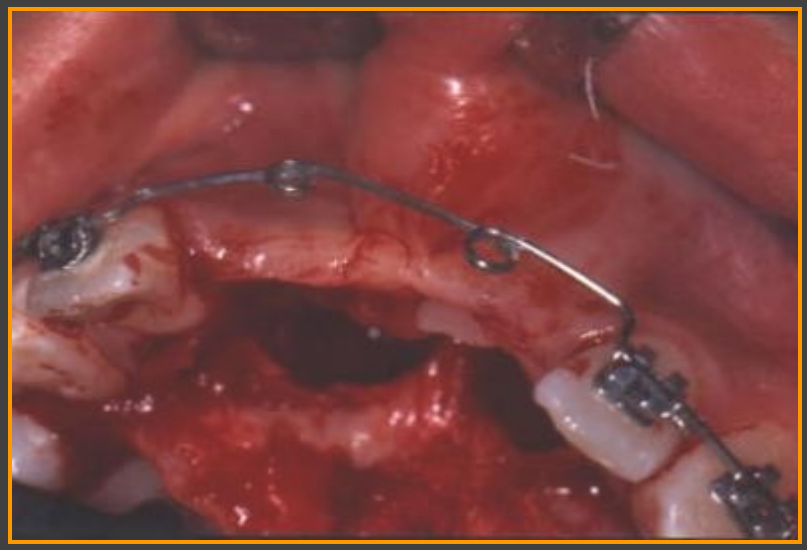








Extraction of the supernumerrary incisors

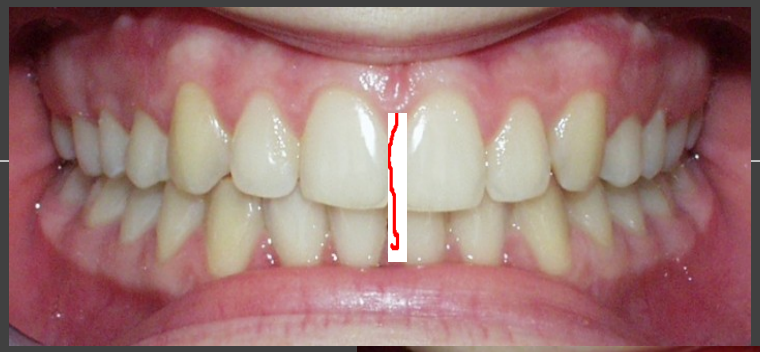


Case 2 - before after treatment

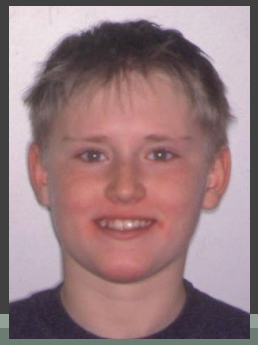
treatment – 16 months

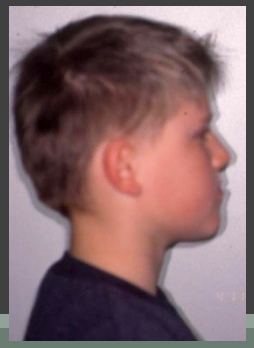
Case 3 – deep bite, crowding

Case 3 – deep bite, crowding – after treatment with fixed appliance – 1,5 year

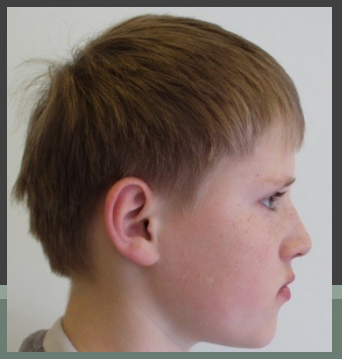


Case 4 – inverted bite, crowding, vestibular eruption canine

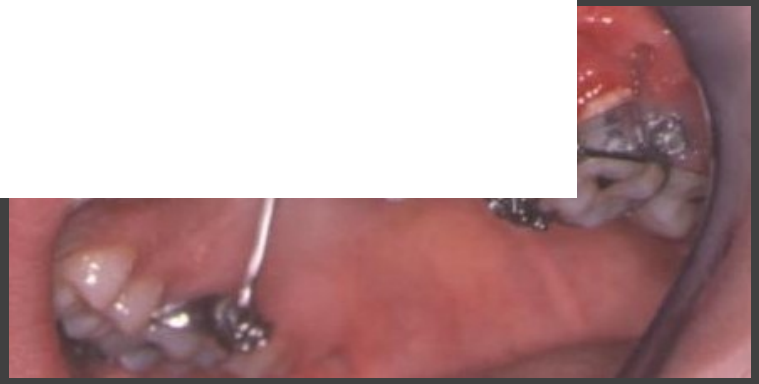




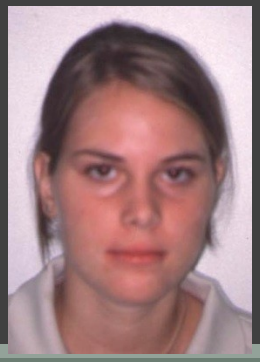
Case 4 – inverted bite, crowding, vestibular eruption canine – after treatment with fixed appliance – no extraction, 2 years



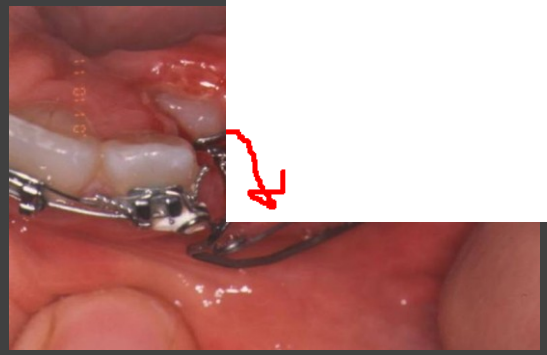
Case 5 – retention of second premolars no space for eruption



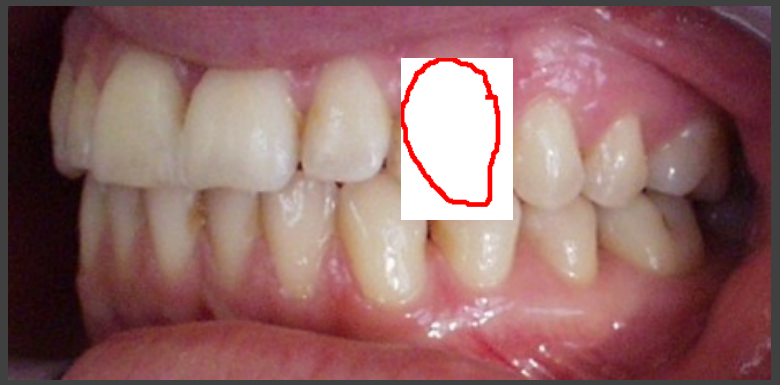
Case 5 – retention of second premolars no space for eruption – after treatment – epanzion, no extraction – 2 years



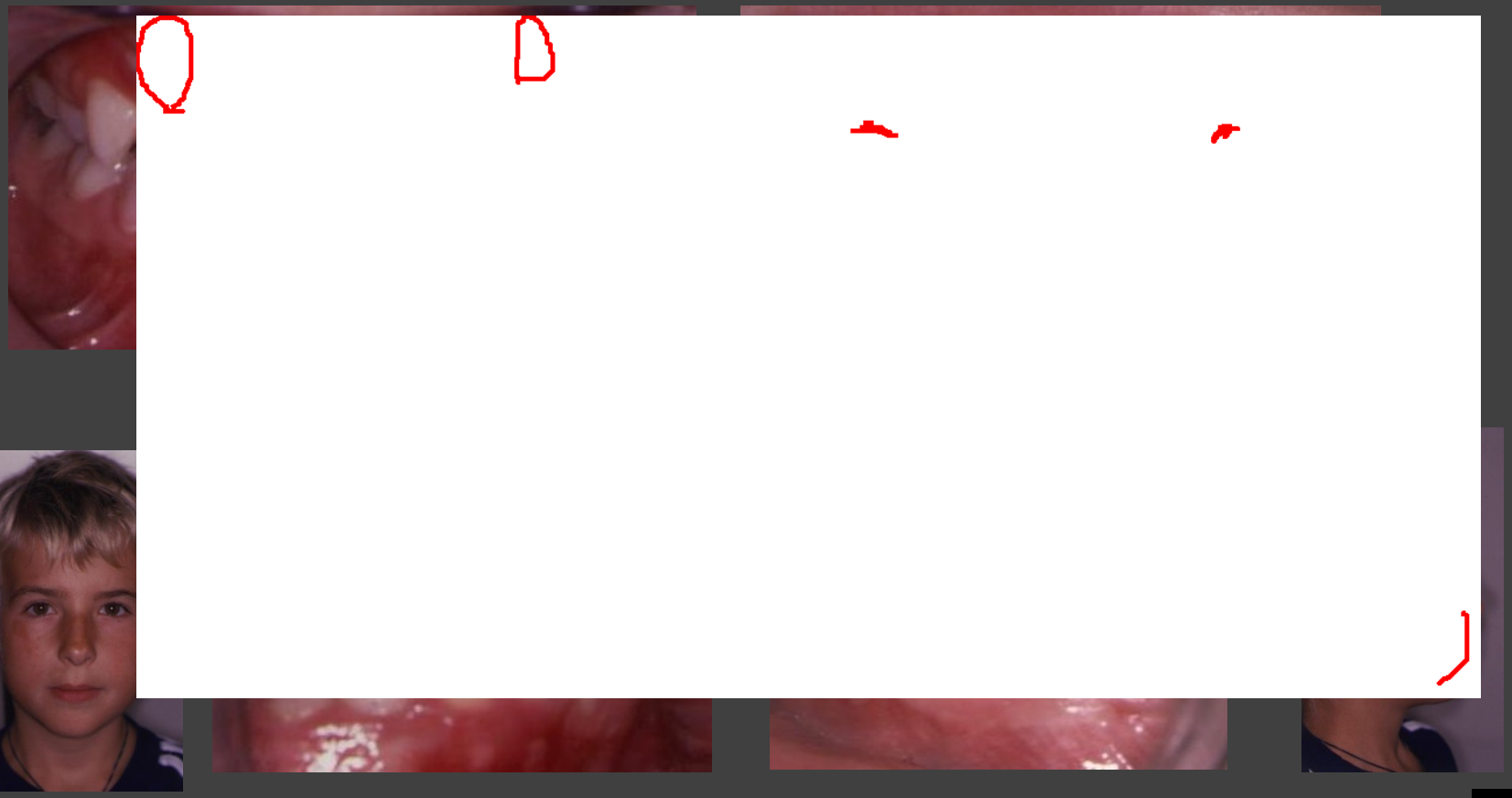
Case 6 – retention of canine, palatal eruption



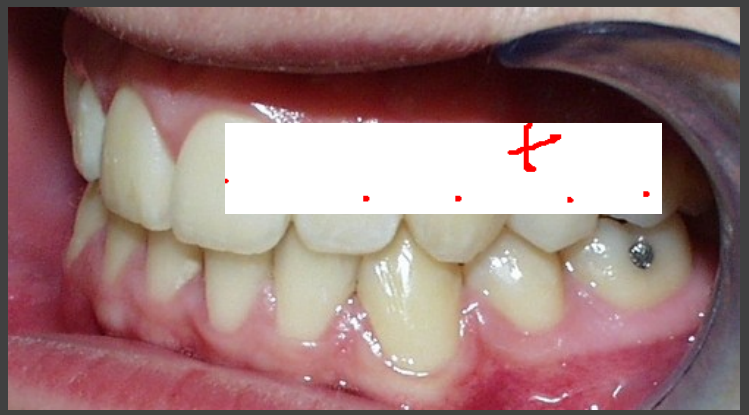
Case 6 – after treatment – expanzion, alignment canine



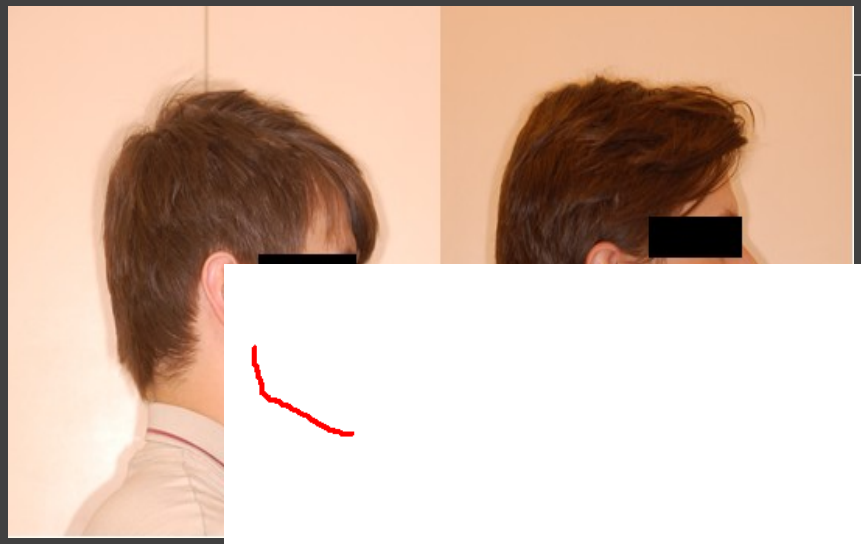
Case 7 - retention of upper anf lower canines, no space for eruptoin

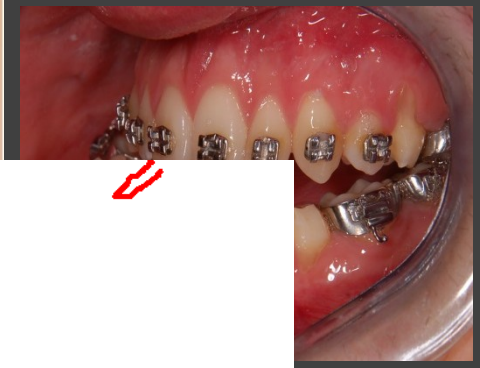


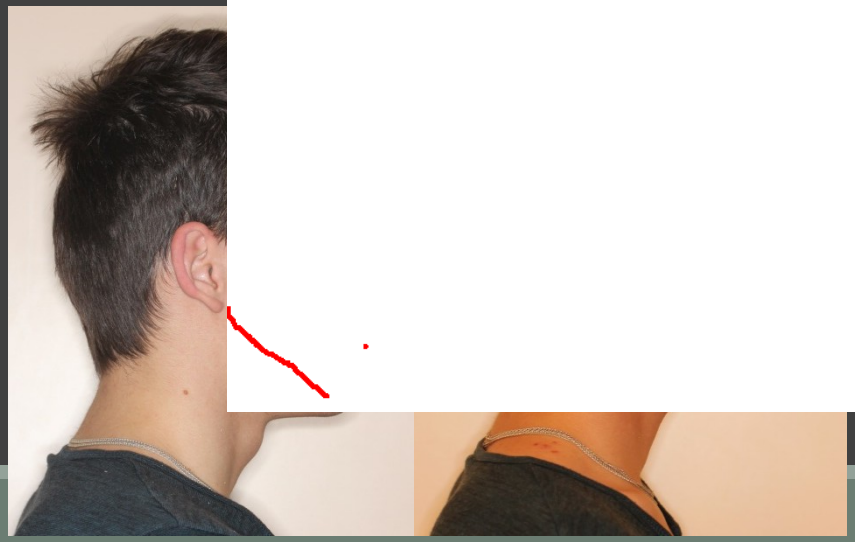
Case 7 - retention of upper and lower canines, no space for eruptoin – after treatment with extraction of 4 first premolars, canines on place



Case – orthodontic treatment with surgery correction – mandibular progenia, skeletal class III, open bite, crowding

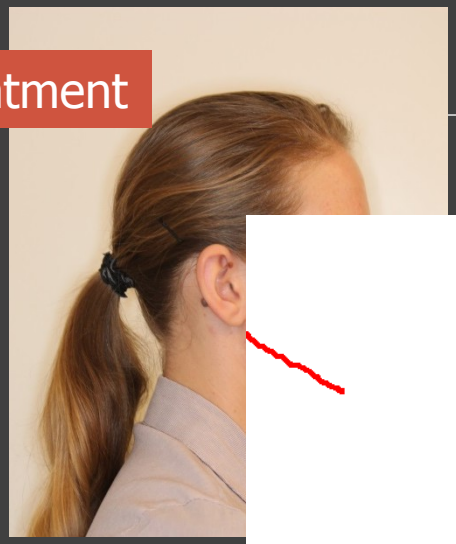




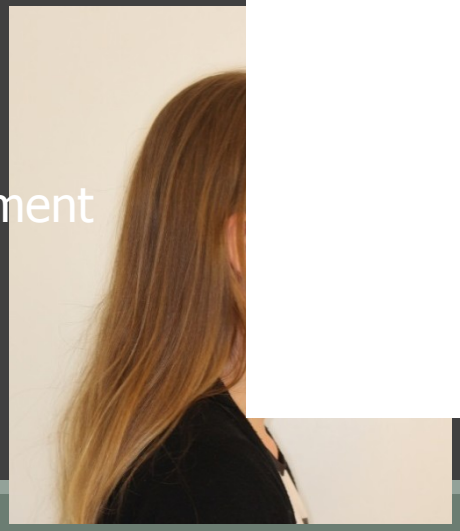


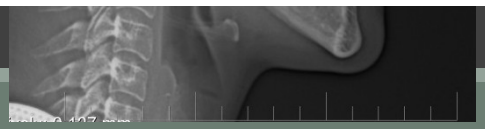
Case – orthodontic treatment with surgery correction – mandibular progenia, skeletal class III, open bite, crowding

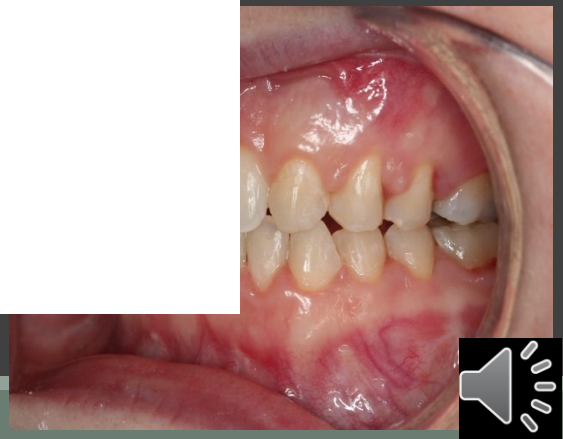
Before treatment



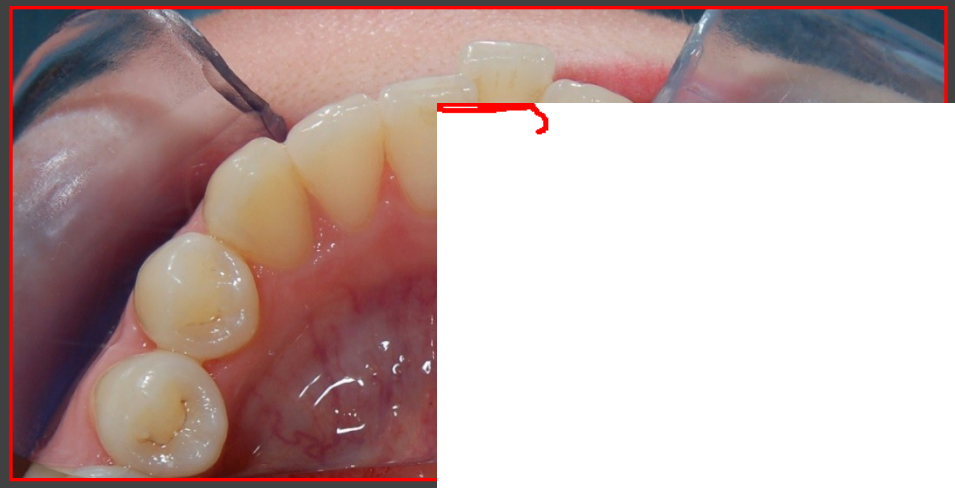
After treatment

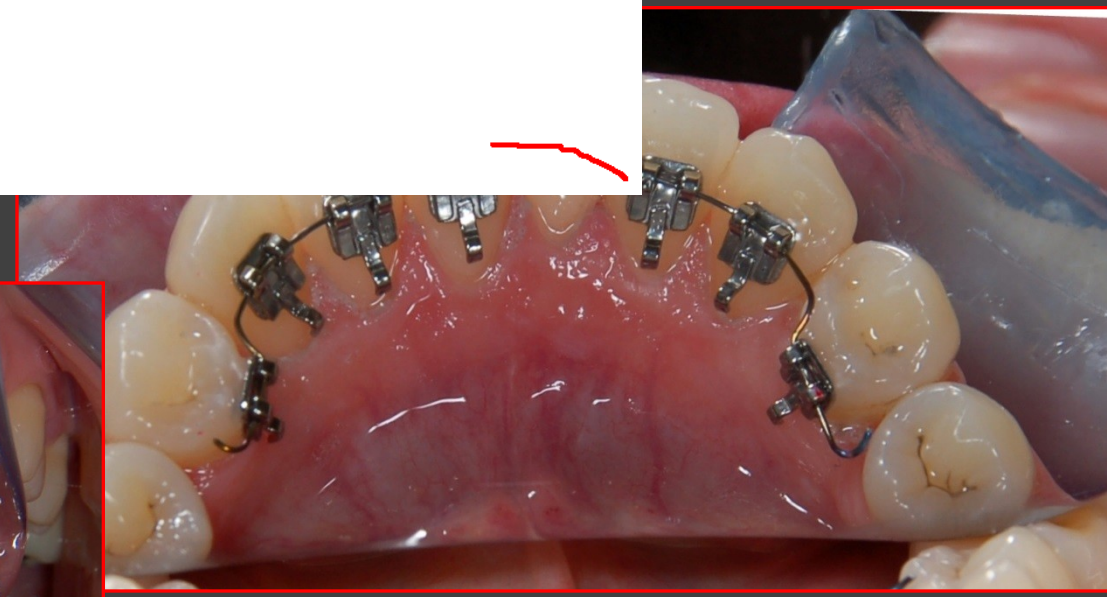




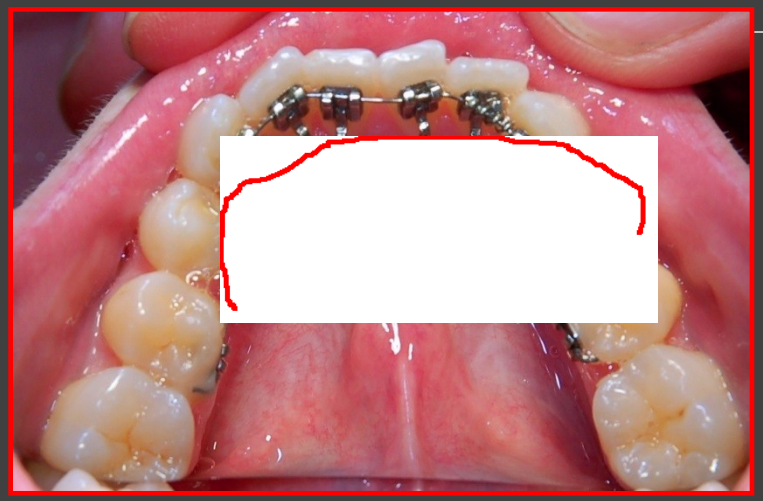


Orthodontic treatment with lingual appliance





Orthodontic treatment with lingual appliance



Fixed retainer after treatment

Treatment - crowding - with lingual appliance

Thank You four Your attention

Questions – email – alena.brysova@fnusa.cz

Consultation – Orthodontic department - St. Anne's Hospital, building D2b – Thursday 1-2 p.m.