

MAXILLOFACIAL TRAUMATOLOGY

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Maxillofacial injuries

- isolated maxillofacial injury
- multiple injuries
- **polytrauma** (injury of more region or organ of the body and one of them is life threatening)

Incidence of maxillofacial injuries

- Injury of soft tissues of head and neck region (35%)
- Injury of jaws (65%)
 - Mandibular fracture (71%)
 - Fracture of middle face bones (25%)
 - Combined fractures (4%)

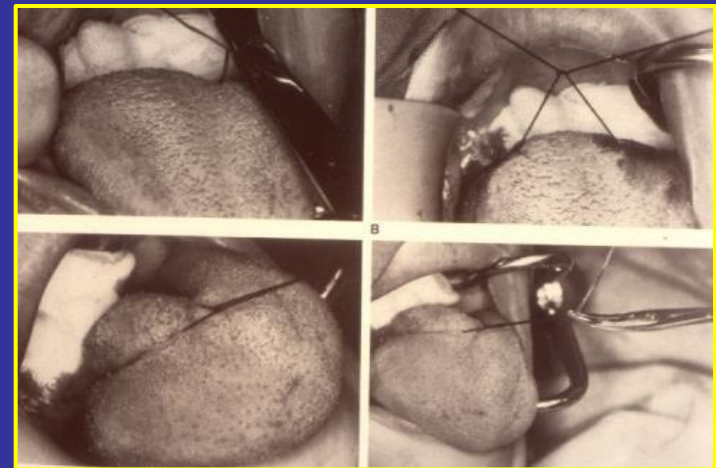
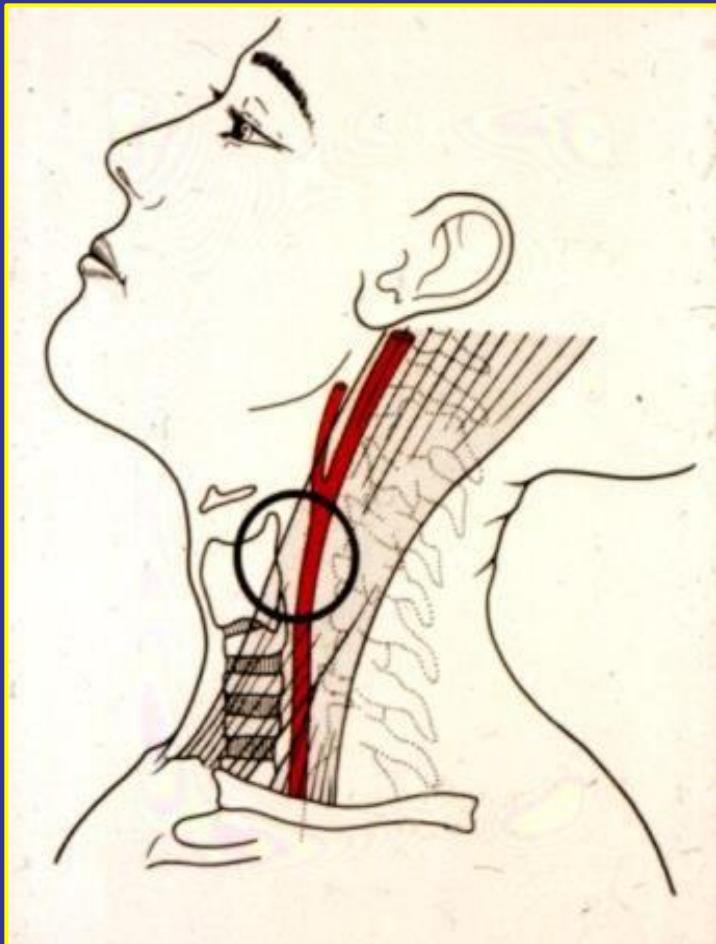
male – female ratio: 2-1

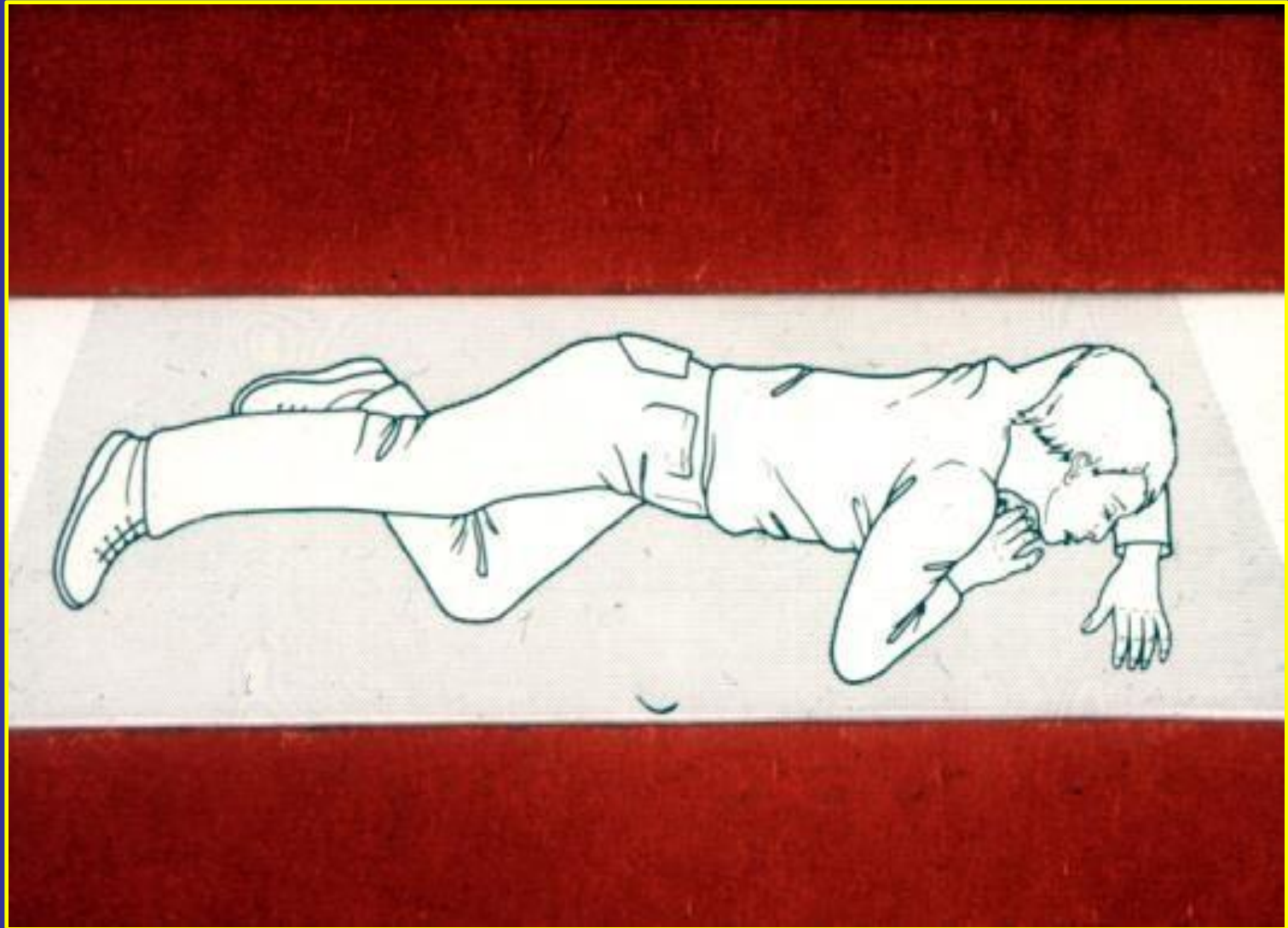
Causes of maxillofacial injuries

- Traffic accident
- Violence
- Accident at work
- Sport injury

First-aid

- Maintenance of free respiration (saliva, blood, prosthesis, luxated teeth, foreign body, fractured middle face, tongue stb.)
- Stop bleeding
- Maintenance of circulation (volumen replacement, shock-therapy)
- Covering of wounds
- Fixation of fractured ends
- Hospitalisation

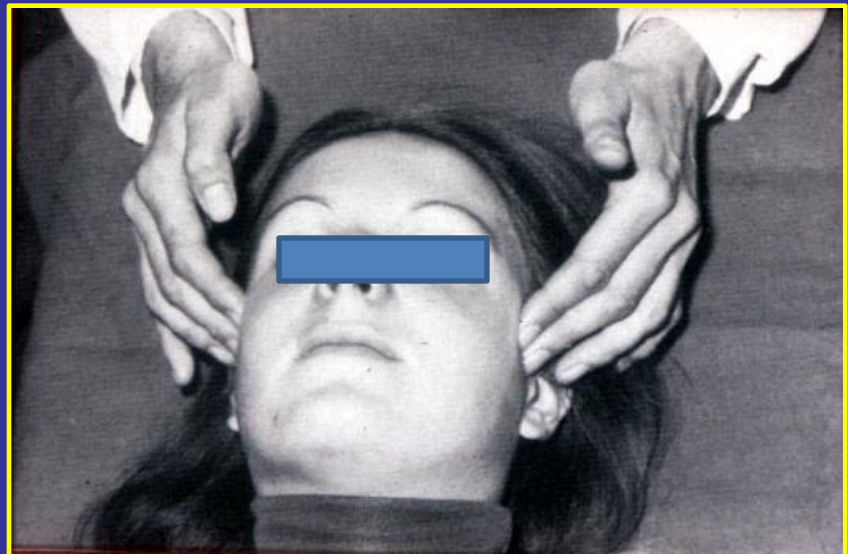
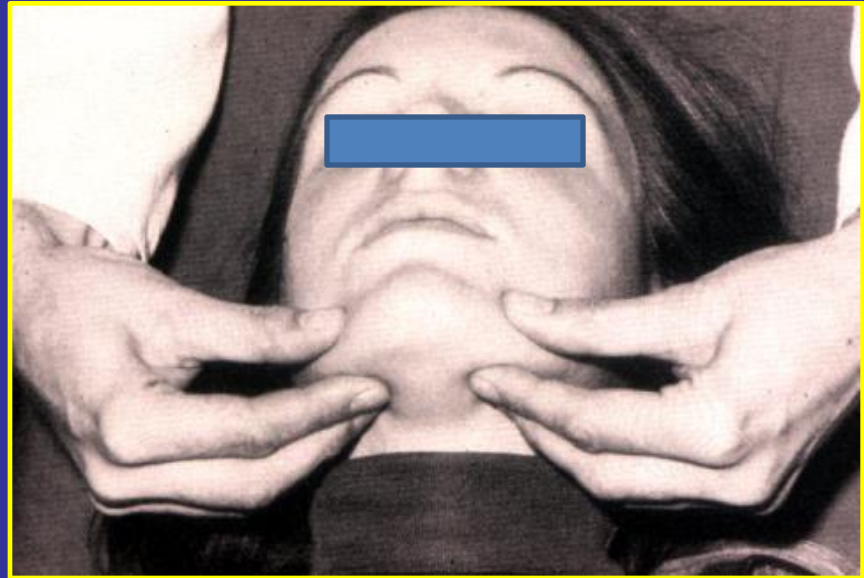
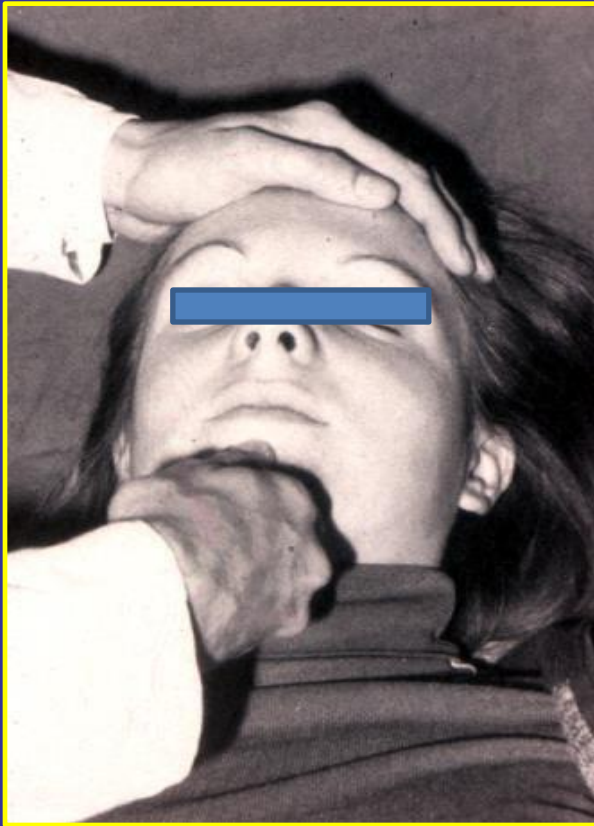




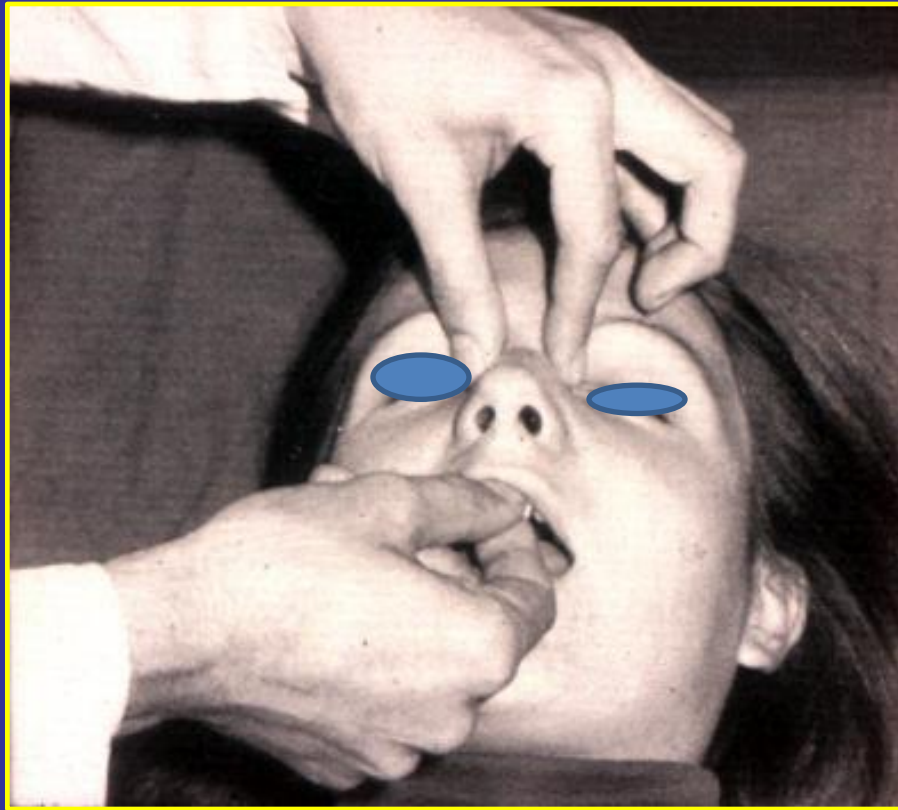
Treatment in hospital

if it is possible immediate and definitive!!!

- diagnosis (clinical symptoms, rtg.)
- treatment of soft tissue injuries
- reposition of fractured bone ends, immobilisation
- antibiotic administration
- nutrition, rehabilitation

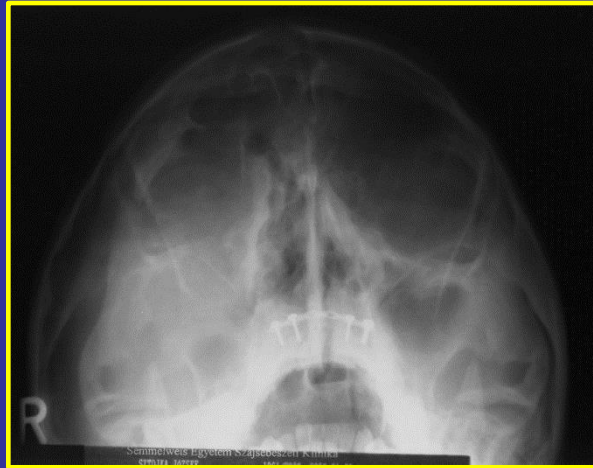


Physical examination

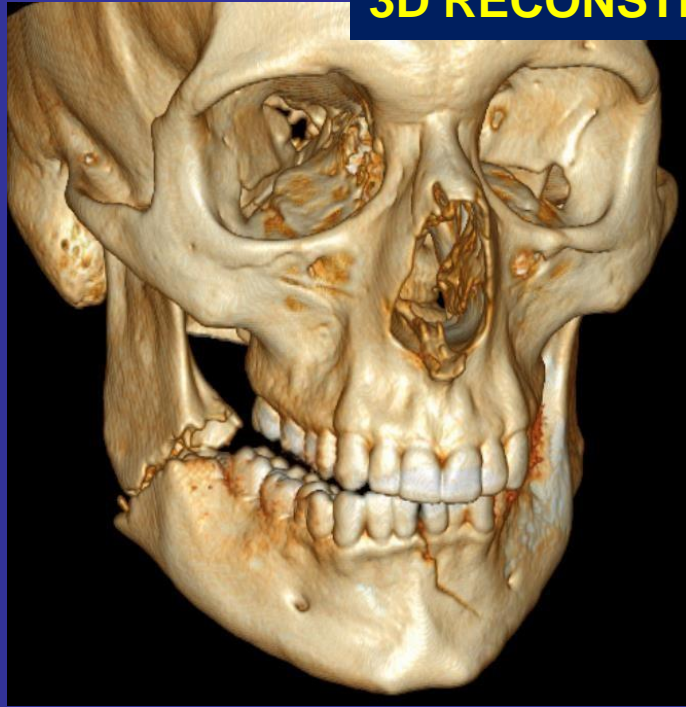


Imaging methods

- OP
- PA
- SINUS
- CT
- CBCT

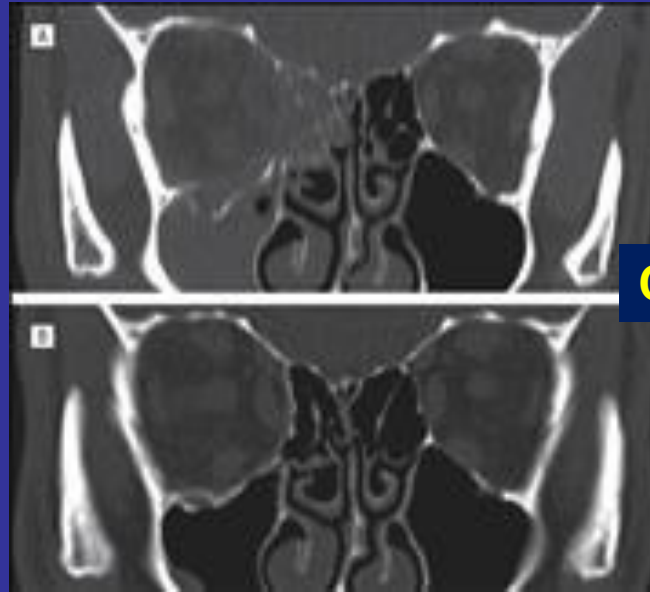


3D RECONSTRUCTION

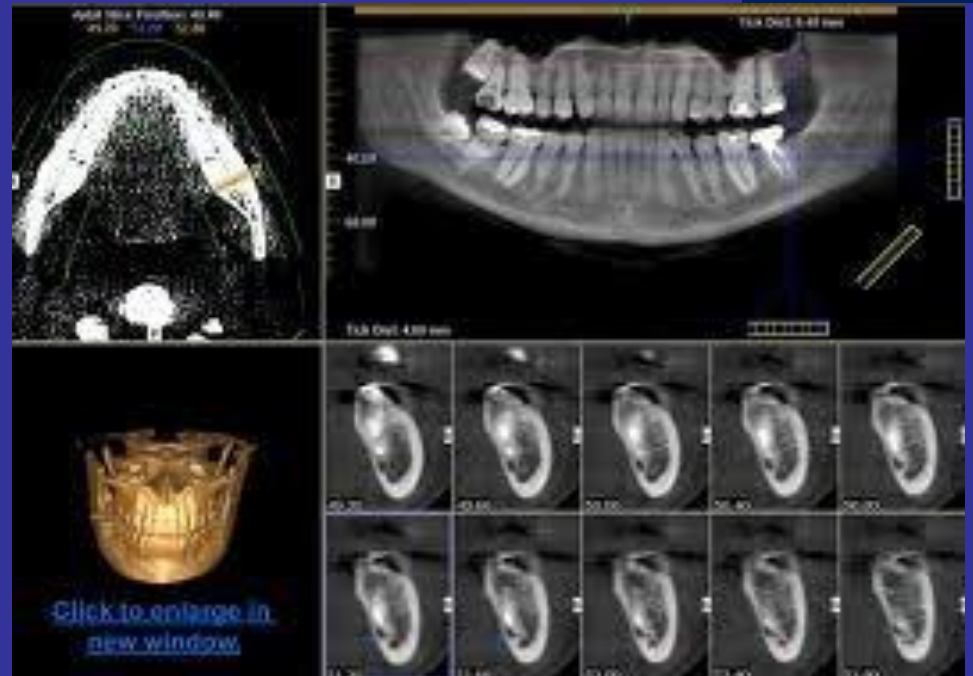


CT FORMS

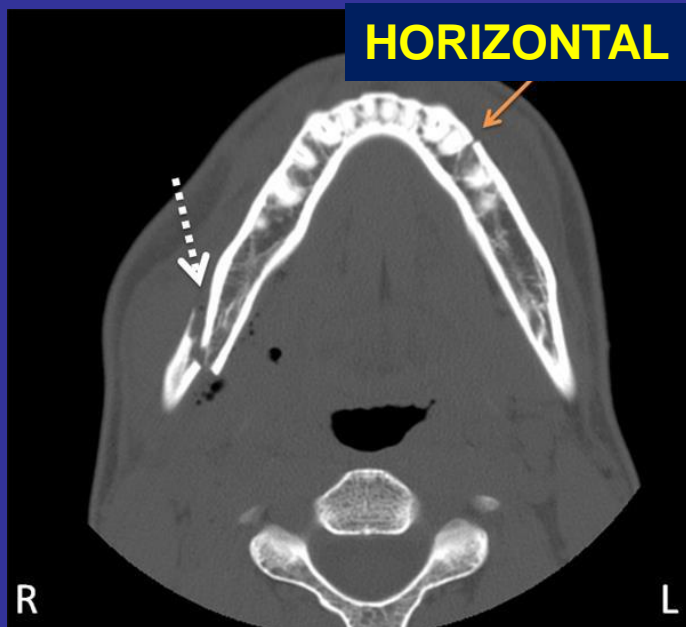
CORONAL



CBCT



HORIZONTAL

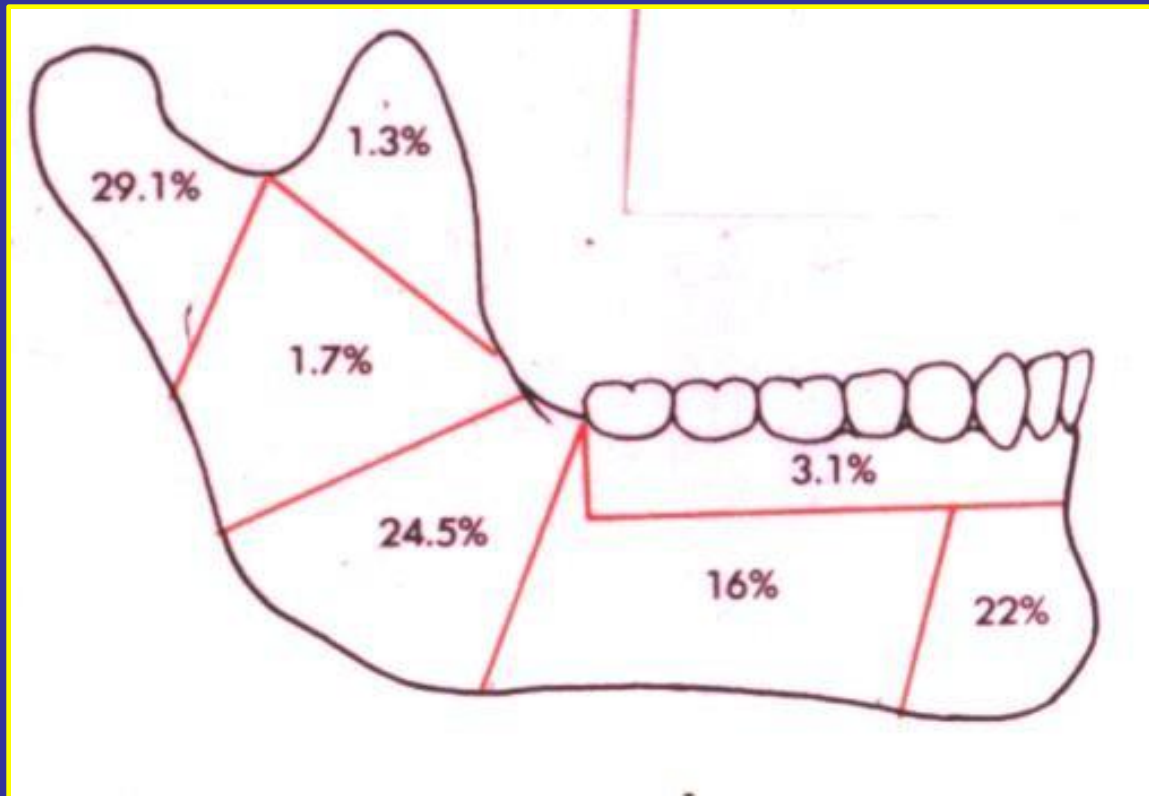


Mandibular fractures

- 75 % of jaw fractures

Classification of mandibular fractures

- connection with outside world (open, closed)
- type (infracture, greenstick fracture, hole width fracture, multiplex fracture)
- site
 - symphyseal /childhood/
 - in region of the canine tooth
 - corpus (between the canine tooth and angle)
 - mandibular angle (second in frequency, and the most often in case of single fracture)
 - ramus of the mandible
 - muscular process
 - condylar process (most often; change in the occlusion)
 - forms: -intracapsular (condylar)
 - extracapsular (subcondylar)



Diagnosis

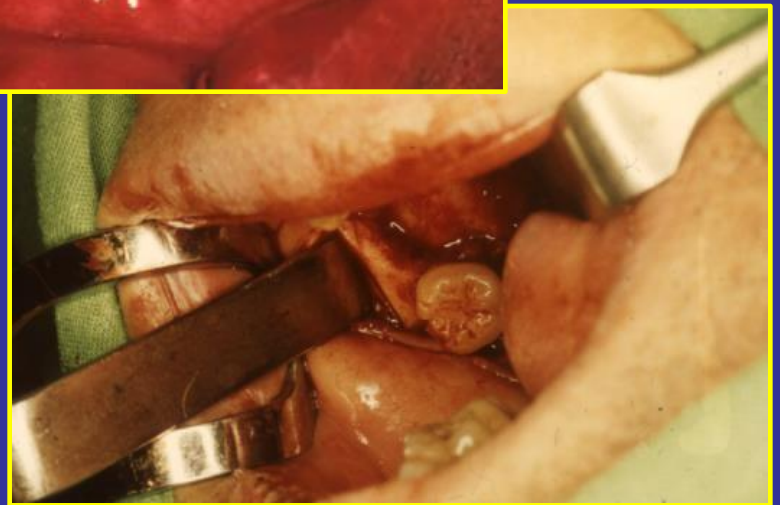
- anamnesis
- inspection
- physical examination
- imaging methods (x-ray, CT, CBCT)

General (uncertain) symptoms of jaw fractures

- Pain (spontaneous, induced by palpation or move)
- Swelling
- Soft tissue injury
- Functional disorders (trismus, biting disorder, paresthesia of the innervation site of n. mentalis)

Certain symptoms of jaw fracture

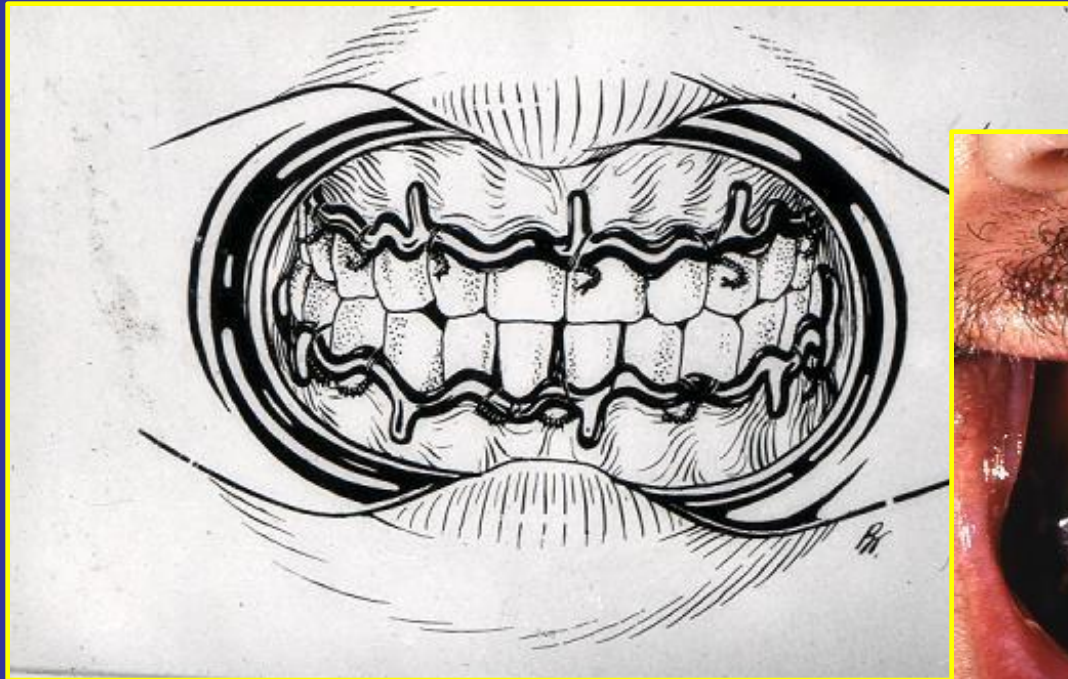
- Occlusional problems
- Pathologic moves
- Crepitation (due to moves of fractured ends)



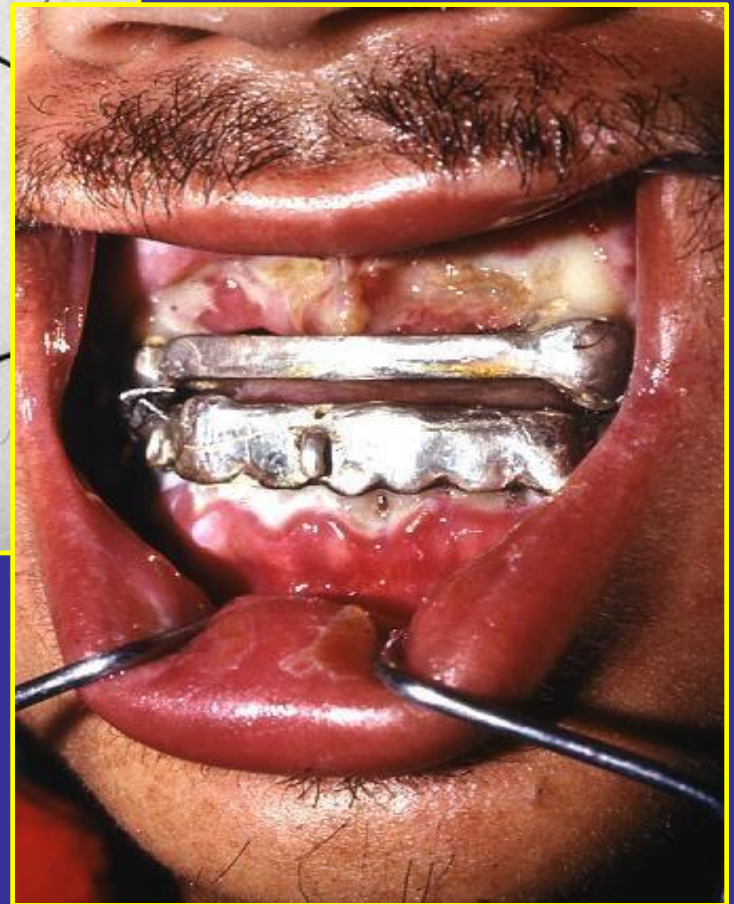
malocclusion

Therapy of mandibular fractures

- **Aim:** to reach the original function and anatomic situation
- **Type of the treatment:**
 - Conservative
 - Surgical
 - Surgical-conservative
- **Conservative:**
 - *intermaxillary fixation (IMF)* with dental splints for 4-6 weeks (Schuchardt-, Stout-, Sauer splints, *Gunning splint* in case of total toothless)
 - *Circumferencial fixation*
 - Problems: nutrition, oral hygiene, morbus sacer, unedentulousness, mental retardation)



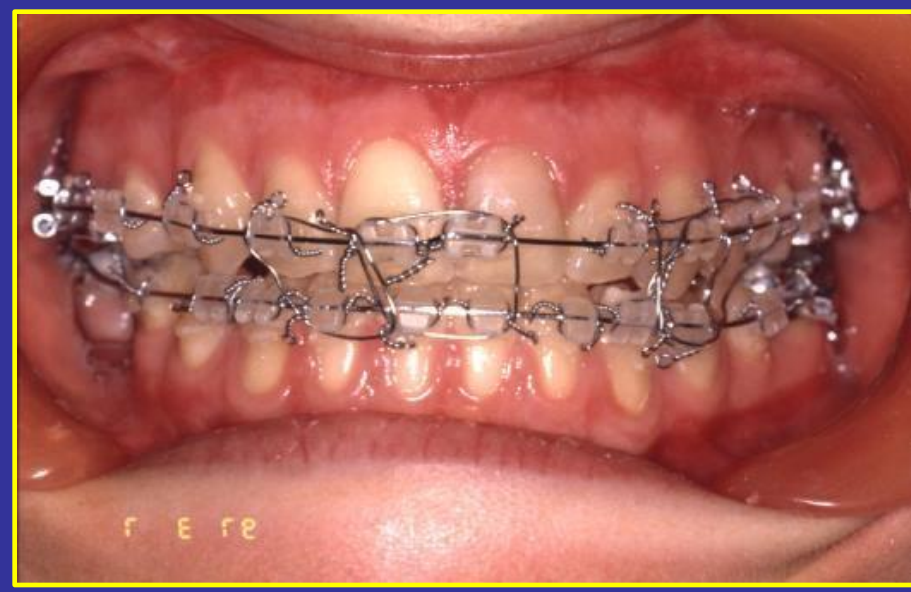
dental splint

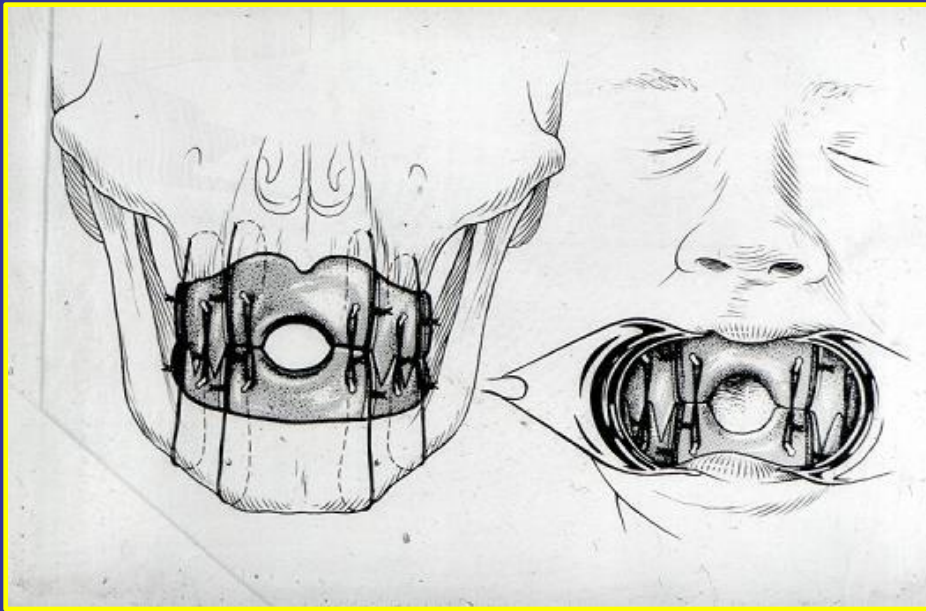


„cap splint”

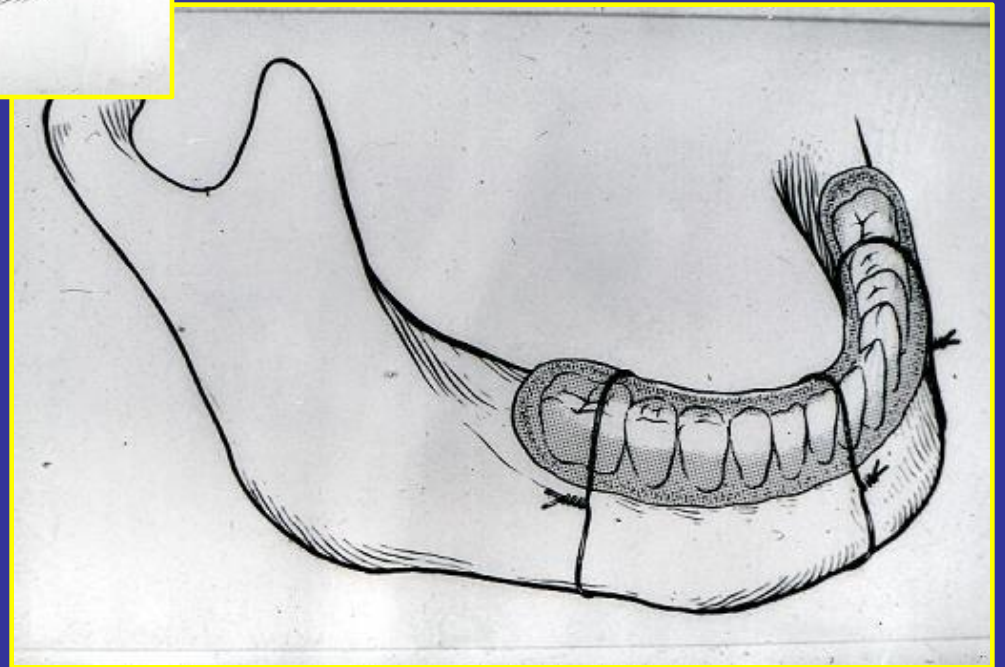


IMF





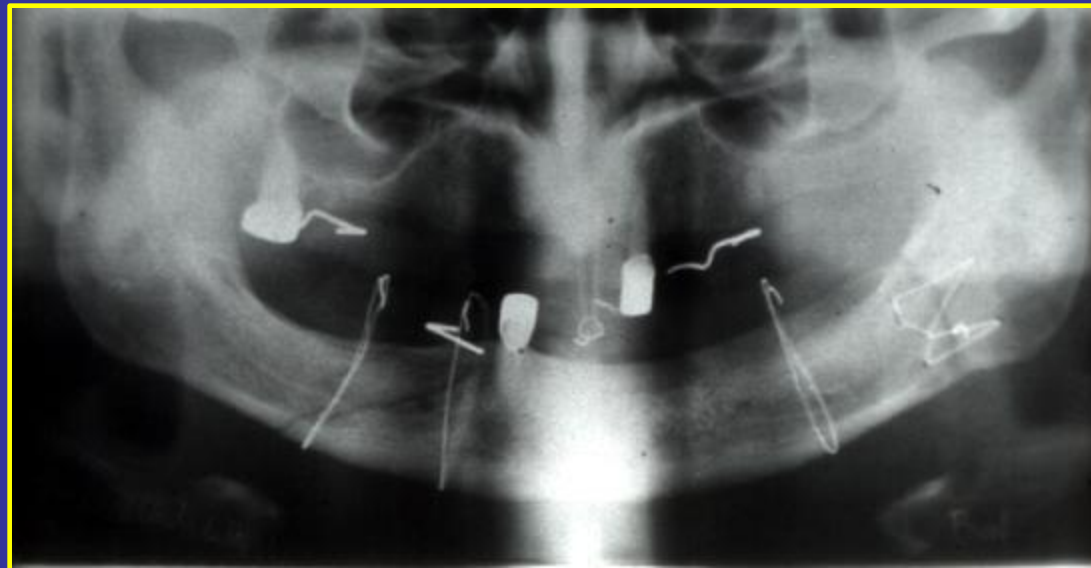
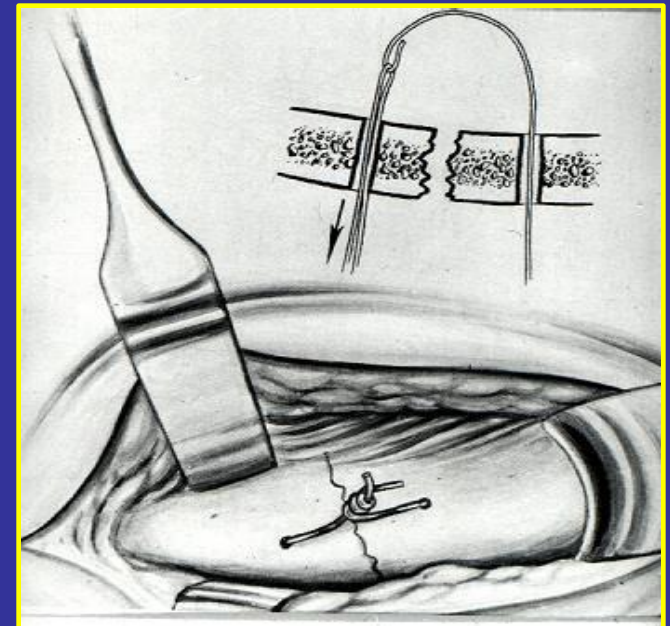
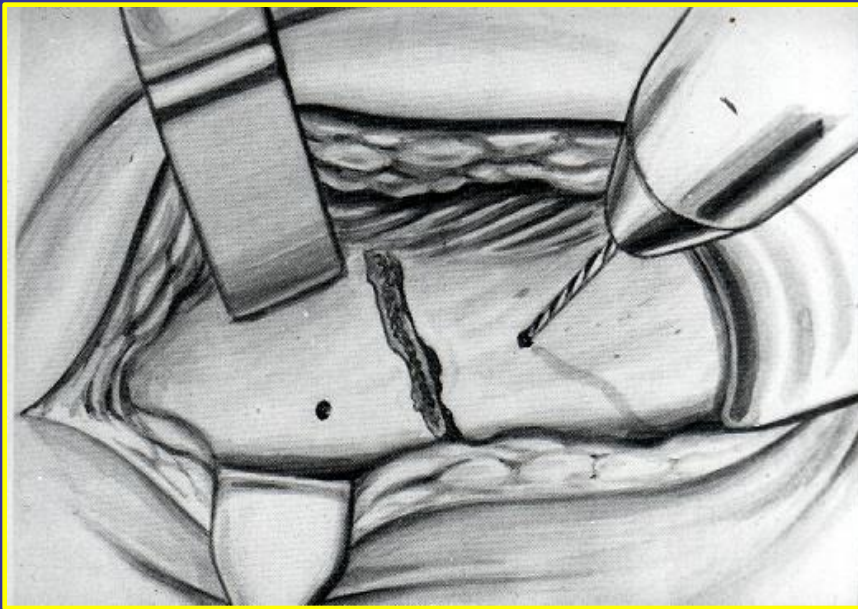
Gunning splint

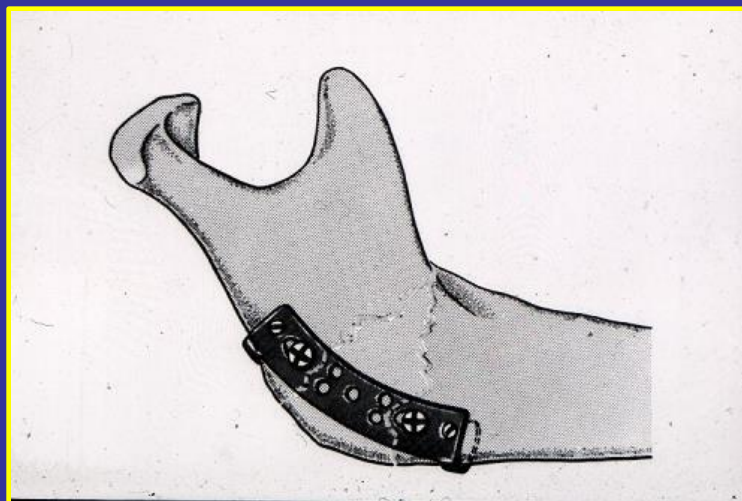


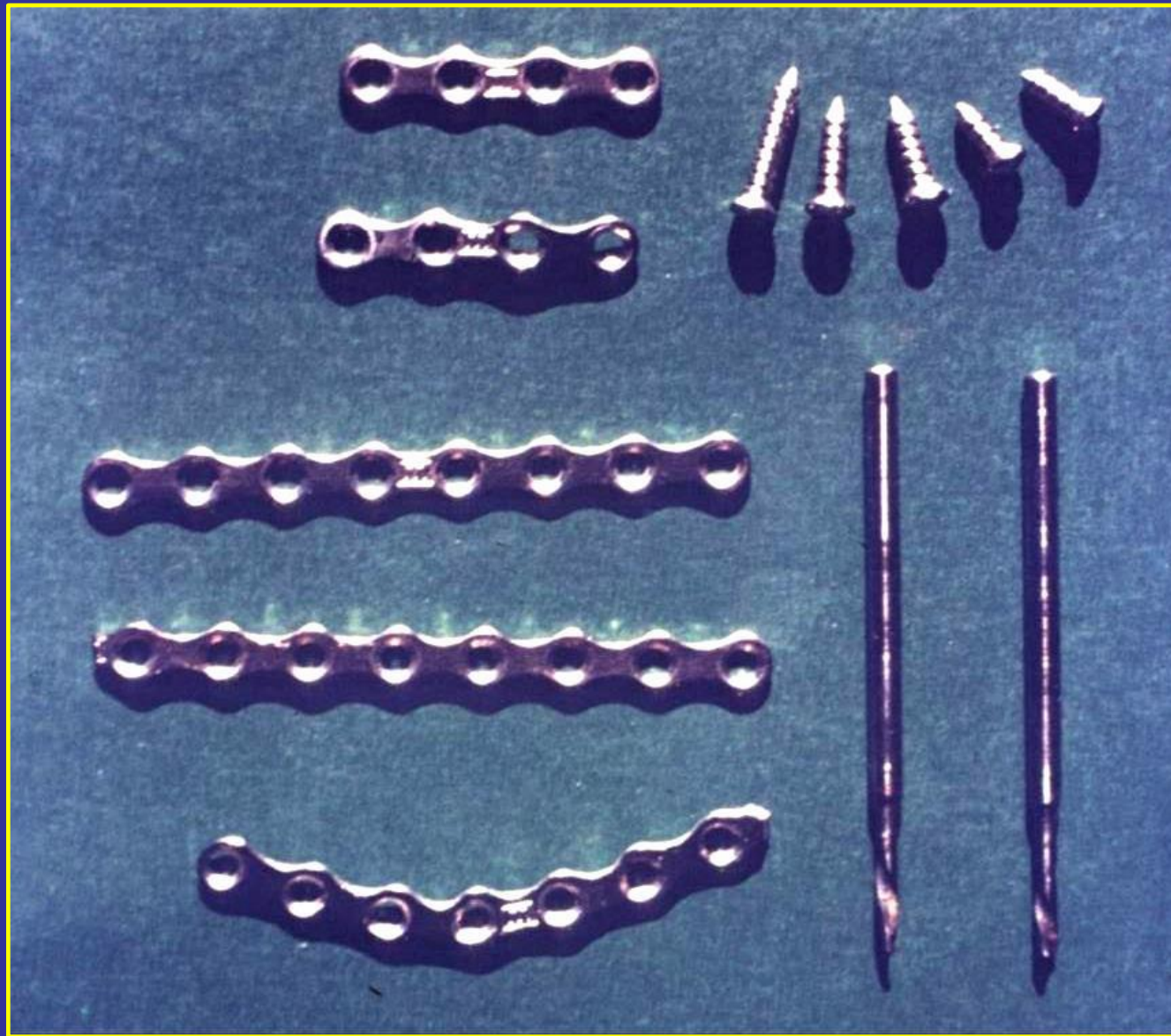
circumferential fixation

Surgical therapy of mandibular fractures

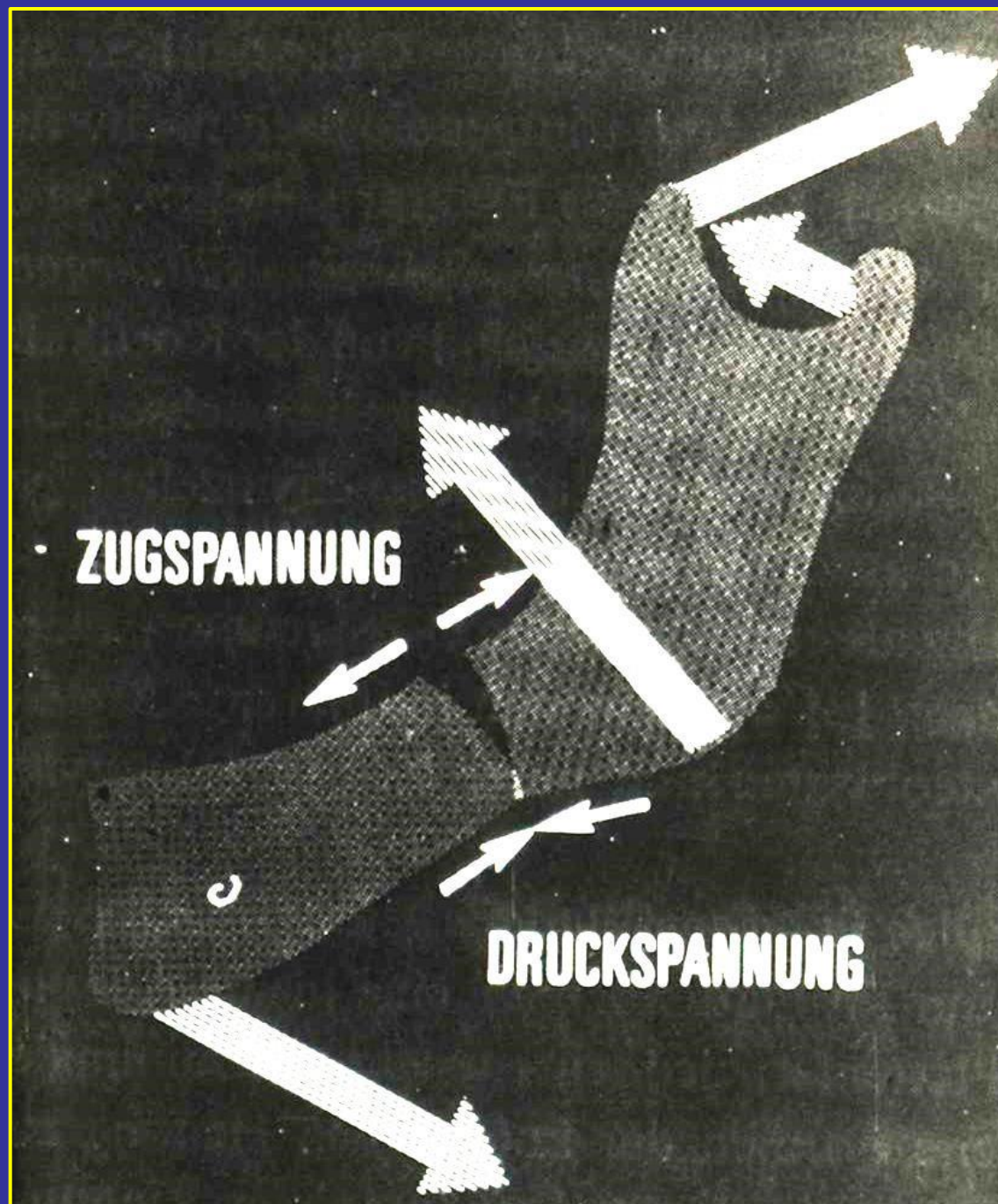
- **Osteosynthesis (extra and/or intraoral)**
 - Types:
 - with wire (Wassmund, Neuner) + IMF
 - with pin fixation
 - with compression plates (first: Luhr in 1968; most modern)
- **-systems:**
 - -Luhr
 - -ASIF (Association for the Study of Internal fixation) – DCP plate (Dynamic Compression Plate)
 - -Miniplate (by Champy)– non-compression plate → selfcompression by muscles
 - Microplate
 - Absorbable plates
 - -AO plates
- **Indications of compression osteosynthesis**
 - total toothless
 - corpus fracture together with high (intercapsular) condylar fracture
 - big dislocation
 - open fracture
 - when IMF is contraindicated (epilepsia, hyperemesis, respiratory disorders, etc.)
- **Contraindications of compression osteosynthesis**
 - childhood (dental bulb injury)



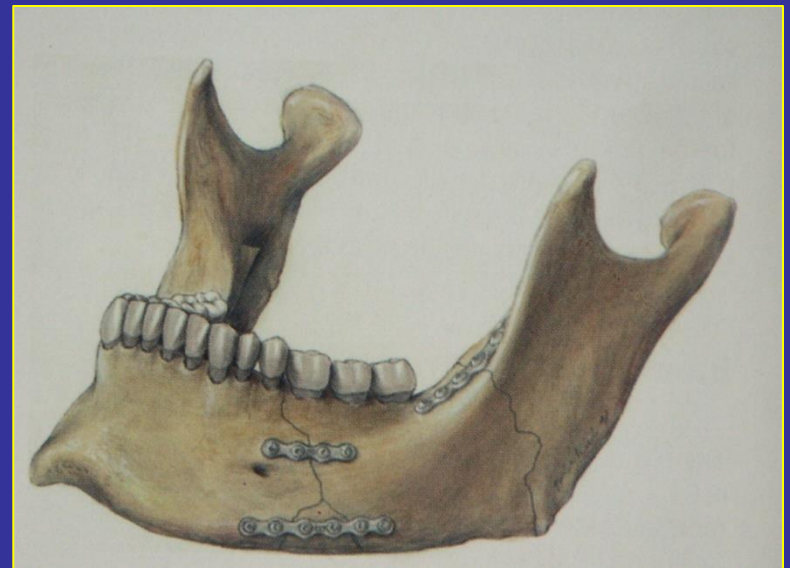
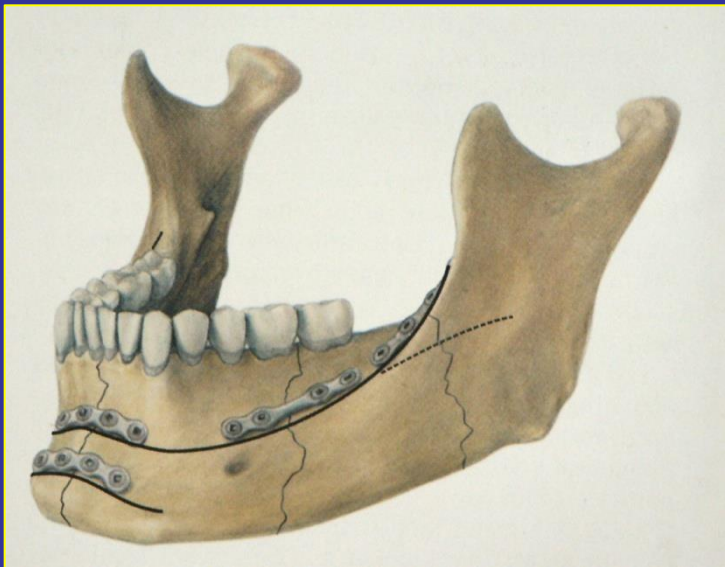
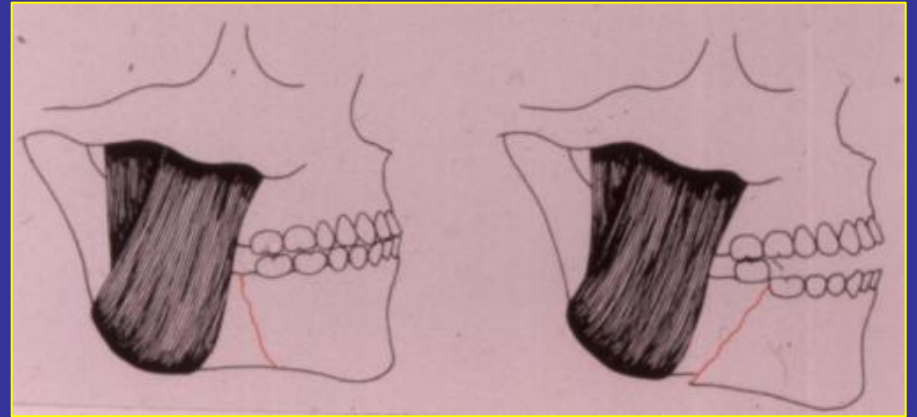


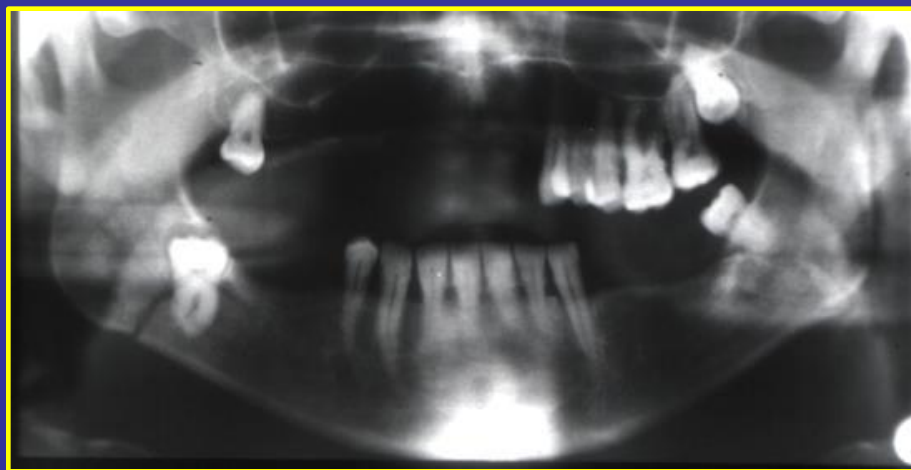


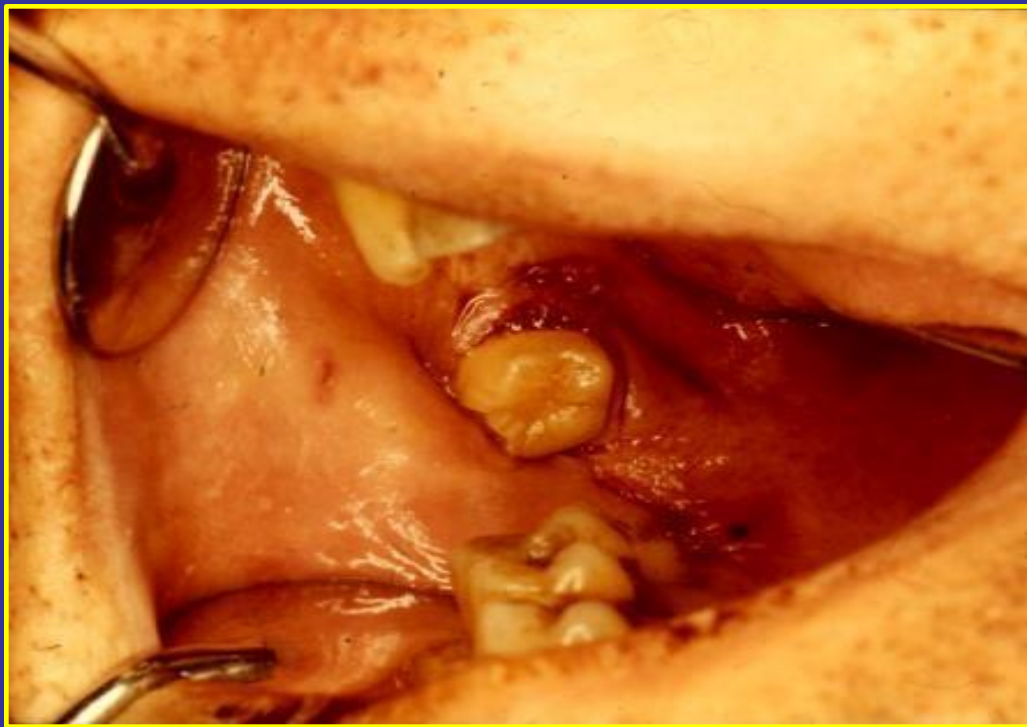
miniplate



Method of miniplate osteosynthesis

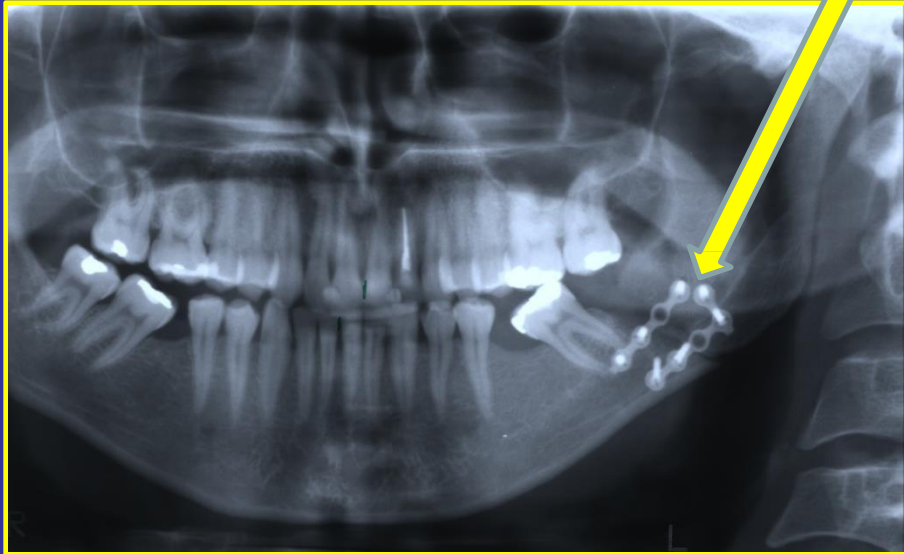


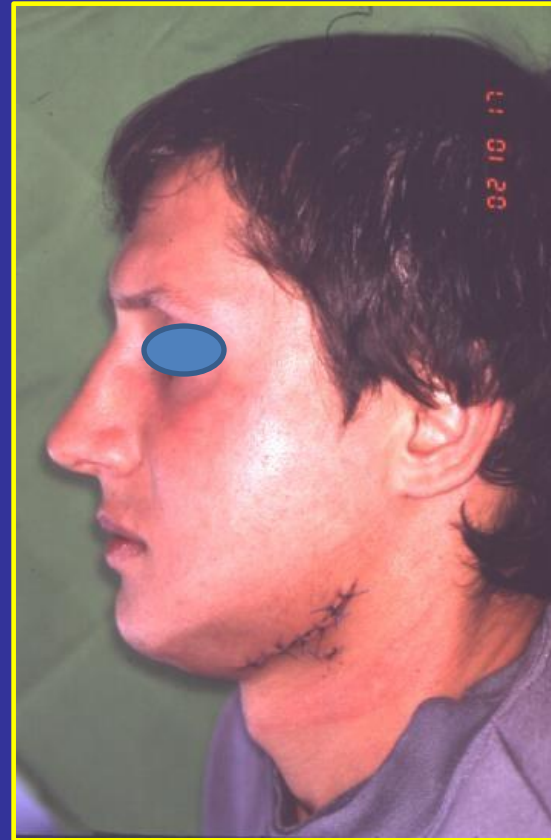




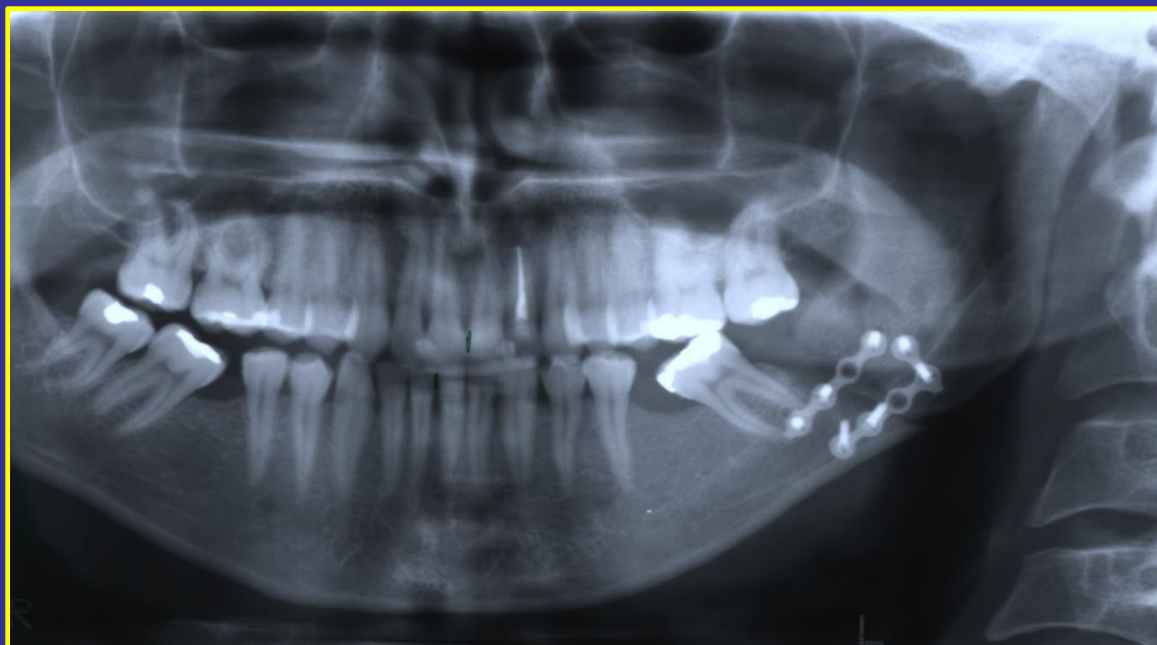


MISTAKES

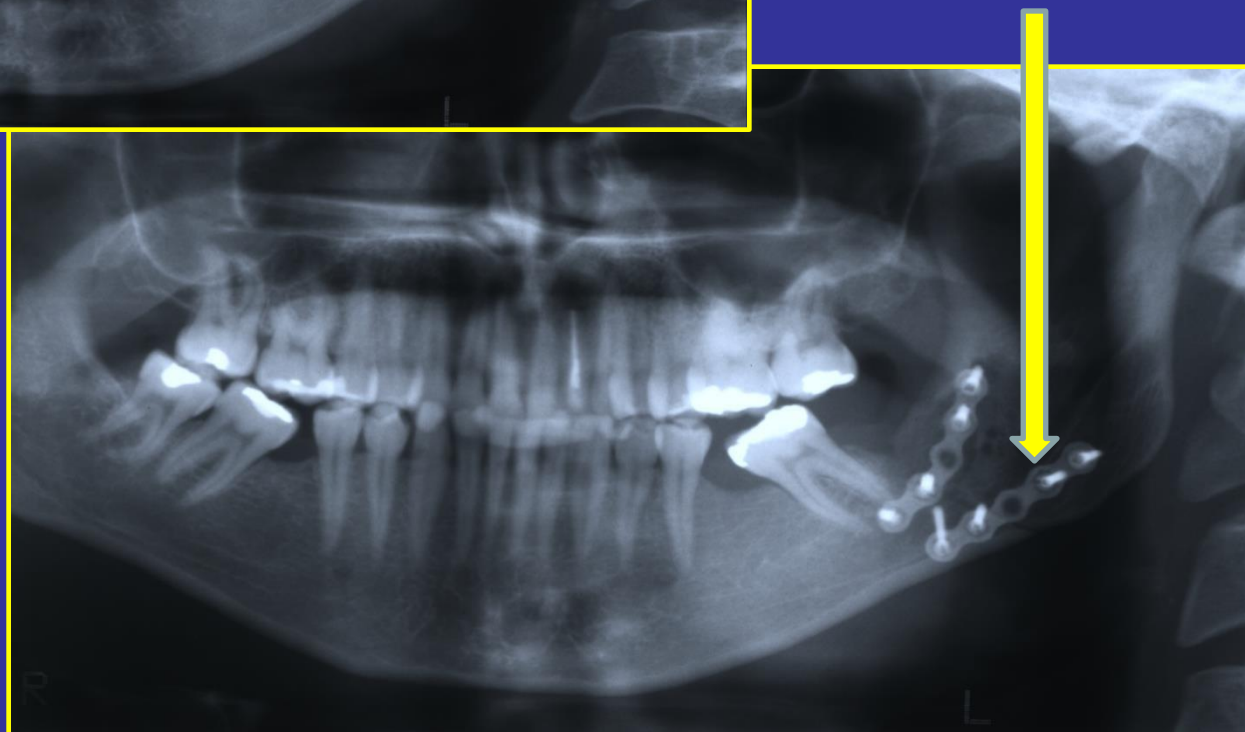


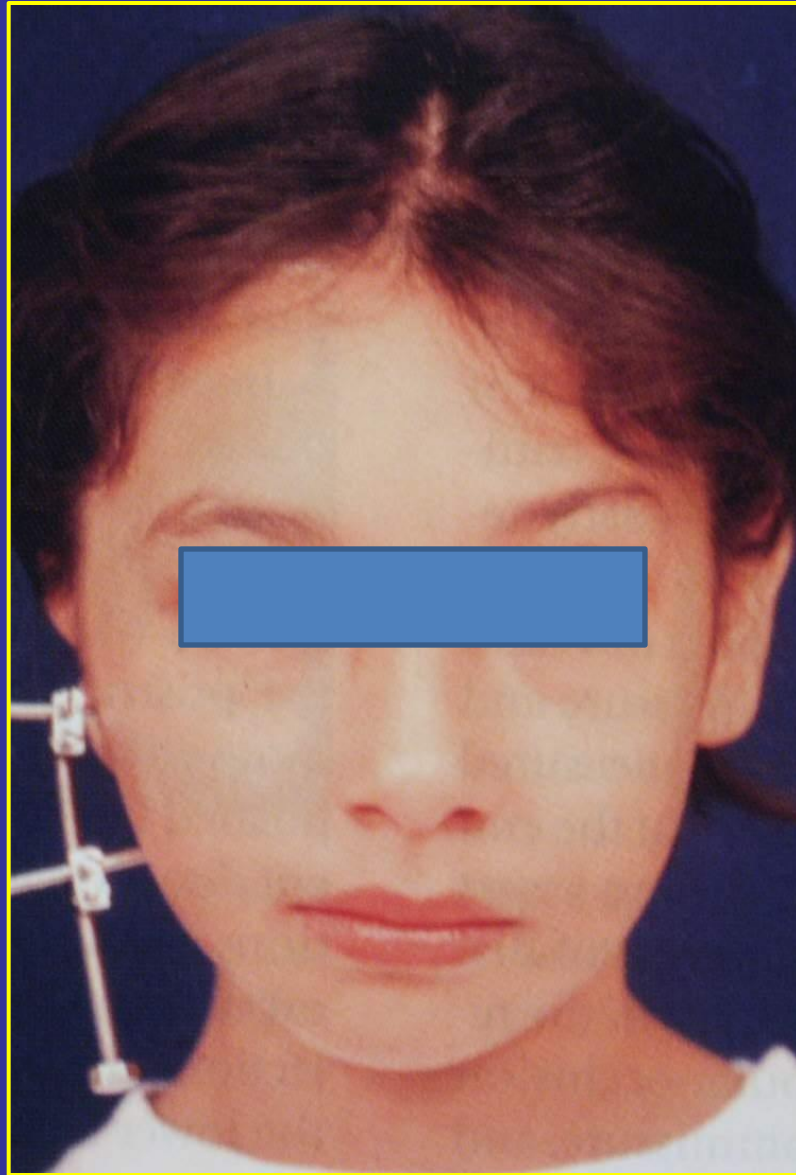


Marginal nerve injury

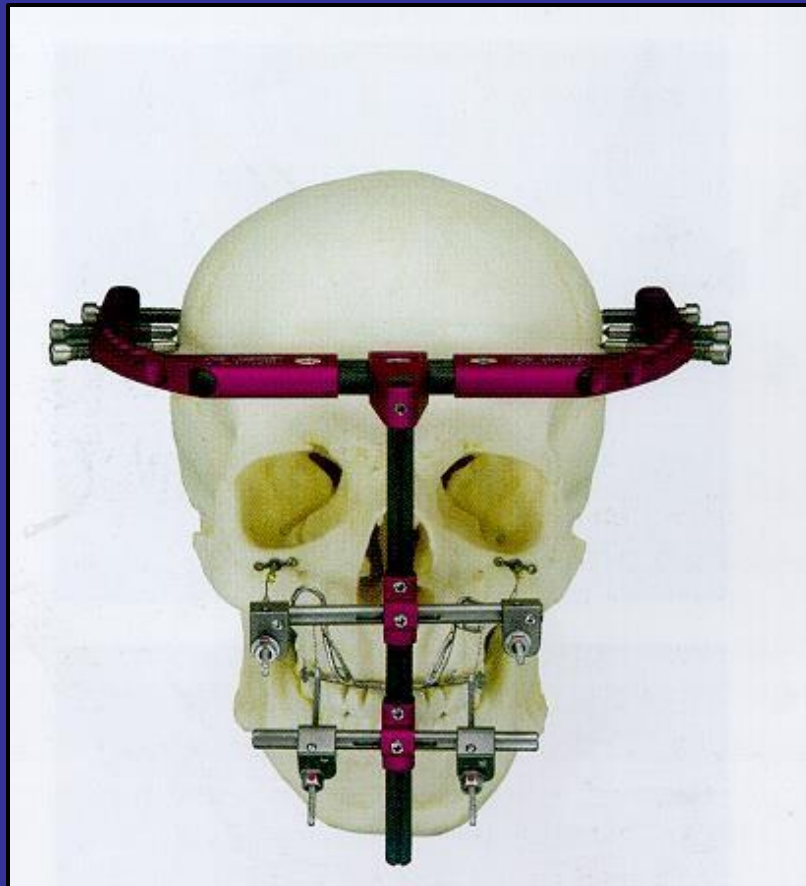


After reoperation





extraoral pin fixation



Midface fractures

Bones of the midface:

maxilla, palatine bone, inferior nasal concha, lacrimal bone, nasal bone, zygomatic bone, ethmoid bone, vomer

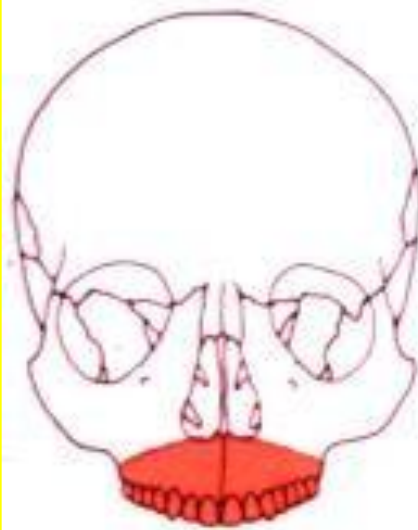
25% of maxillofacial region fractures

Classification of midface fractures

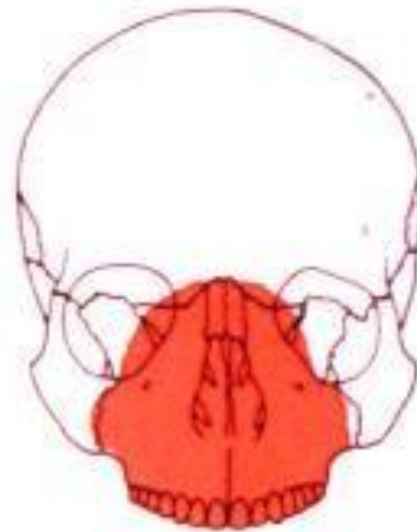
(by Schwenzer – 1967)

- **I. CENTRAL**
- **II. CENTROLATREAL**
- **III. LATERAL**
- **I. Central Midface Fractures**
 - -Alveolar process fracture
 - -LeFort I. (horizontal maxilla fracture)
 - -Le fort II. (pyramidal) – high and deep forms
 - -Nasal bone fracture
 - -Fracture of the nasoethmoideal region
- **II. Centrolateral Midface Fracture**
 - -LeFort III.
- **III. Lateral Midface Fractures (most often forms)**
 - -Zygomatic bone fracture
 - -Zygomatic arch fracture
 - -Zygomaticomaxillary fracture
 - -Blow out fracture (base of the orbita) – fat or muscle (rectus inf. or obliquus int.) herniation

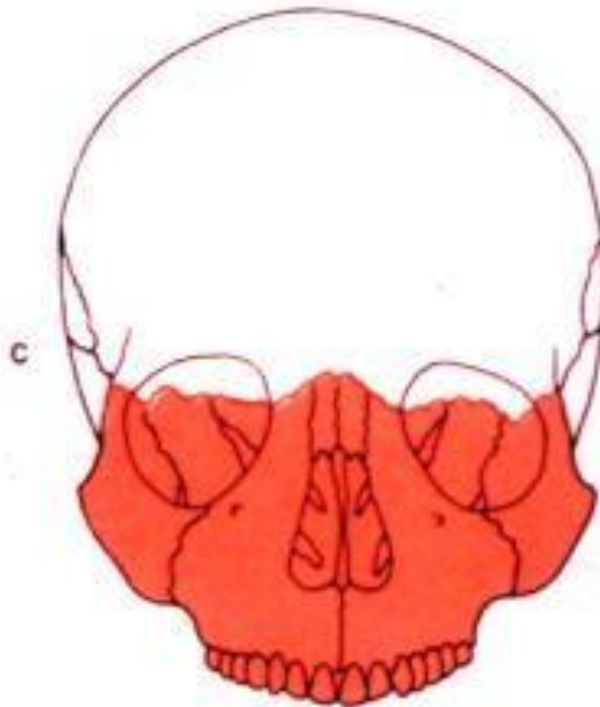
Le Fort I



Le Fort II

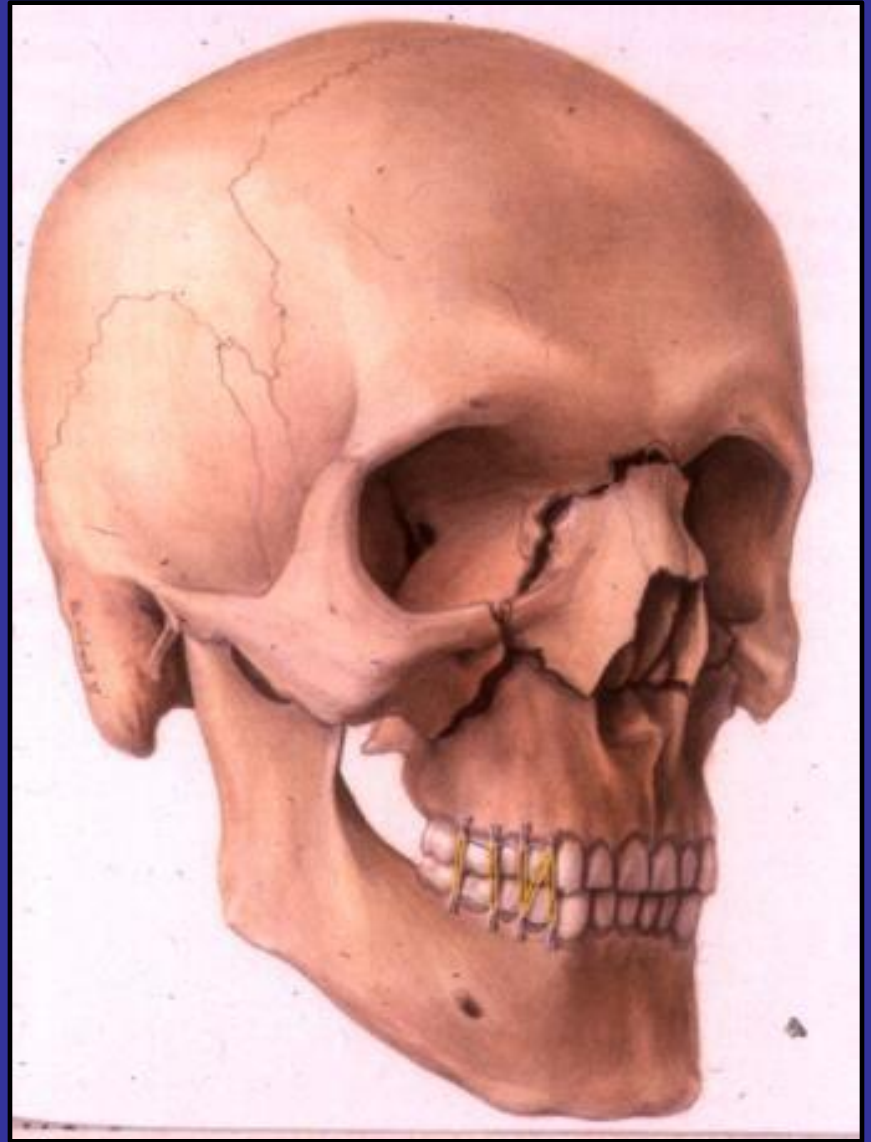


Le Fort III

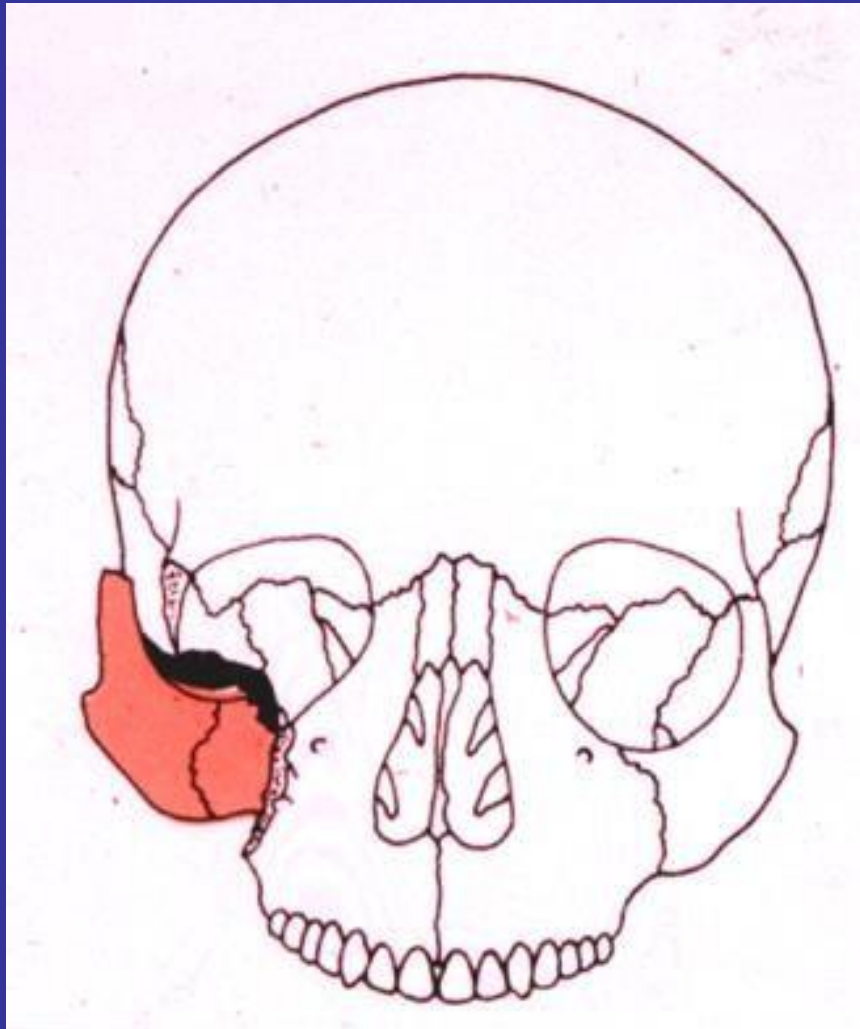




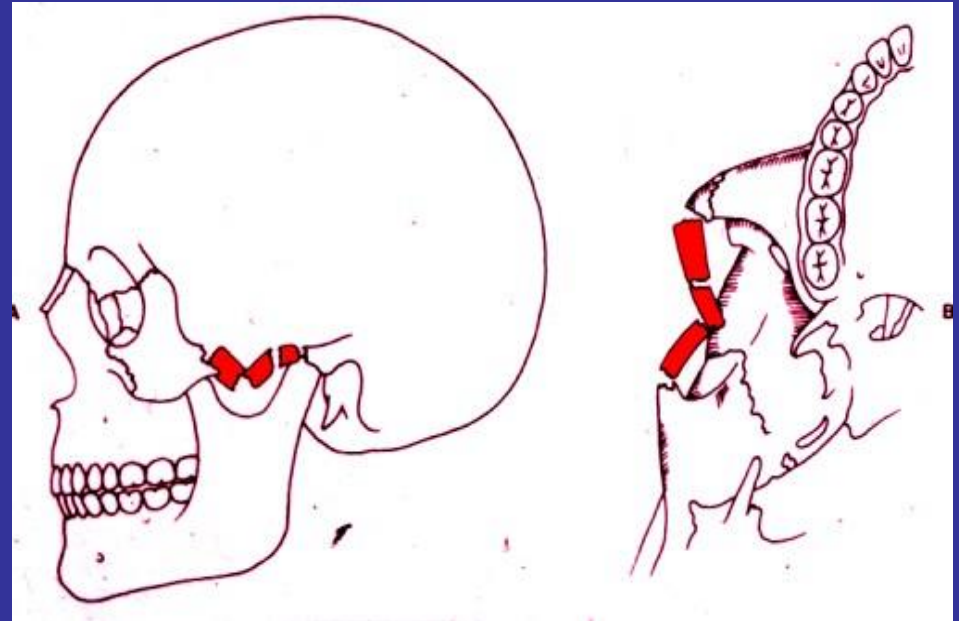
Le Fort I.



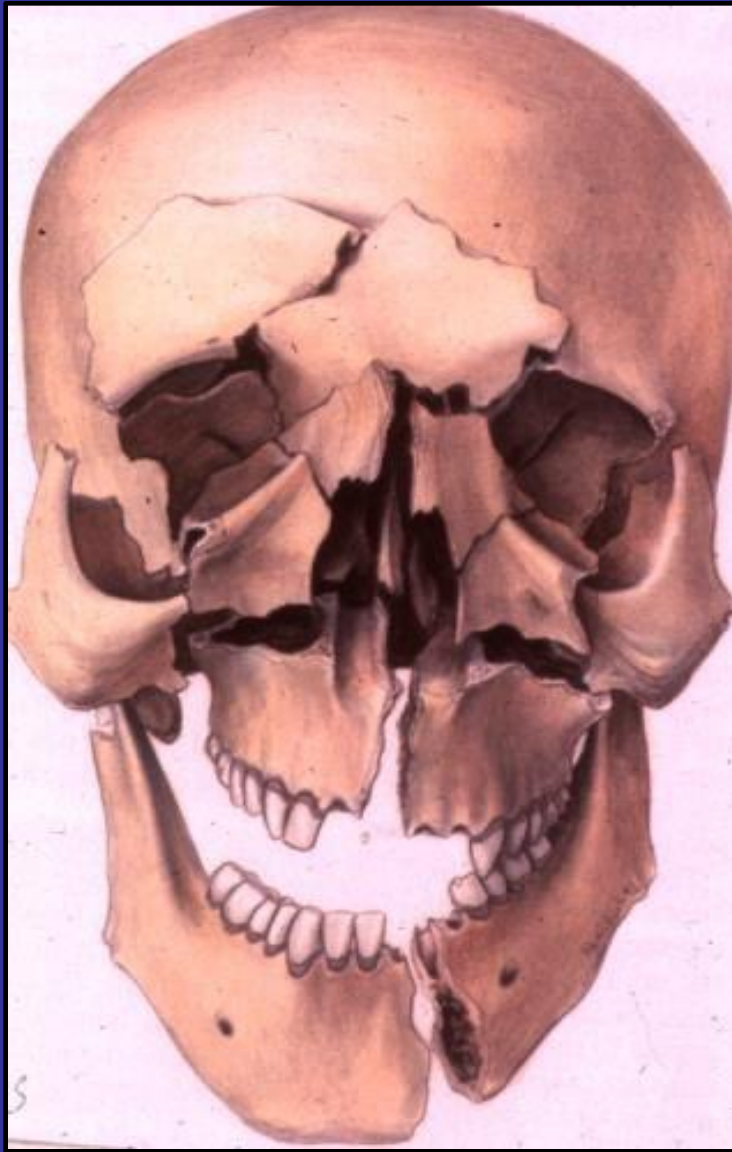
Le Fort II.



zygomatic corpus fracture



zygomatic arch fracture



multiplex midface fracture

Diagnosis of midface fractures

- **Physical examination (inspection, palpation)**
 - swelling, „flat face”, pain, pathologic moves, step formation, nose bleeding, periorbital emphysema, malocclusion, diplopia
- **Imaging methods**
 - X-ray. (OP, PA, zygomatic arch- sinus-, overbiting x-ray, etc.)
 - CT, CBCT



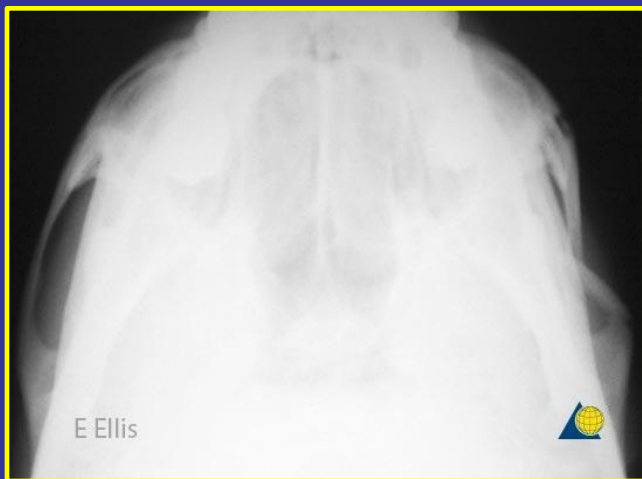
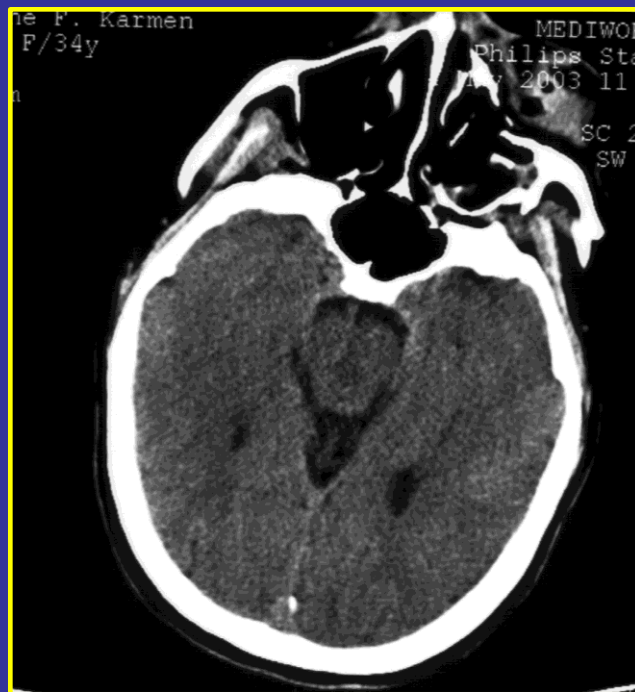
**Periorbital
hematoma**



„flat face”



Inhibited eye moves



Therapy of midface fractures I.

Aim:

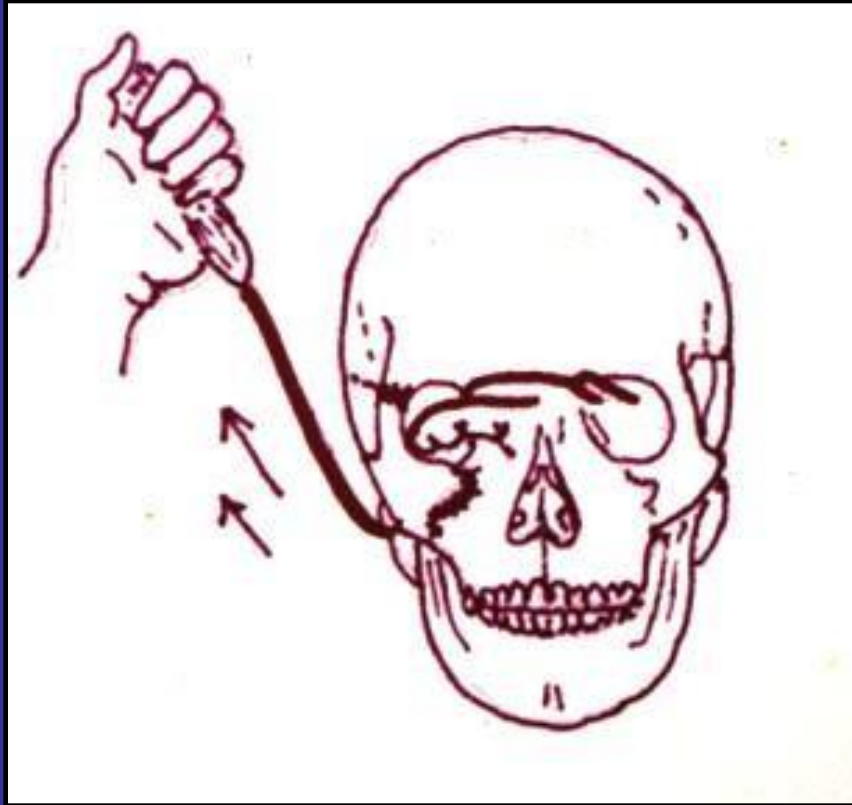
- Reconstruion of occlusion, functions and esthetics

Steps:

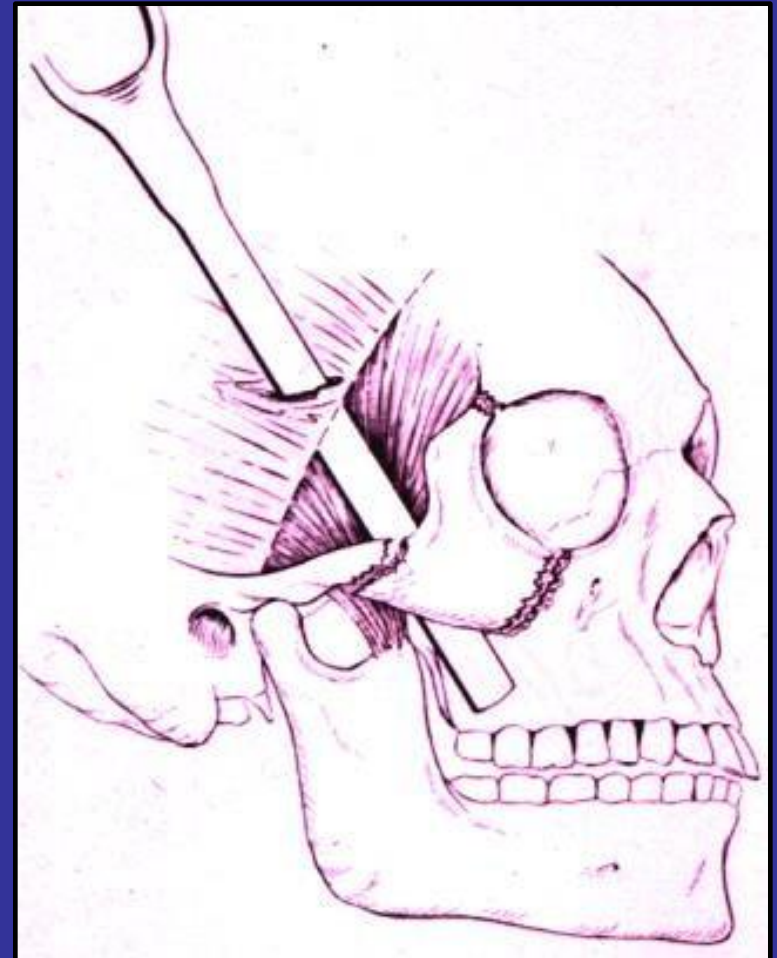
- reposition
- immobilisation (fixation)
- rehabilitation

Therapy of midface fractures II.

- conservative (rare)
- surgical
 - Elevation with surgical hook or by elevator (Gillies) without fixation in case of zygomatic bone fracture
 - External fixation: pin fixation, Halo instrument
 - Internal fixation: miniplat-, microplate-, absorbable plate osteosynthesis, Addams wire ligature
 - orbita base reconstruction with bone or lyophilized dura, titanium net or with plastic plate (PDS)



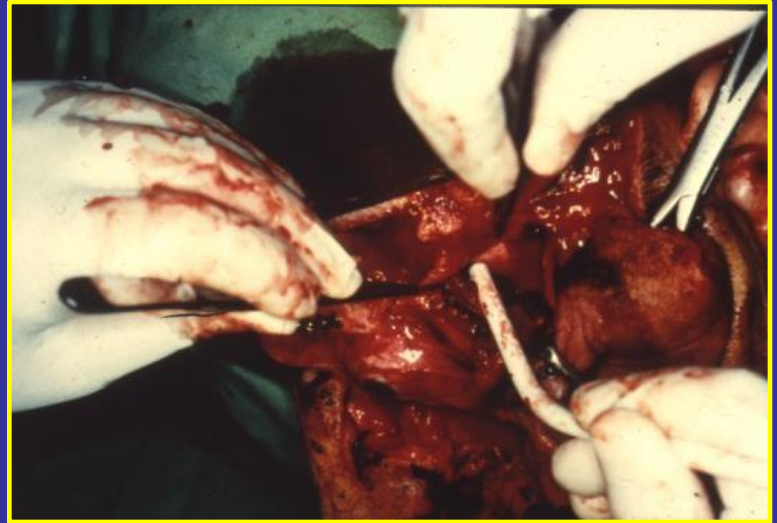
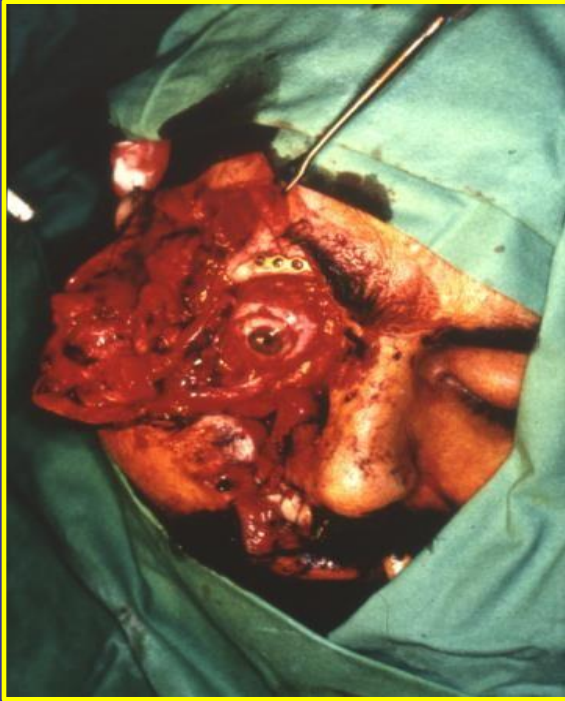
„hook elevation”

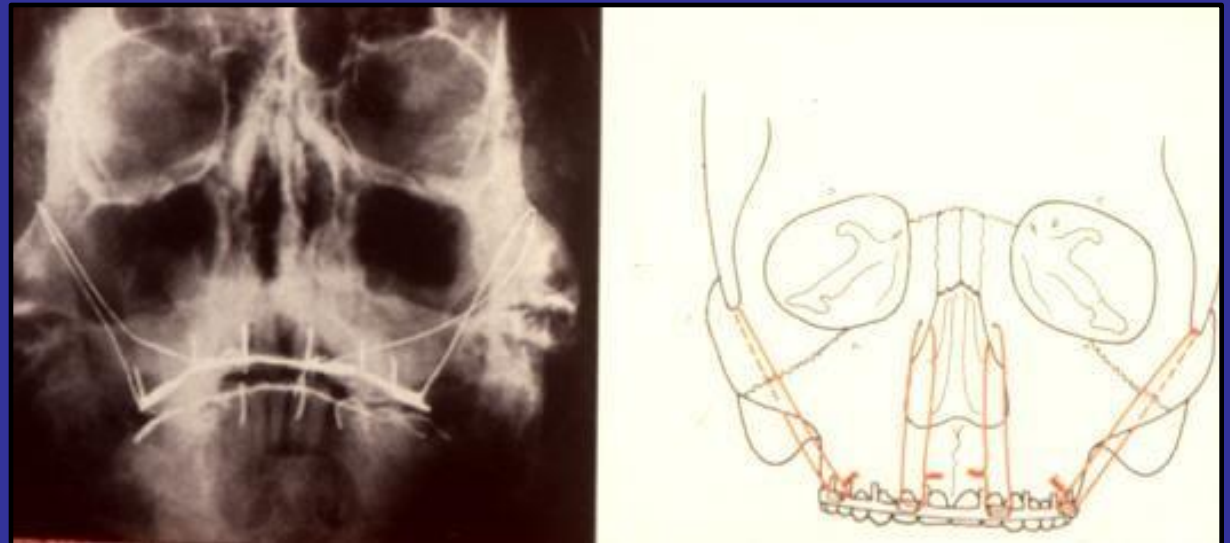
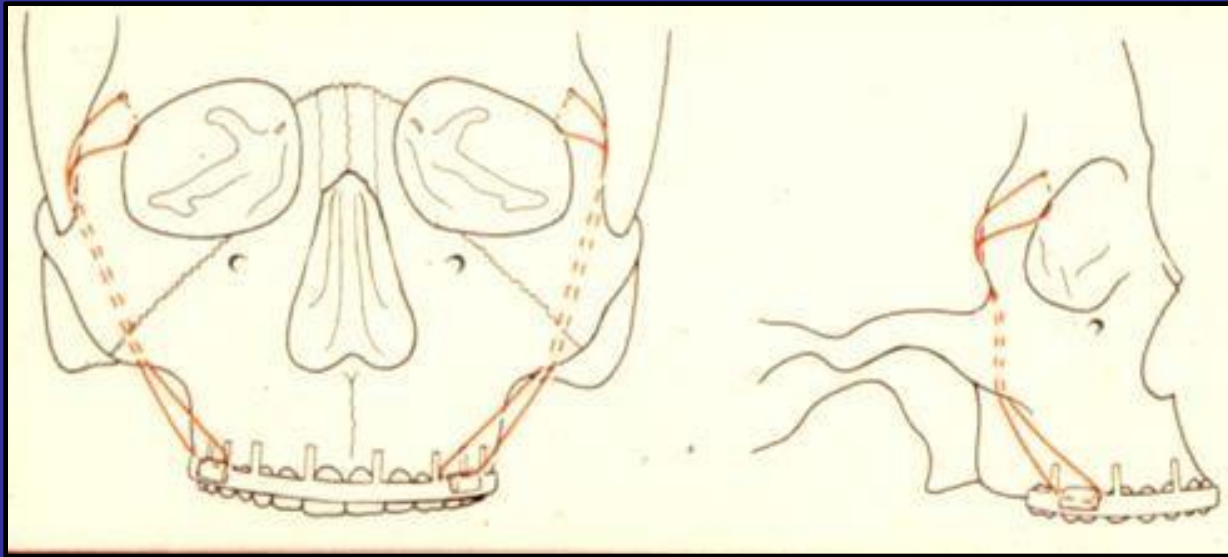


Gillies operation



miniplate osteosynthesis

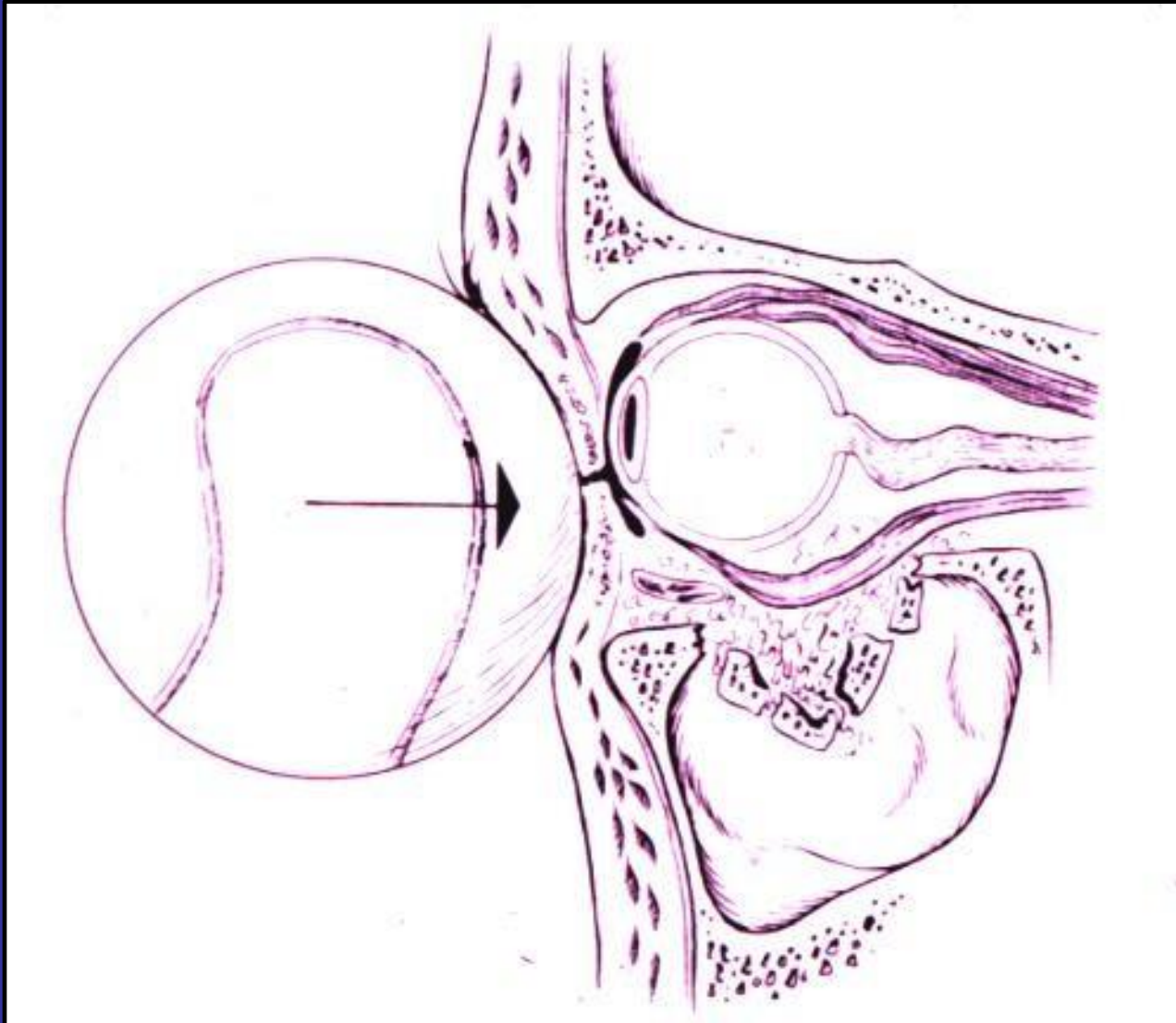




**Addams like wire ligature
(not used)**

Blow- out fracture

Content of the orbita (fat or muscle
/rectus inf. or obliquous int./ herniation through
the orbital base impressional fracture into the
sinus cavity due to sudden increase of orbital
content pressure



blow-out fracture

Symptoms

- decreased eye moves
- dyplopia
- enophthalmus

Diagnosis

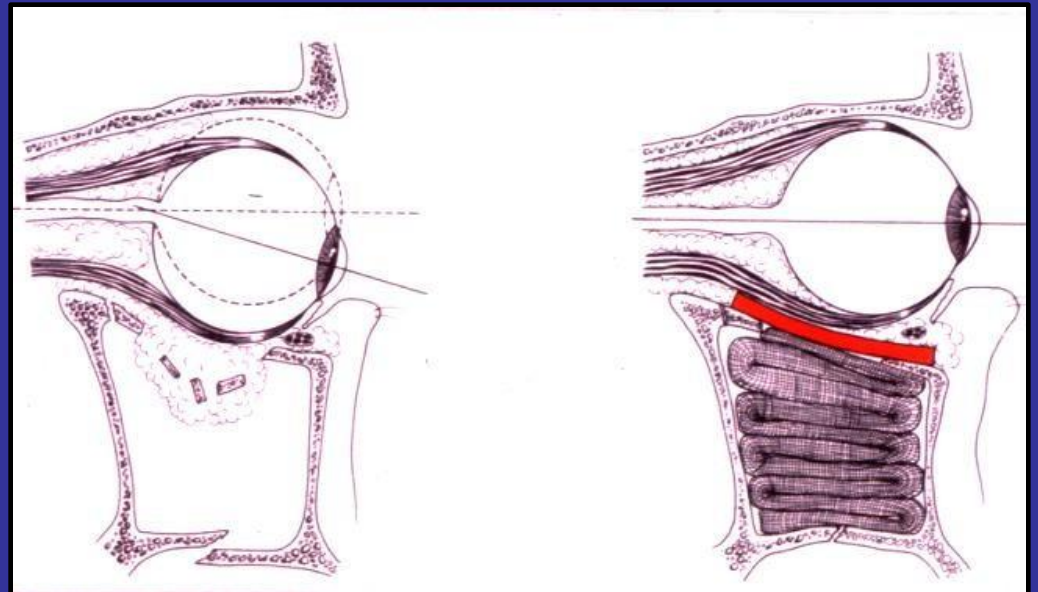
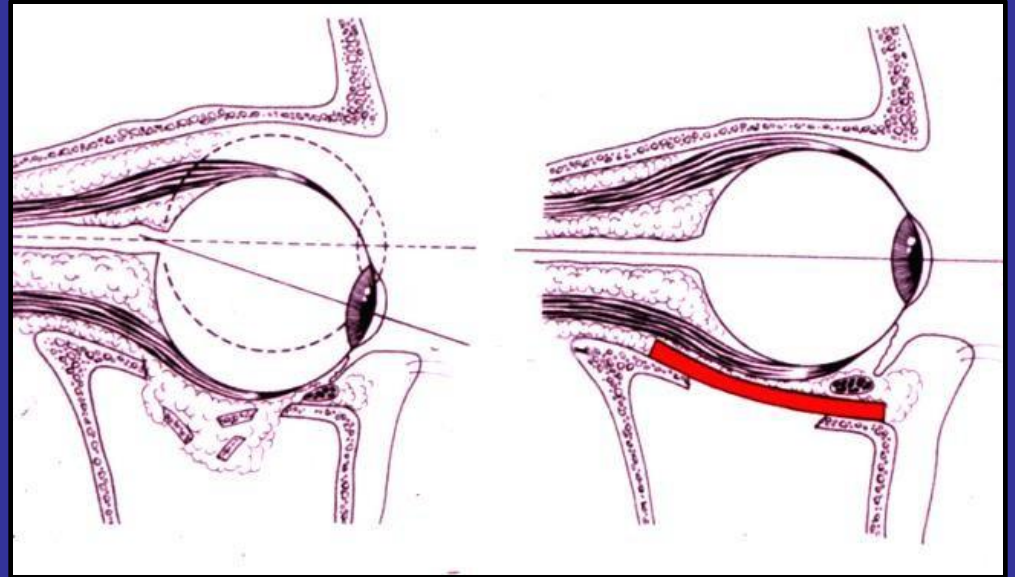
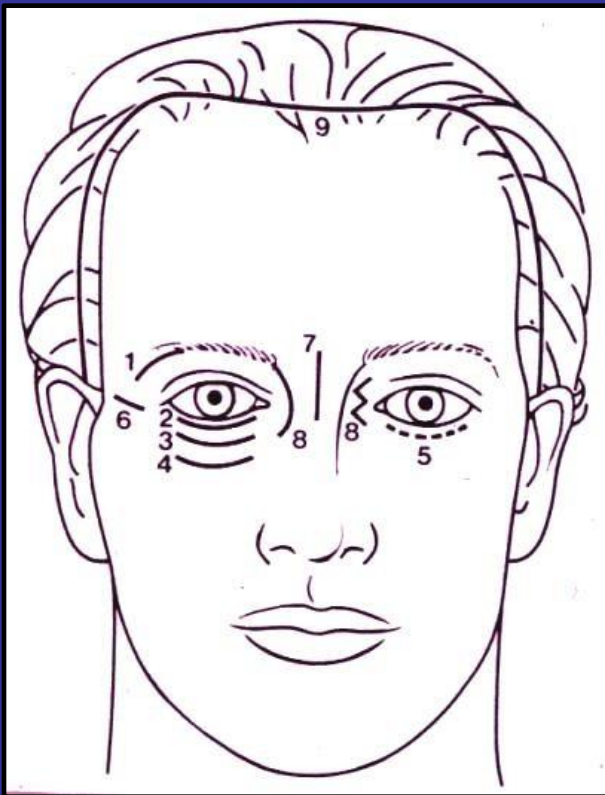
- **Physical examination**
- **Imaging methods**
 - **PA skull x-ray, CT (coronal) !!!**



blow-out fracture

Therapy of blow-out fracture

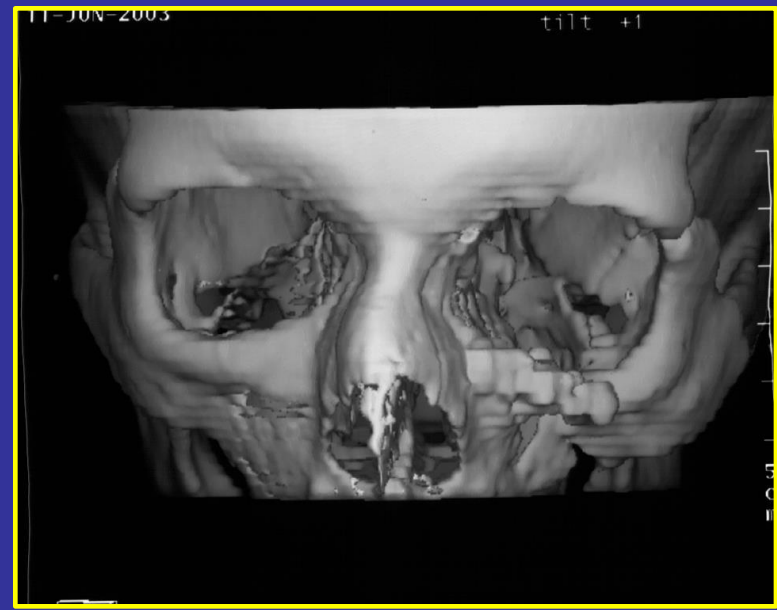
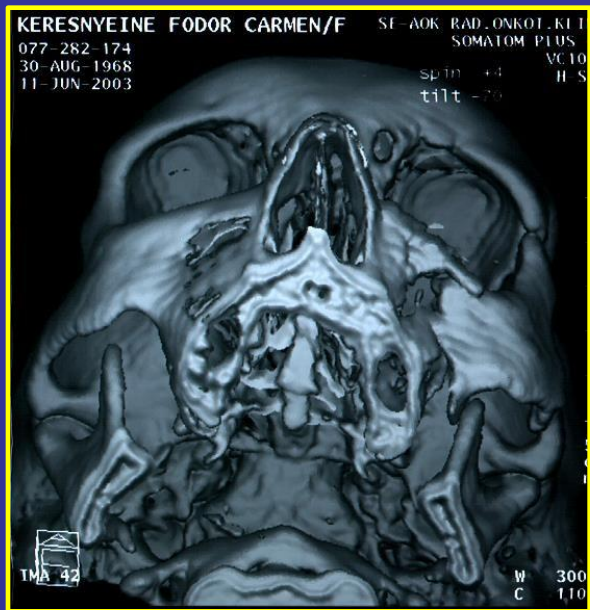
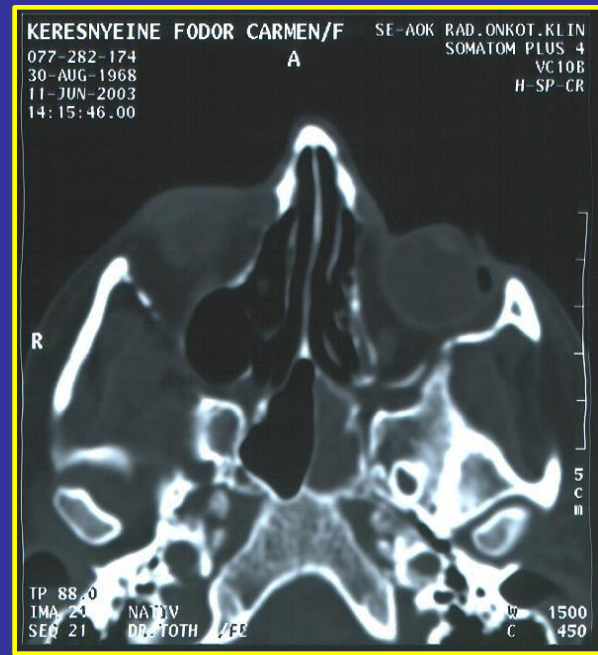
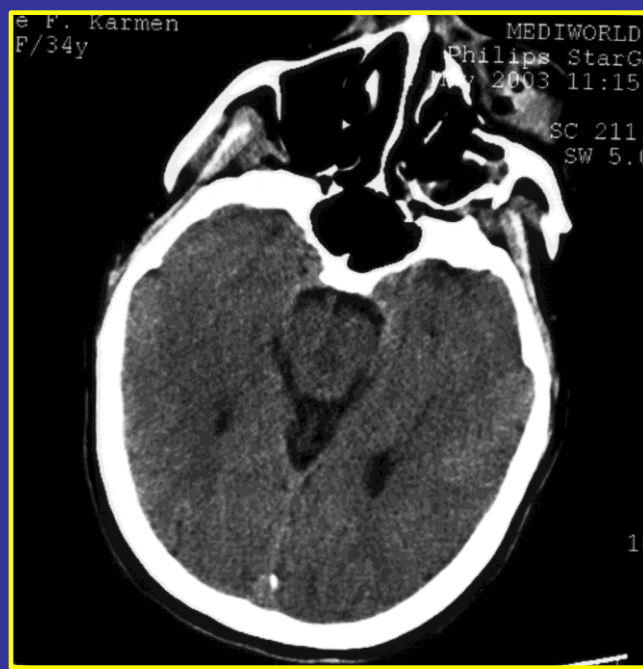
- **exploration of orbital floor**
- **reposition**
- **fixation**
 - **Reconstruction of orbital floor (titanium net, Lyodura, PDS membrane, autologous bone etc.**
 - **Support of the orbital floor through the maxillary sinus (Folley cateter)**

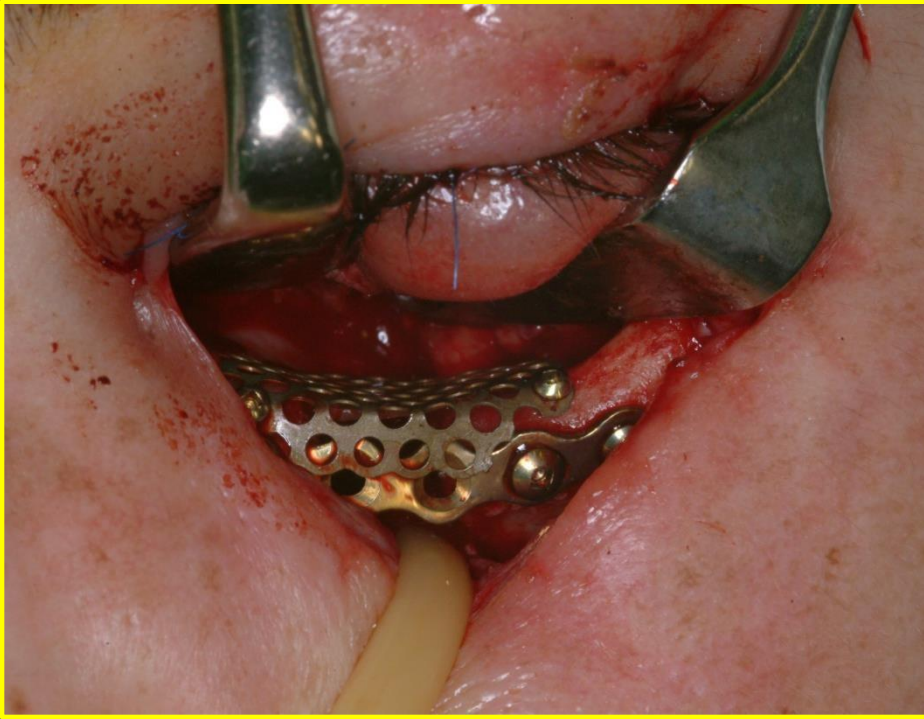


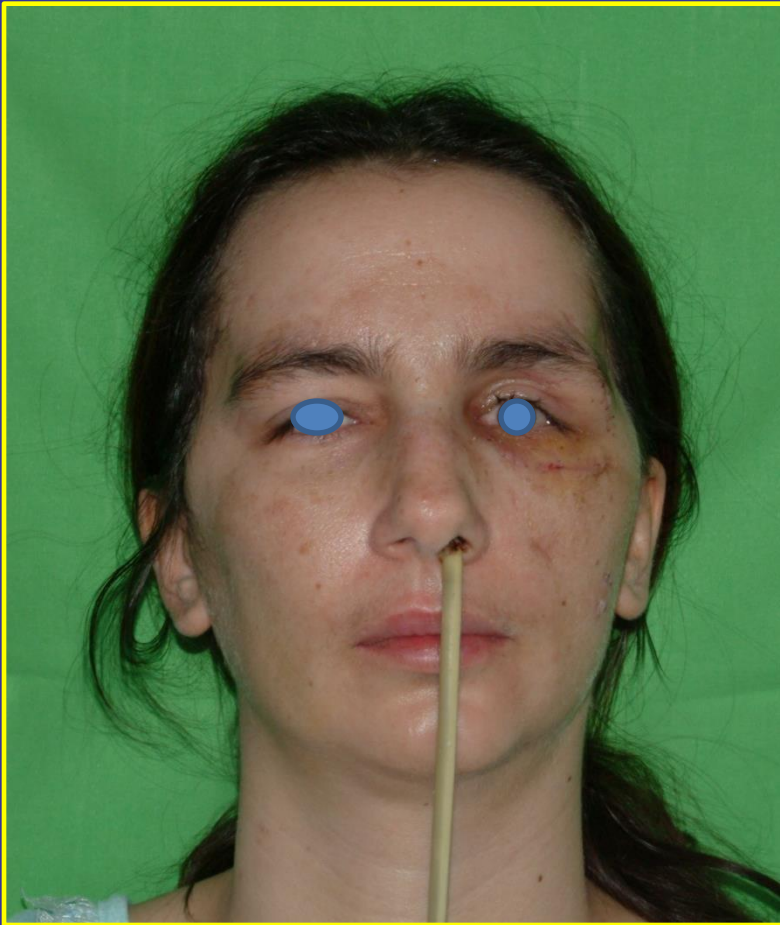
**Therapy of
blow-out fracture**



Preoperative picture







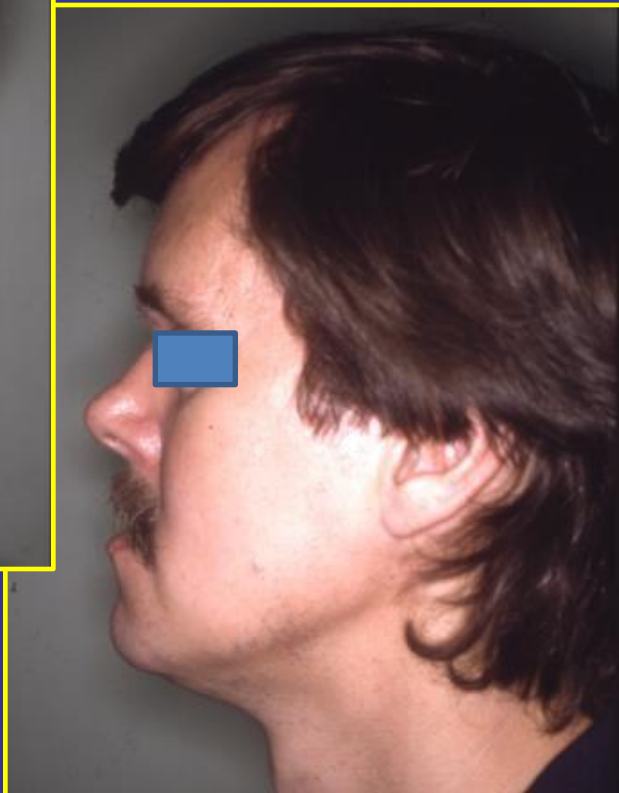
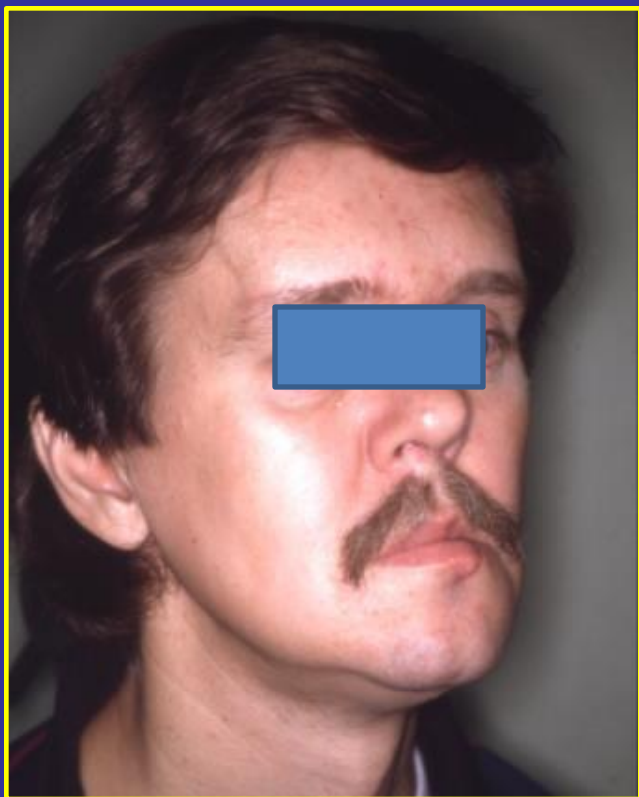
post op 7. day

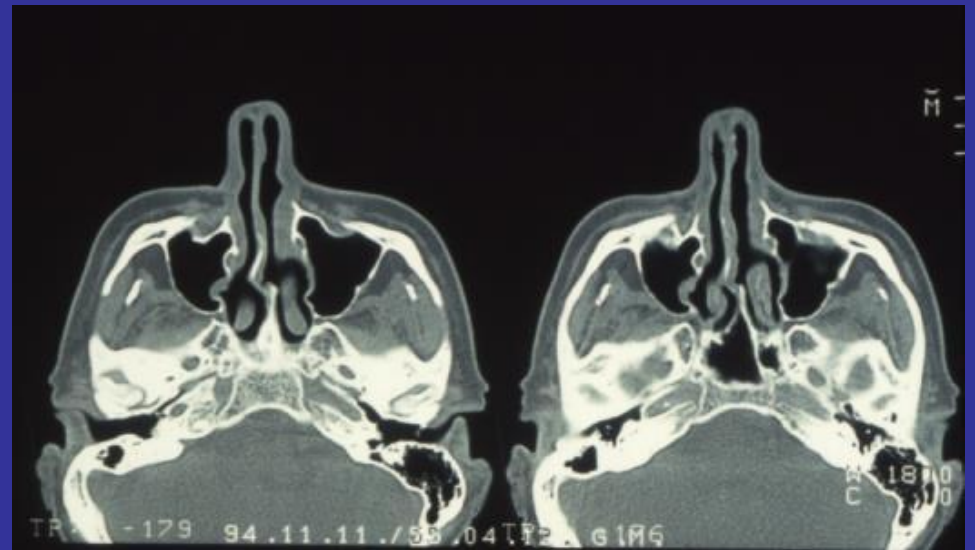
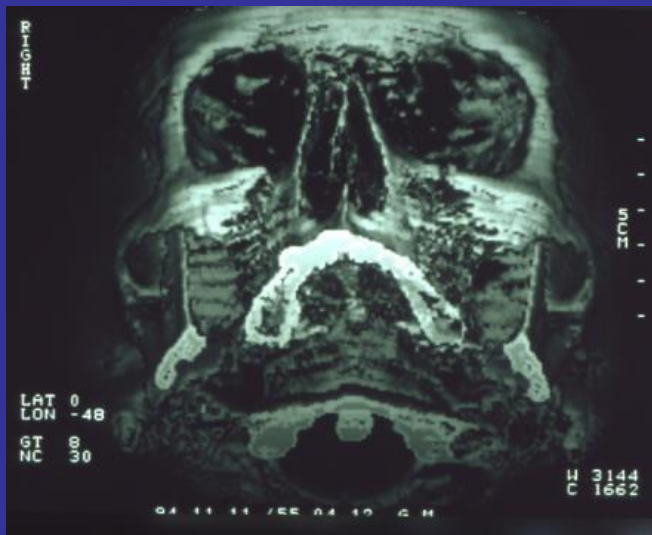




post op. 7. month









Preoperative condition



Postoperative condition

THANK YOU!