ORTHODONTICS

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

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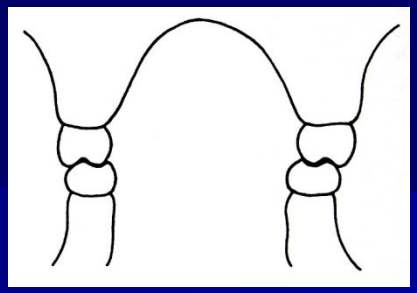
- MALOCCLUSION is a manifestation of genetic and environmental interaction on the development of the orofacial region

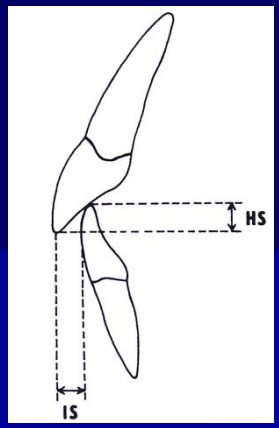
GOALS OF TREATMENT:

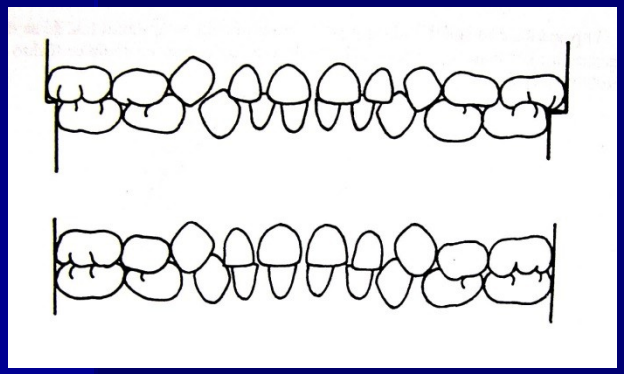
- Ideal functional occlusion
- Ideal soft tissue proportions and adaptation
- Ideal jaw, skeletal and dental relationship

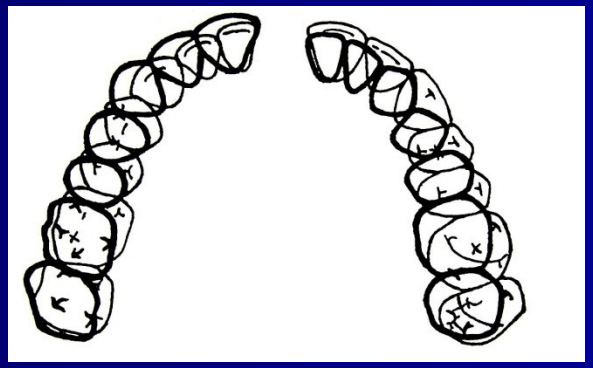
Ideal occlusion

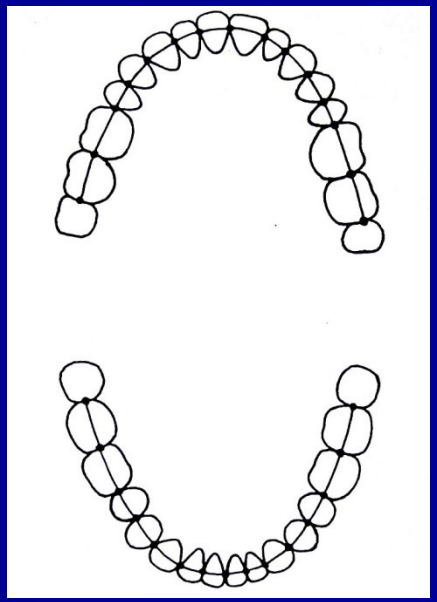
- correct relationship of molars
- correct overjet and overbite
- Correct intercuspidation of teeth
- Points of contact are lined in an regular arch
- Deciduous dentition is ended either by a small step or the posterior teeth facets are aligned











Correct dentition has 6 keys of correct occlusion- Andrews

Ideal occlusion

Ideal occlusion

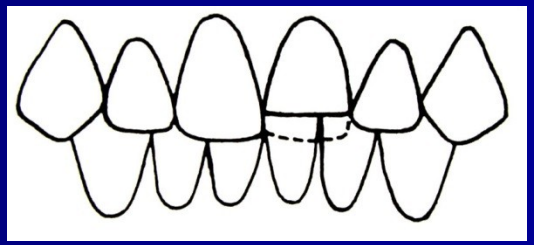
Classification of orthodontic anomalies

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

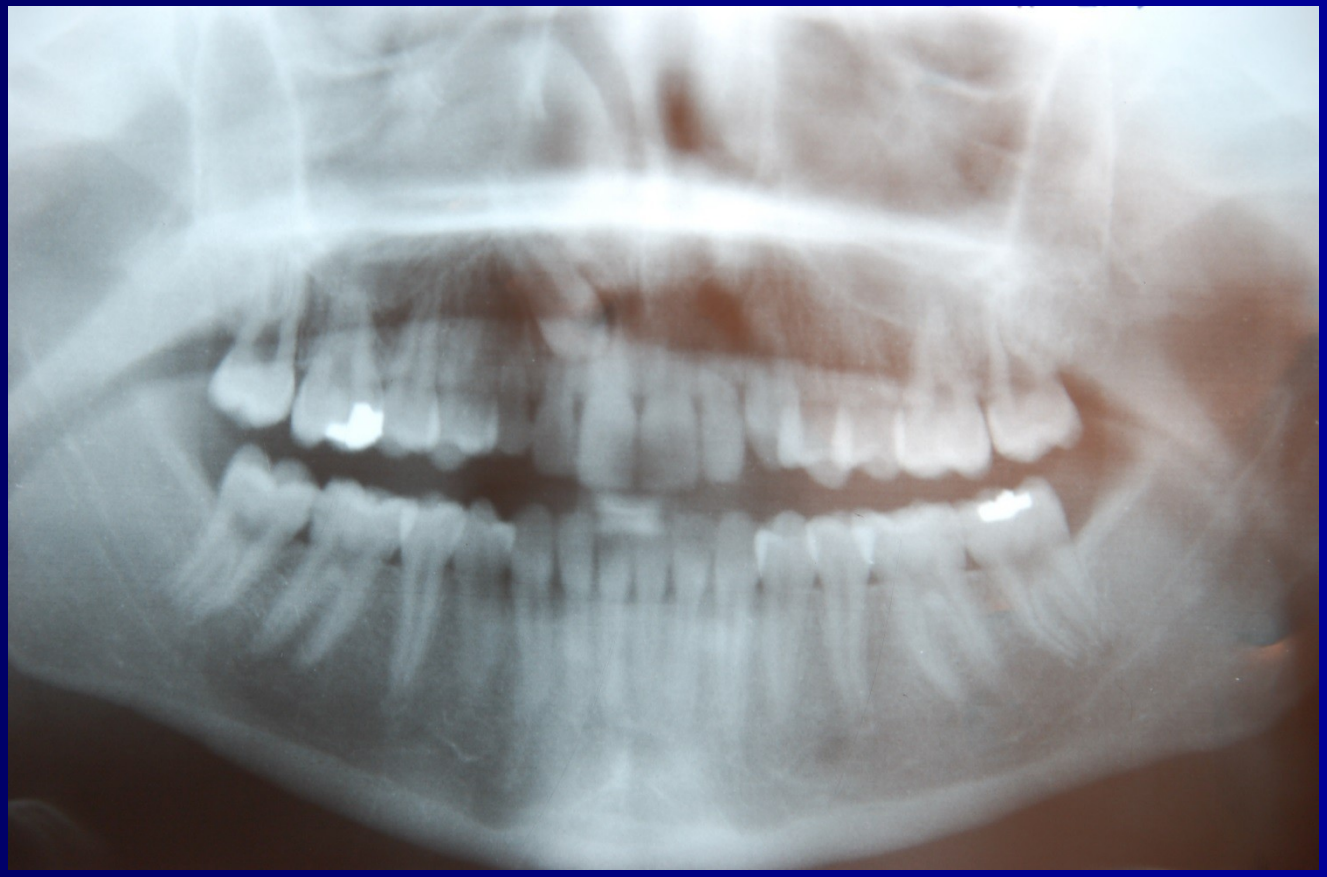
Anomalies of the shape of teeth

Palatal eruption

Palatal eruption

Retention of canine

Retention of canine



Infraocclusion

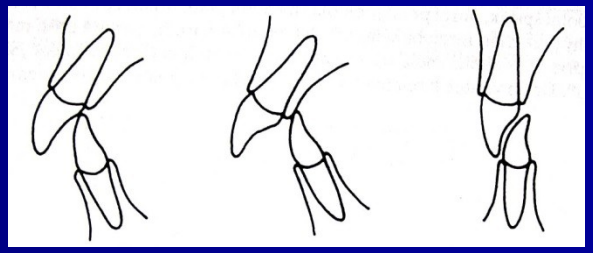
Buccal nonocclusion

Classification of orthodontic anomalies

2. Anomalies of groups of teeth

- groups of teeth are in irregular position

Protrusion, retrussion



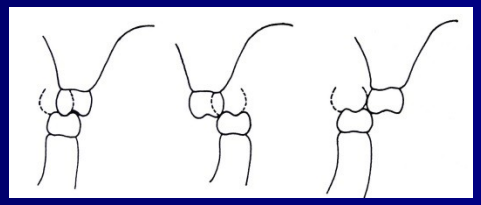
Inverted bite – is in the frontal part – lower tooth is more anteriorly than the upper tooth

Inverted bite

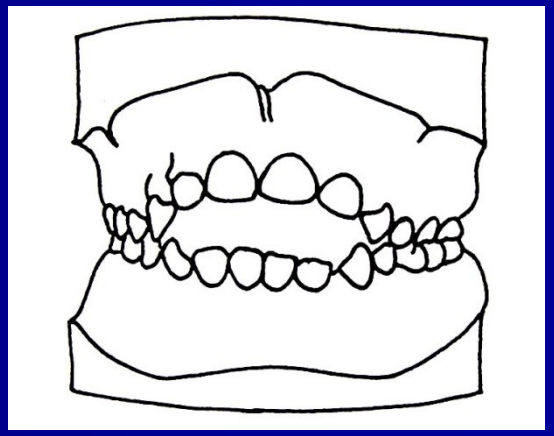
Classification of orthodontic anomalies

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

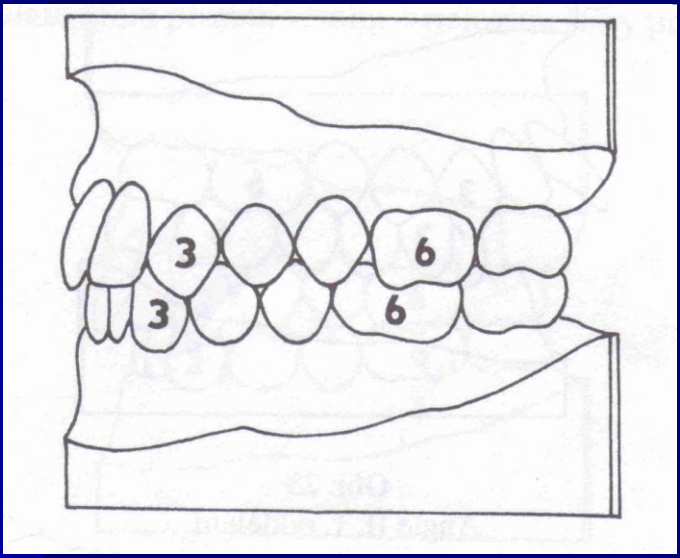
Deep bite

Crowding

Classification of orthodontic anomalies

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

Class I . normoocclusion

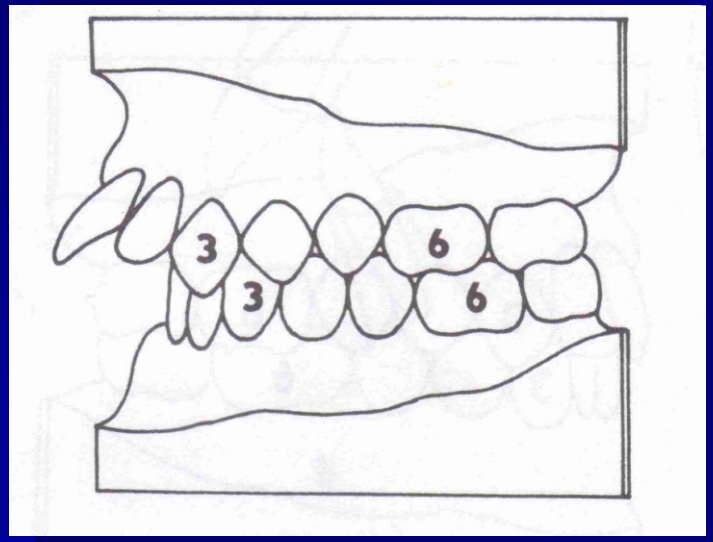


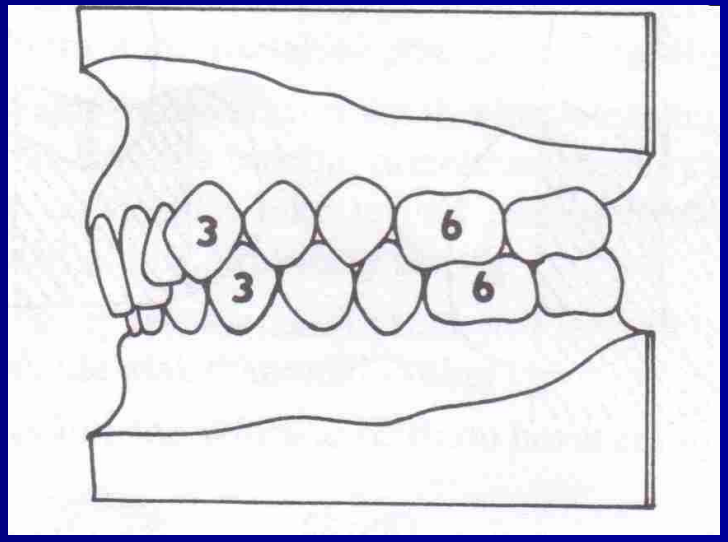
Angle I

Classification of orthodontic anomalies

- Class II : distal occlusion

  - with protrusion of upper incisors
  - with retrusion of upper incisors

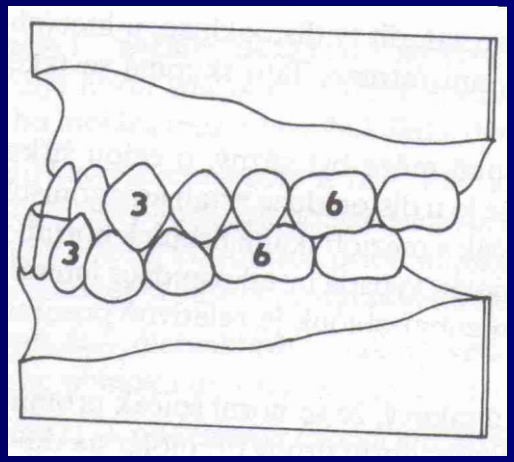




Angle II

Classification of orthodontic anomalies

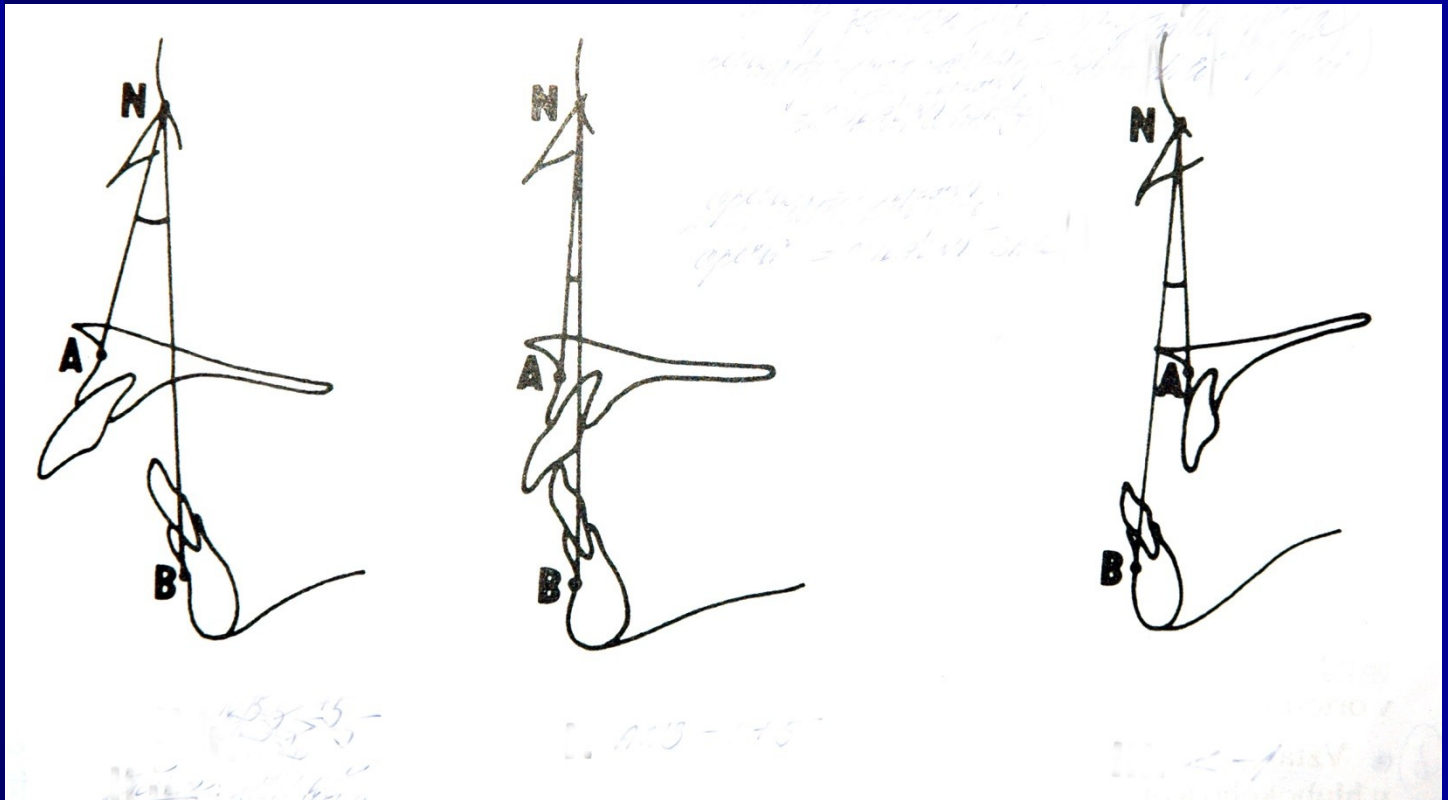
- Class III : mesial occlusion



Angle III

Classification of orthodontic anomalies

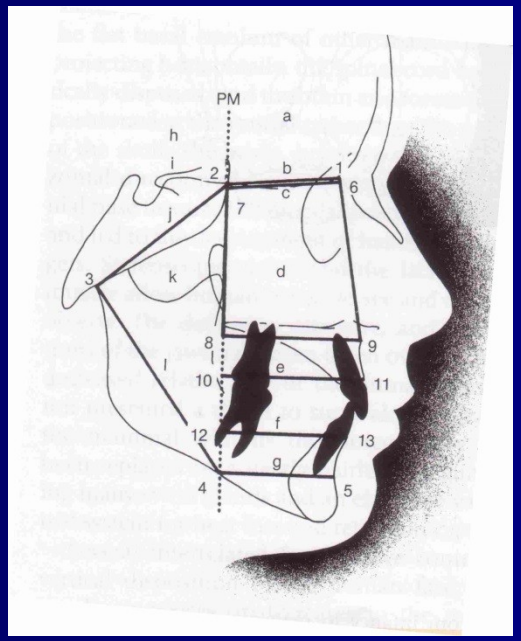
- 4. Anomalies of position, size and relationship of the jaws-bones



Classification of orthodontic anomalies

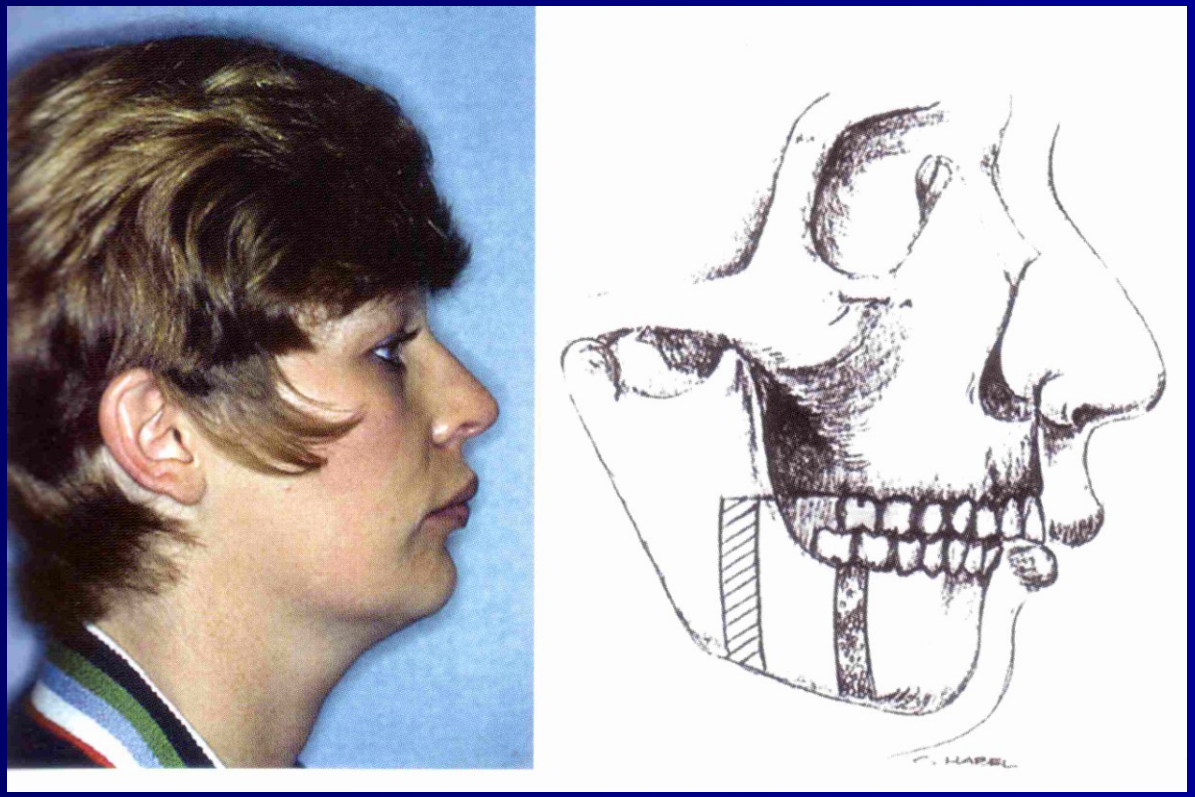
4. Anomalies of position, size and relationship of the jaws-bones

Skeletal class I : relationship of jaws without any deviation



Classification of orthodontic anomalies

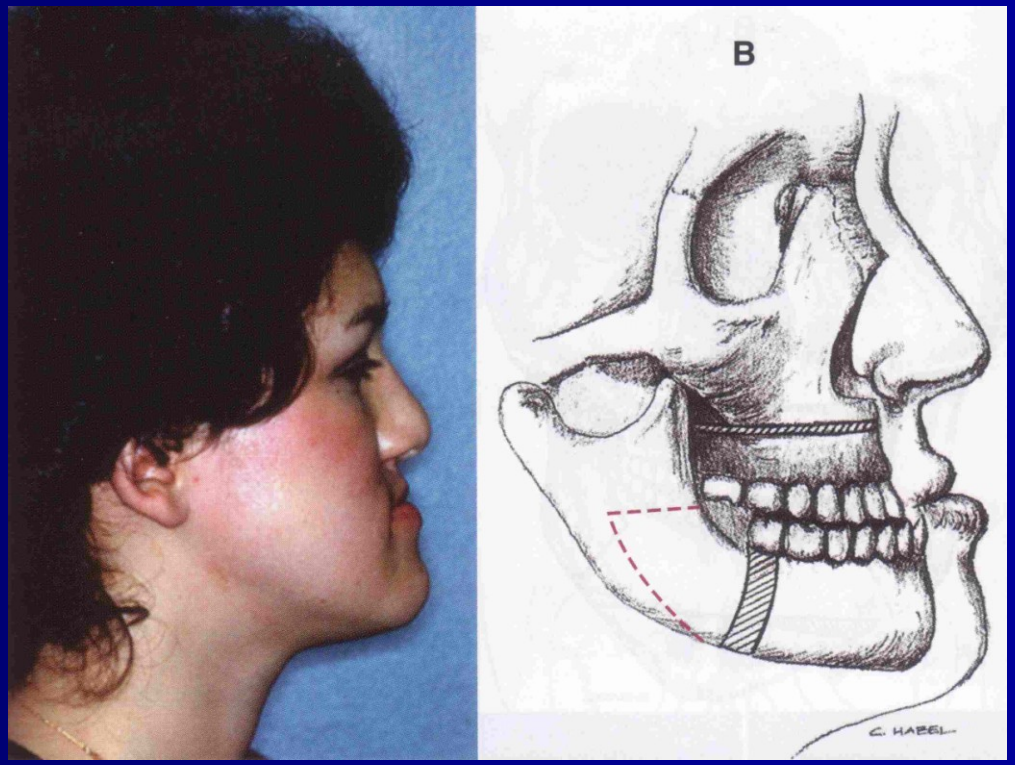
- Skeletal class II : the lower jaw is more distally to the upper jaw (small lower jaw, large upper jaw)



Angle II

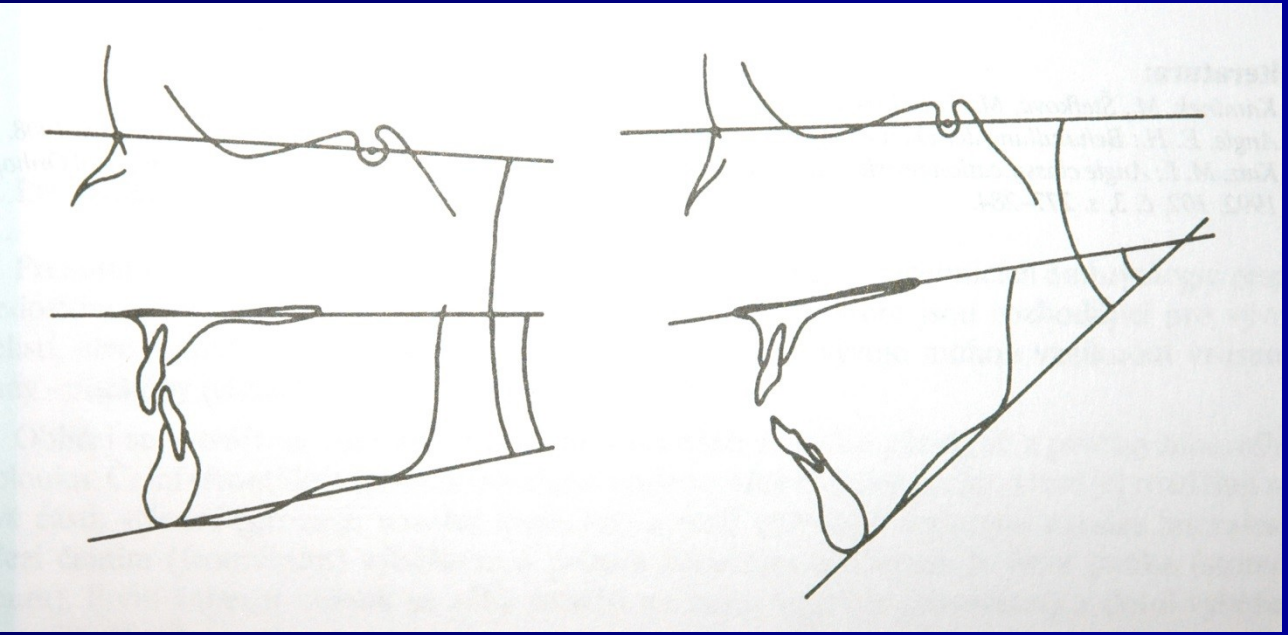
Classification of orthodontic anomalies

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



Angle III - TLR

Classification of orthodontic anomalies




Deep bite


Deep bite,
skeletal class II


Protrusion ,
skeletal class II


Inverted bite,
skeletal class III


Skeletal, dental
open bite


Skeletal open bite,
class III.

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

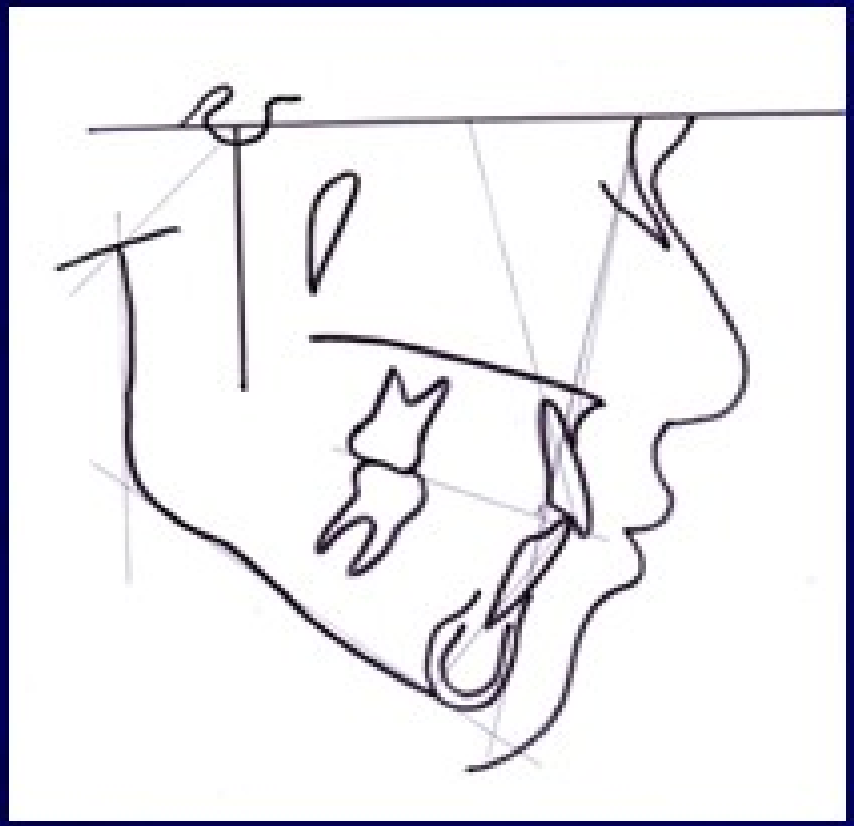
- detection of congenital absences of teeth
- detection of supernumerary teeth
- evaluation of the dental health of the permanent teeth
- assessment of trauma to the teeth after injury
- determination of dental age of the patient
- calculation of root resorption
- condyles

Diagnostic examination

4. RADIOGRAPHS

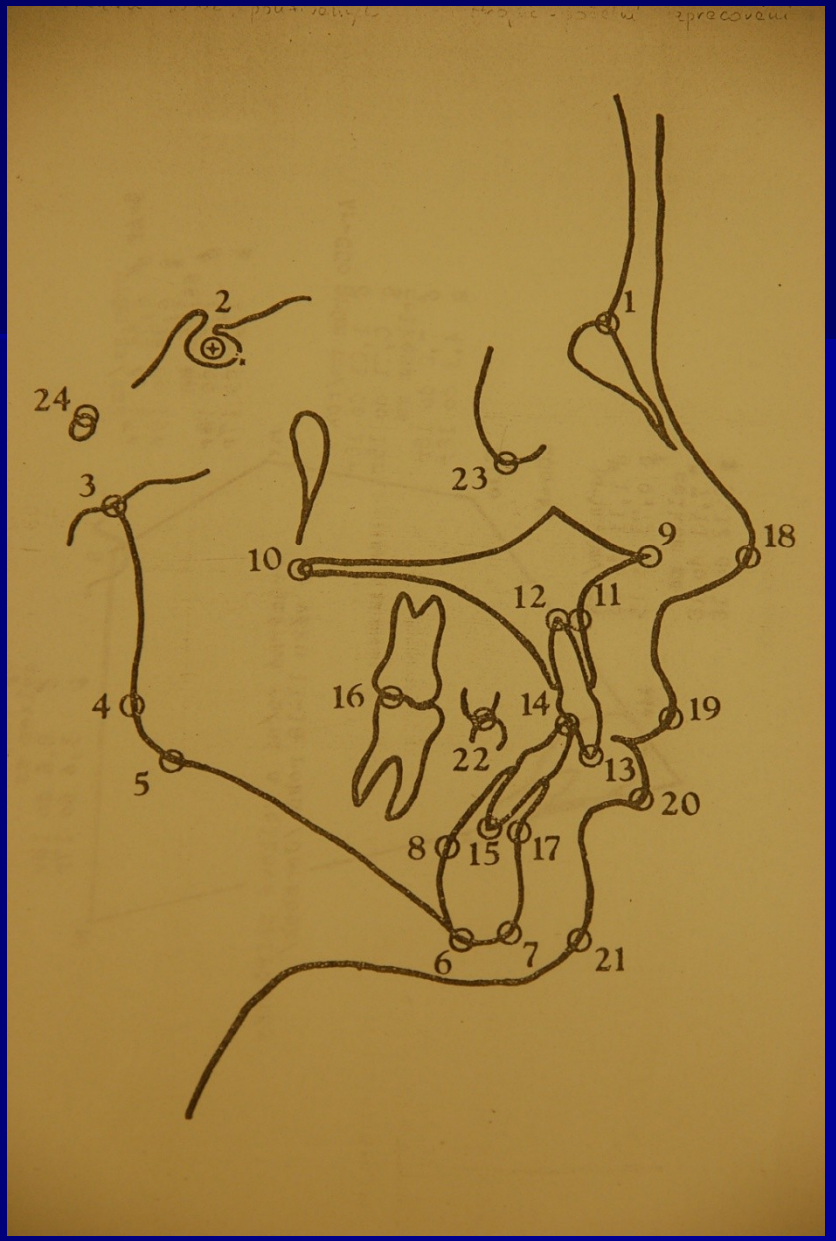
b] Cephalometric radiographs

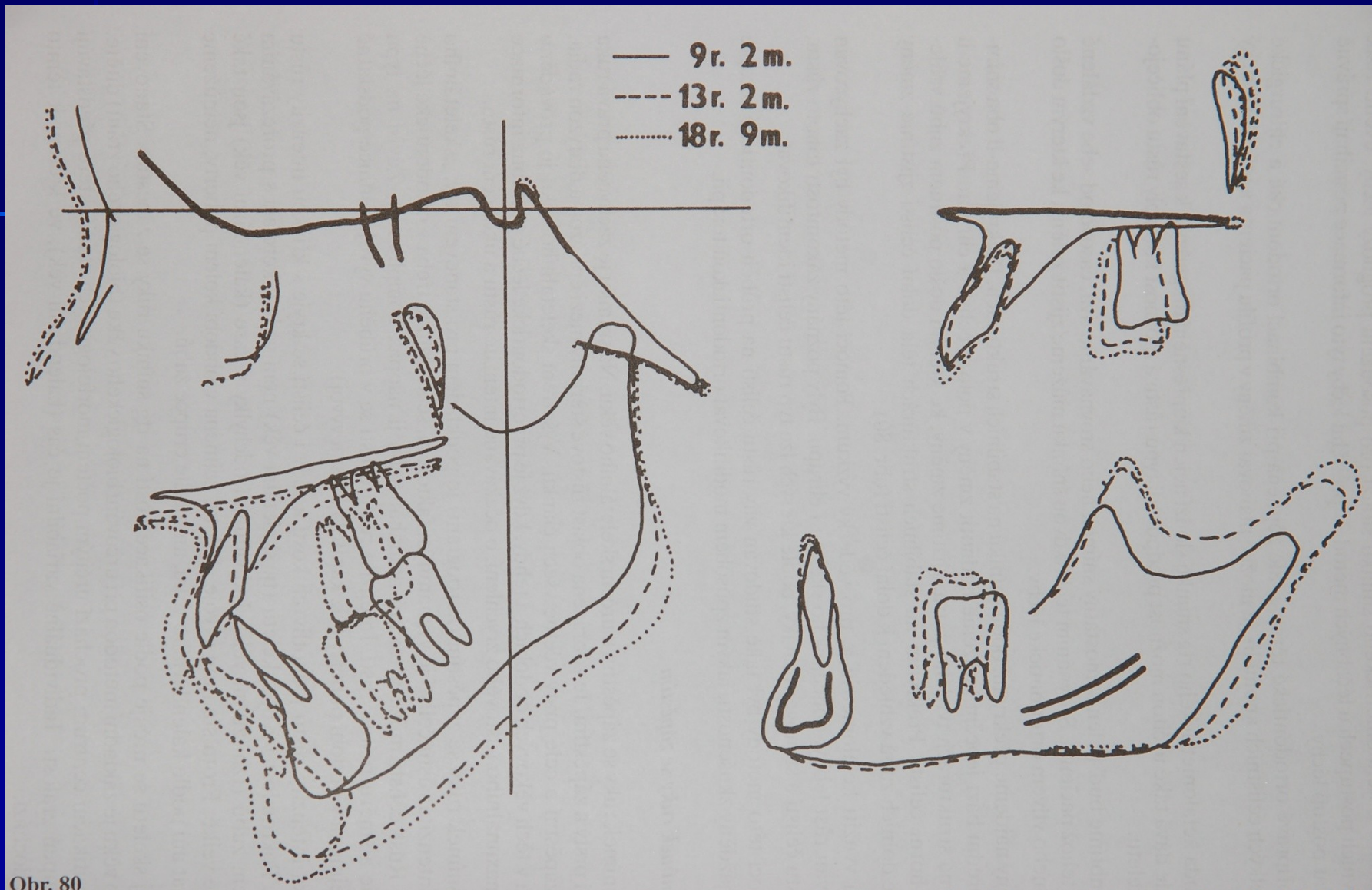
- evaluation of craniofaciodental relationship
- assessment of the soft tissue matrix
- determination of mandibular position
- prediction of growth and development
- detection of skeletal age



Cephalometric analysis

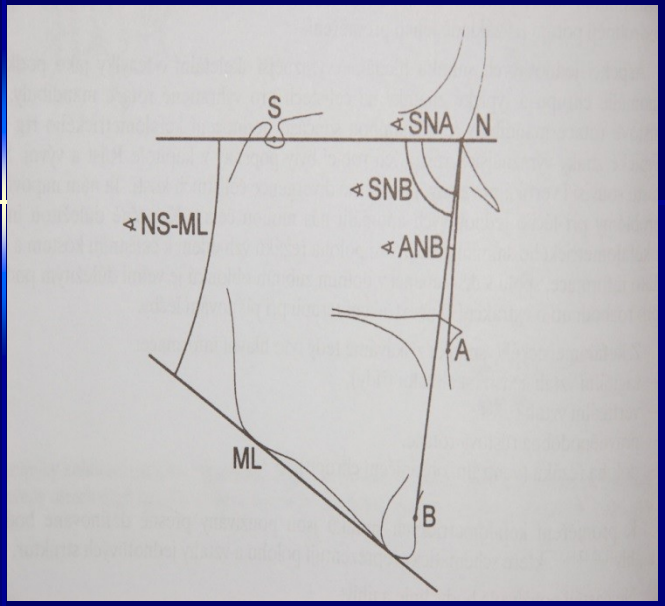
N - nasion (1)
S – sella (2)
a – articulare (3)
Me – menton (6)
Po – pogonion (7)
SpA – spina nasalis ant. (9)
SpP – spina nasalis post. (10)
A – bod A (11)
Is - apex horního středního řezáku (12)
Is – incisale superius (13)
Ii – incisale inferius (14)
Ii - apex dolního řezáku (15)
B – bod B (17)
Go – gonion (kontr. bod: 1. a-4, 2. ML)
Gn – gnation (konstr. bod: 1. N-Po, 2. ML)
ML – mandibulární linie (Me-5)
FOL – funkční okluzální linie



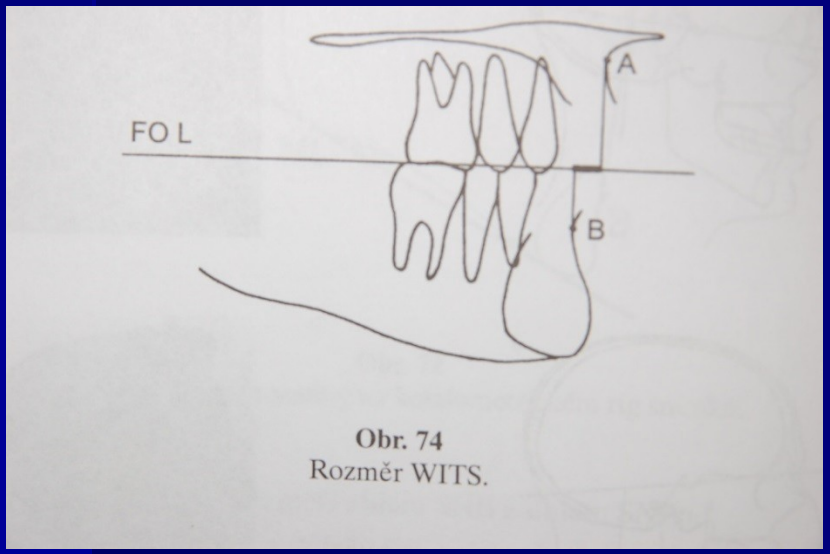


Obr. 80

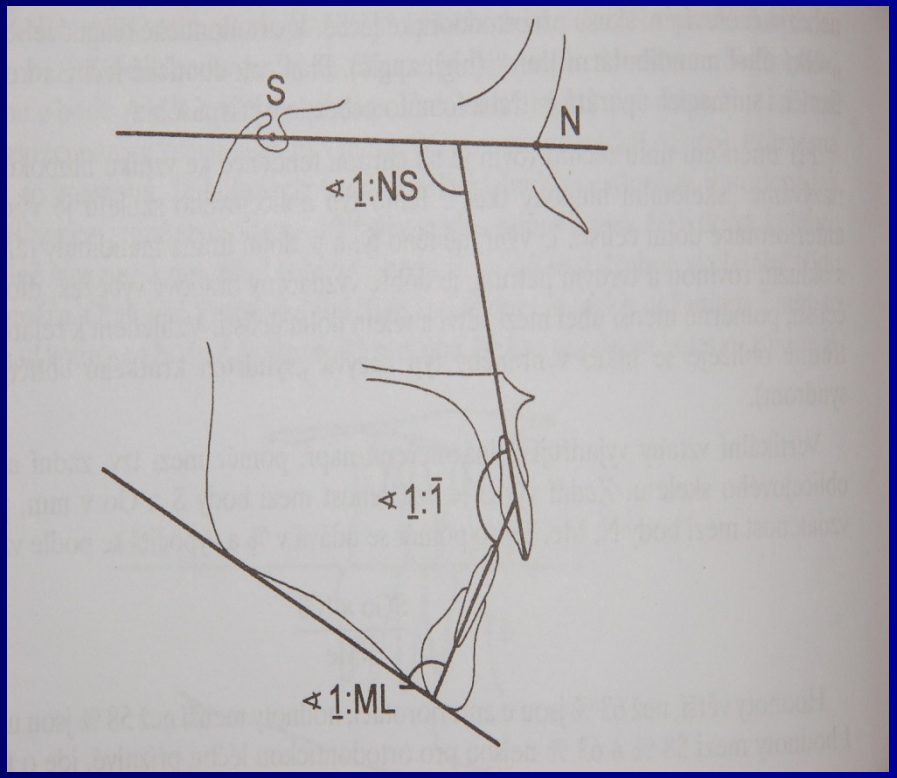
skeletal analysis



- ANB (-1 to +5 degree)
- WITS (-2 to +2 mm)



Obr. 74
Rozměr WITS.


S
N
∢1:NS
∢1:1̄
∢1:ML

Skeletal class I

Skeletal Class II

With protrusion of upper incisors

With retrusion of upper incisors

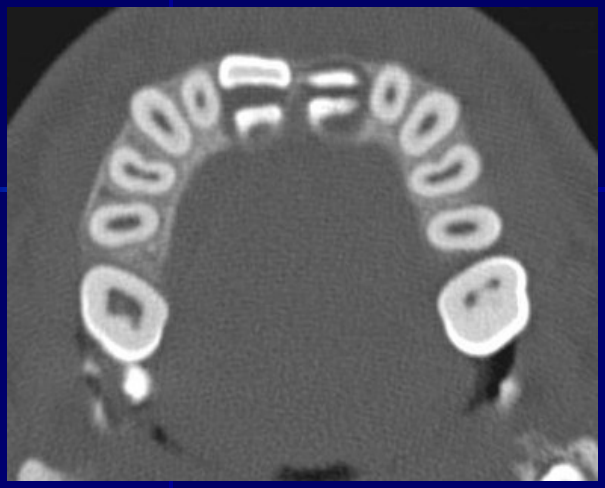
Skeletal Class III.

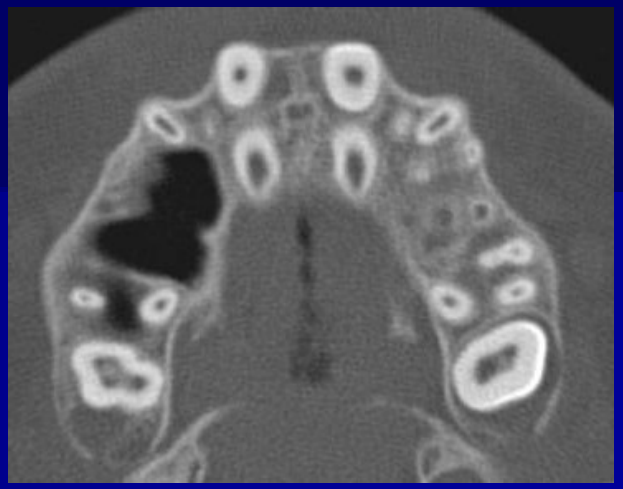
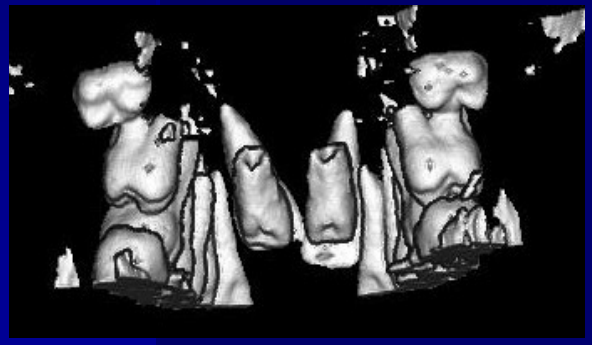
Diagnostic examination

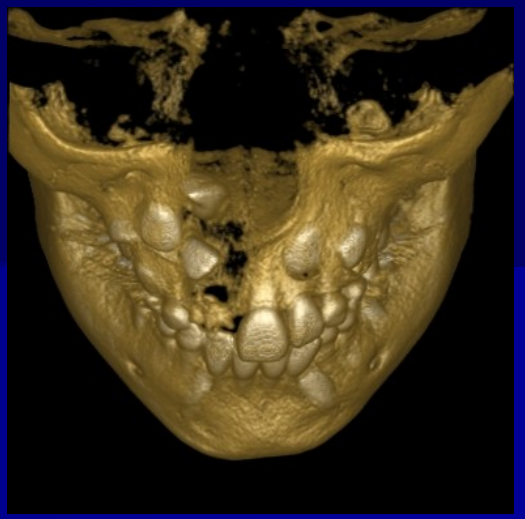
4. RADIOGRAPHS

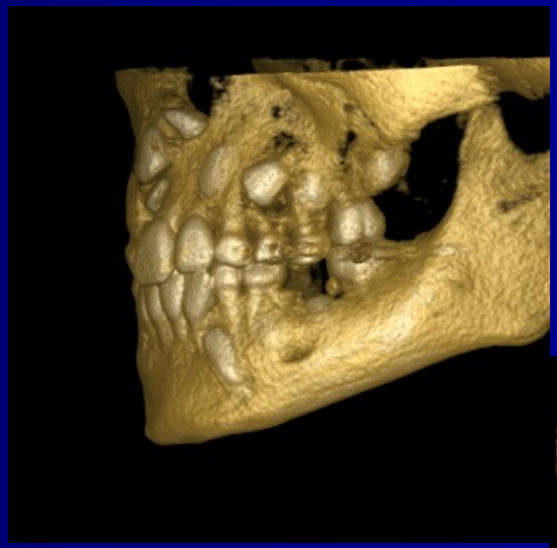
c] Other radiographs

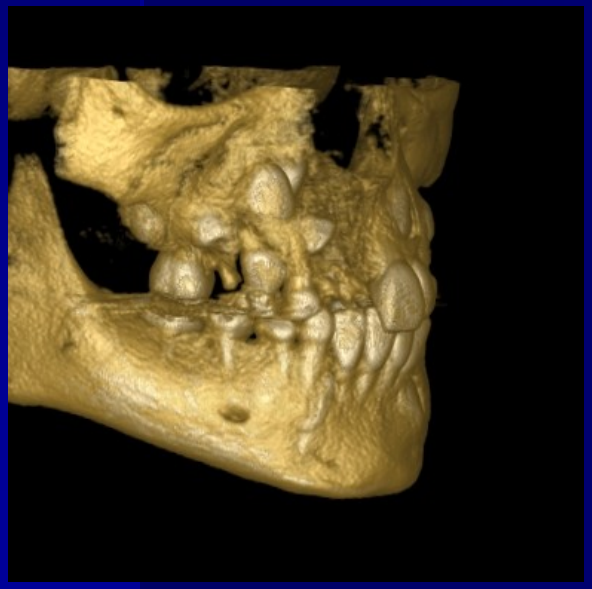
- Bitewing – caries detection
- Hand wrist – detection of skeletal age
- Computer tomography –CT scan [impacted tooth, ankylosed tooth, difficult skeletal anomalies
- Digital imaging – computer generated model reconstructed from the initial imaging data

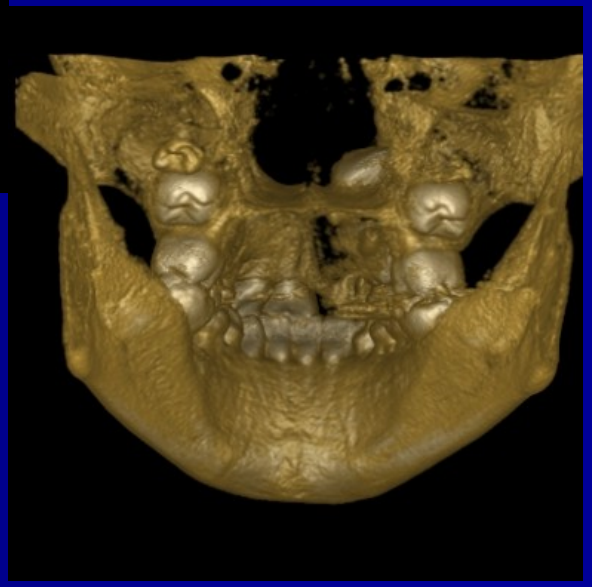










Diagnostic examination

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

- 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

- Anomalie -Developmental defects - amelogenesis

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

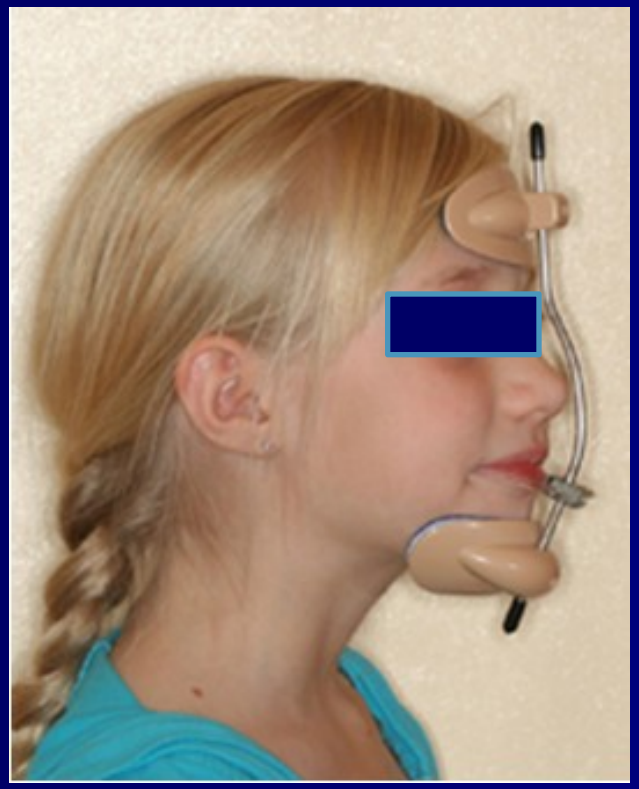
3. 6-9 years [1. phase of mixed dentition]

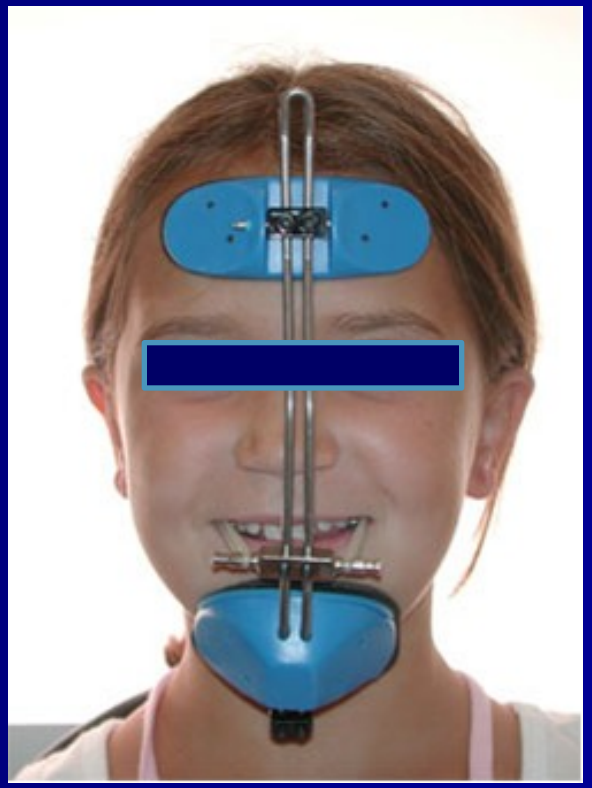
The best time for treatment :

- 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

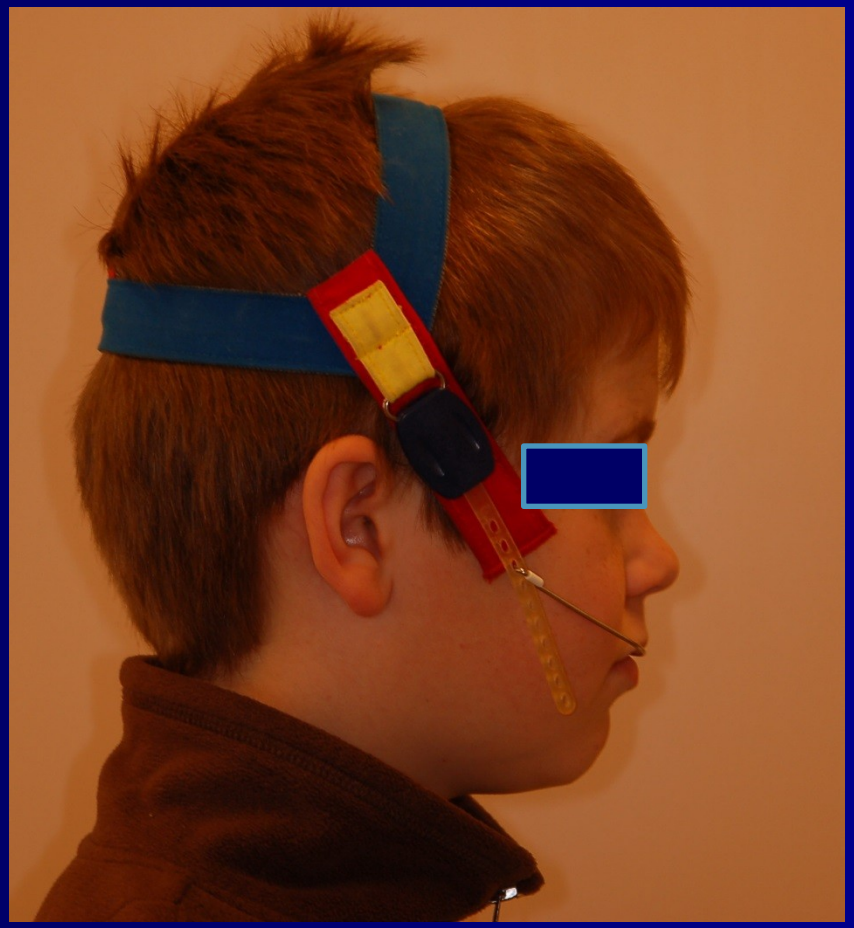
4. 9-12 year [second phase of mixed dentition]

- 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

Functional appliances

- modifiyng extent and direction of orofacial growth
- exploit muscular activity and soft tissue stretch to stimulate dental and bone changes
- operates at the time of maximum growth of orofacial region = 9-12 years old children
- We need construction bite
- Type of functional appliances :

  Bionator, Klampt, Maxilator – class II and open bite

  Fränkel appliance – class III

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

Orthodontics brackets

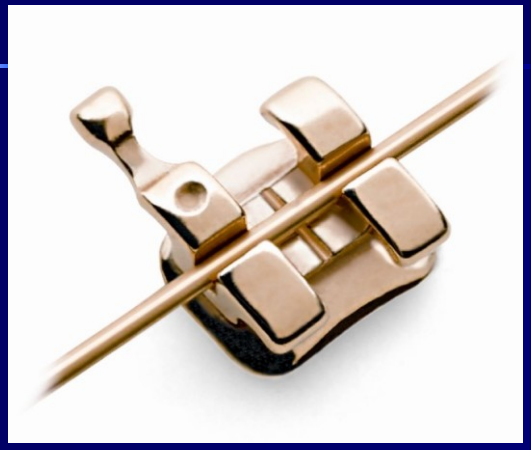
Sapphire brackets

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

Selfligating stainless steel brackets

Orthodontics brackets

Lingual brackets – 2D,3D

Advantages:

- Aesthetics

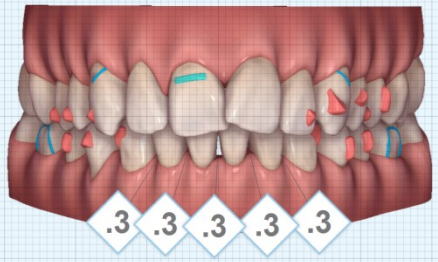
Disadvantages:

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

Lingual bracket

Orthodontics brackets

Decorative brackets



ClinCheck® Software

Simulated Teeth movements, actual treatment results may vary.
Treatment plan are determined by your doctor.

invisalign®

Fixed lingual retainer

Direct bonding

1.cleaning

2. etching

3.rinse

4. drying

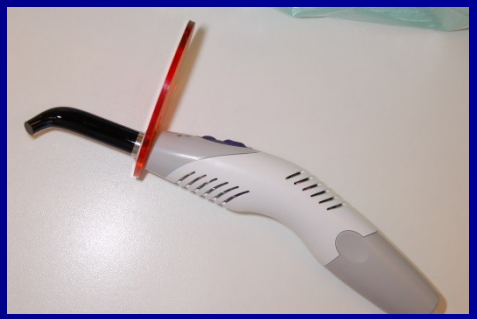
Direct bonding

5. primer

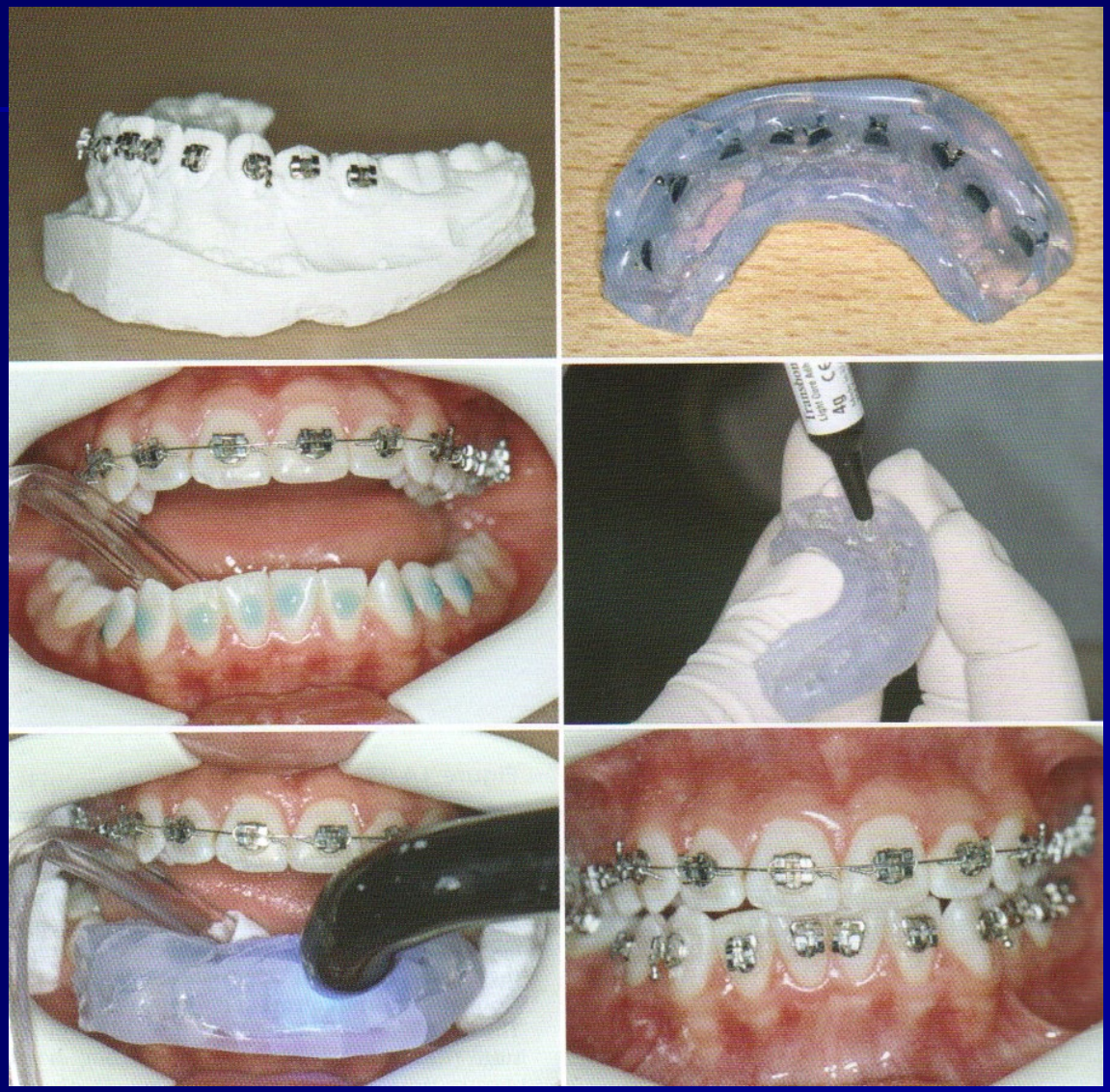
6. bonding

7. remove excess

8. light or chemically cured



Indirect bonding



Case 1 : vestibular eruption 11, crowding, supernumerary 11

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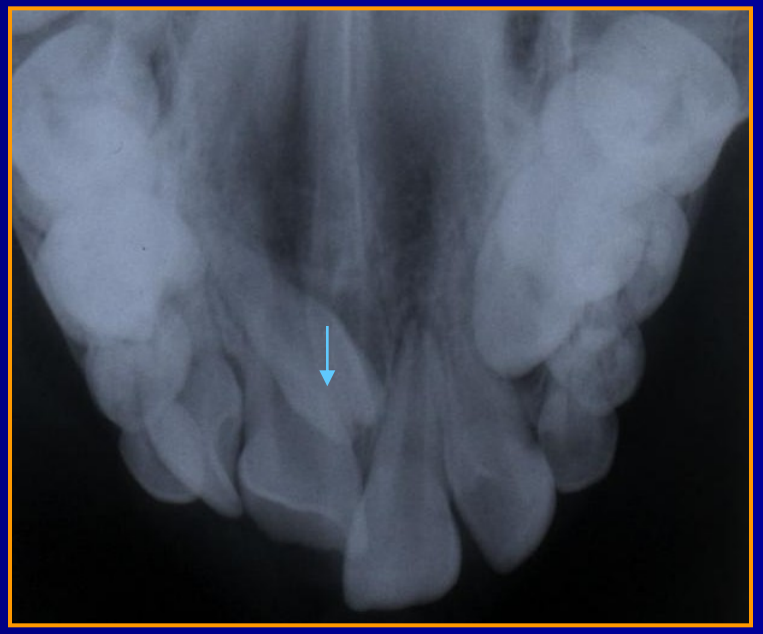
Case 1 : vestibular eruption 11, crowding, supernumerary 11



Case 1 : vestibular eruption 11, crowding, supernumerary 11 - Treatment






Case 1 : vestibular eruption 11, crowding, supernumerary 11 - Treatment

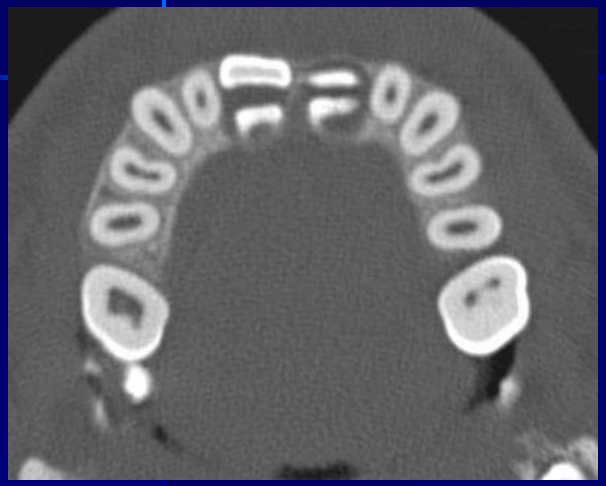
- Treatment time – 11 months

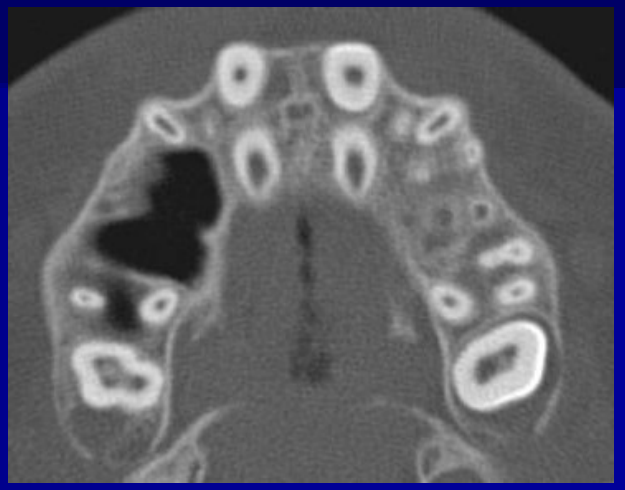
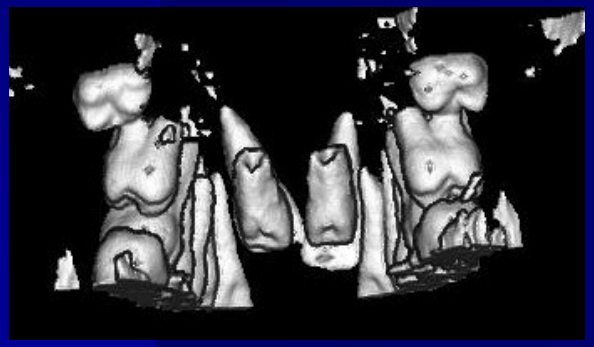
Case 2 : retention 11,21 , crowding, supernumerary 11, 21

Case 2 : retention 11,21 , crowding, supernumerary 11, 21

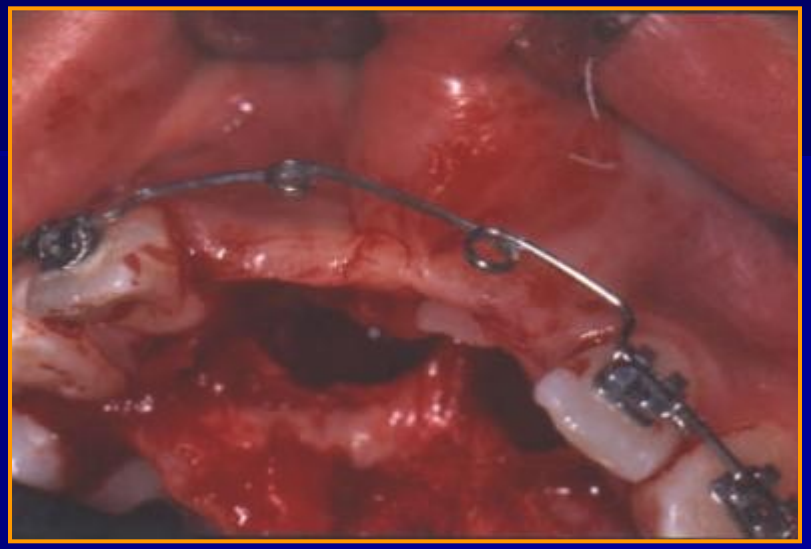
Case 2 : retention 11,21 , crowding, supernumerary 11, 21

Case 2 : retention 11,21 , crowding, supernumerary 11, 21
CBCT



Case 2 : retention 11,21 , crowding, supernumerary 11, 21
Treatment - Extraction of the supernumerary 11,12



Case 2 : retention 11,21 , crowding, supernumerary 11, 21
Treatment

Case 2 : retention 11,21 , crowding, supernumerary 11, 21
Treatment

Case 2 : retention 11,21 , crowding, supernumerary 11, 21
After Treatment

Case 2 : retention 11,21 , crowding, supernumerary 11, 21

- Treatment time 16 months

Case 3 : Crowding, deep bite

Case 3 : Crowding, deep bite
After Treatment with a fixed orthodontic appliance

Treatment time – 1,5 years

Case 4 : Crowding, inverted bite, vestibular eruption 13

Case 4 : Crowding, inverted bite, vestibular eruption 13
Treatment – fixed appliance - expansion, leveling, bite correction

Treatment time – 1,8 years

Case 5 : retention 25, no space for 25 eruption
Treatment – fixed appliance - expansion, open space for 25
leveling

Case 5 : retention 25, no space for 25 eruption
Treatment – fixed appliance - expansion, open space for 25 leveling

Treatment time – 2 years

Case 6 : retention 23, no space for 23 eruption, crowding
Treatment – fixed appliance - expansion, open space for 23, leveling






Treatment time – 2 years

Case 7 : retention 13,23, no space for 13,23 eruption, crowding
Treatment – fixed appliance – extraction 14,24,34 44, leveling, bite correction







Treatment time – 2 years

Orthodontic – surgery treatment - by skeletal Class III. case

Before treatment

After treatment

Lingual appliance 2D – crowding treatment






Thank You four Your attention