

TRAUMA-FRAKTUR-DISLOKASI & MULTI TRAUMA

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Definisi :

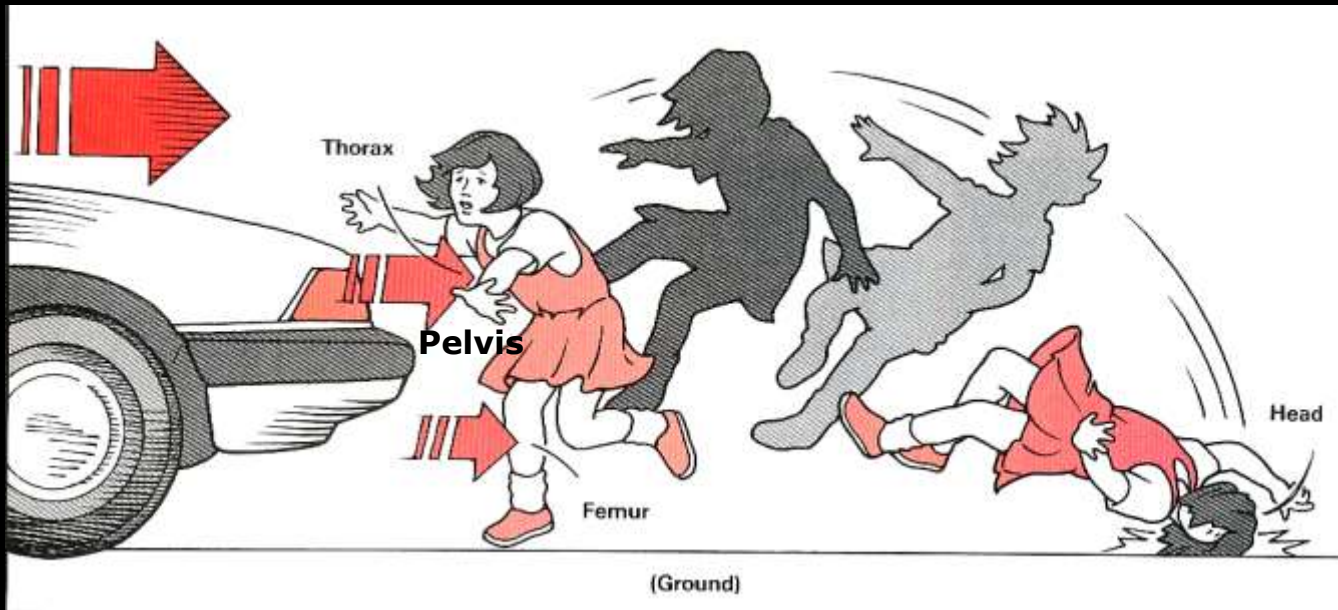
⇒ Emergency :

- A situation that involves a potential disabling or life threatening condition, thus requiring immediate treatment intervention

⇒ Trauma :

- A physical wound or injury to living tissue caused by an extrinsic agent

Biomechanics of Fractures



V_m

m

M

V_M

$$E \text{ (Energy Kinetic)} = \frac{1}{2} MV^2$$

Assume a 155 pound (70 kilo) object traveling at 30 mph, the kinetic energy (KE) would be:

$$\text{kinetic energy} = \frac{\text{mass} \times \text{velocity}^2}{2}$$

$$\text{kinetic energy} = \frac{(155) \times (30)^2}{2}$$

$$\text{kinetic energy} = 69,750$$

For comparison, look at what happens with changes in mass and velocity:

	155 lb (70k)	165 lb (75k)	200 lb (90k)
30 mph	69,750	74,250	90,000
40 mph	124,000	132,000	160,000
60 mph	279,000	297,000	360,000

REAKSI TUBUH terhadap TRAUMA FISIK

1. Reaksi lokal

a. Perdarahan

b. Kerusakan jaringan → mediator

- Histamin
- Prostaglandin
- Bradikinin
- Leukotrin
- Enzym proteolytic

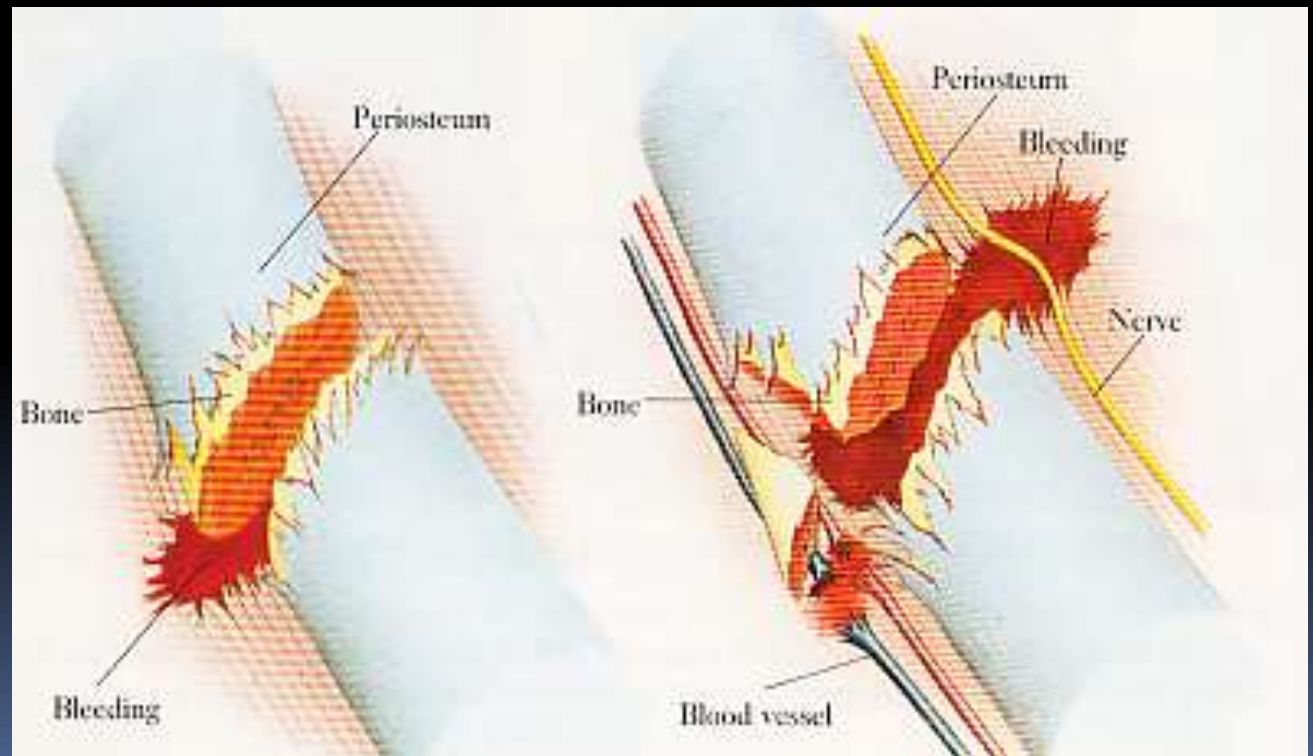
Inflamasi

a & b → Bengkak → RICE (48 jam I)

2. Reaksi Umum : SIRS

FRACTURE (PATAH TULANG)

- DISKONTINUITAS KORTEK TULANG & ATAU TULANG RAWAN



PEMBAGIAN/JENIS FRAKTUR

- **Garis fraktur**
 - Simple-transverse-multiple
 - Komunitif-segmental
 - Oblique-spiral
 - Complete-incomplete
- **Hubungan dengan luar :**
 - terbuka-tertutup
- **Anak-anak :**
 - Green stick
 - epiphysiolysis
- **Tarikan otot/ligament :**
 - Avulsi



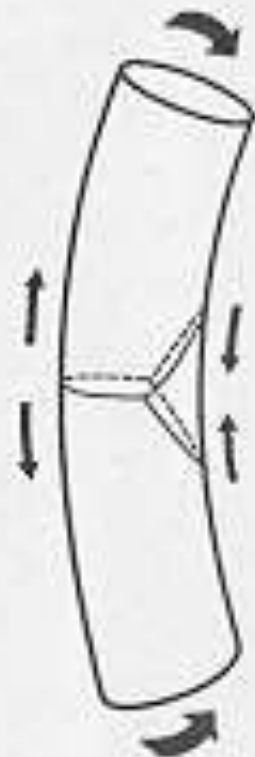
Transverse



Oblique

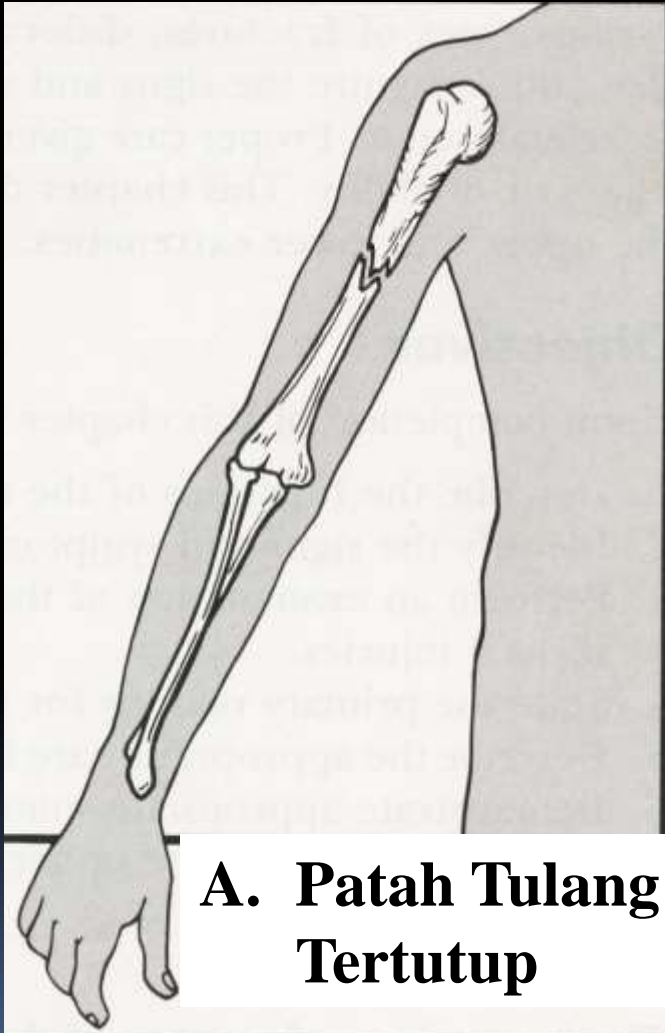


Spiral

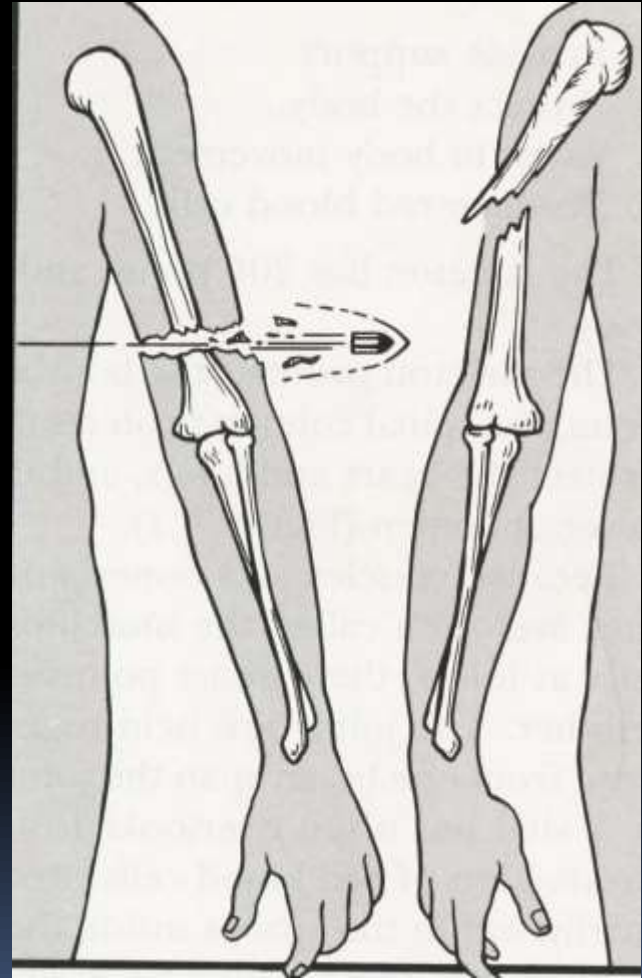


Transverse with butterfly fragment

Jenis Patah Tulang



A. Patah Tulang Tertutup



B. Patah Tulang Terbuka

Fracture Pada Anak-Anak



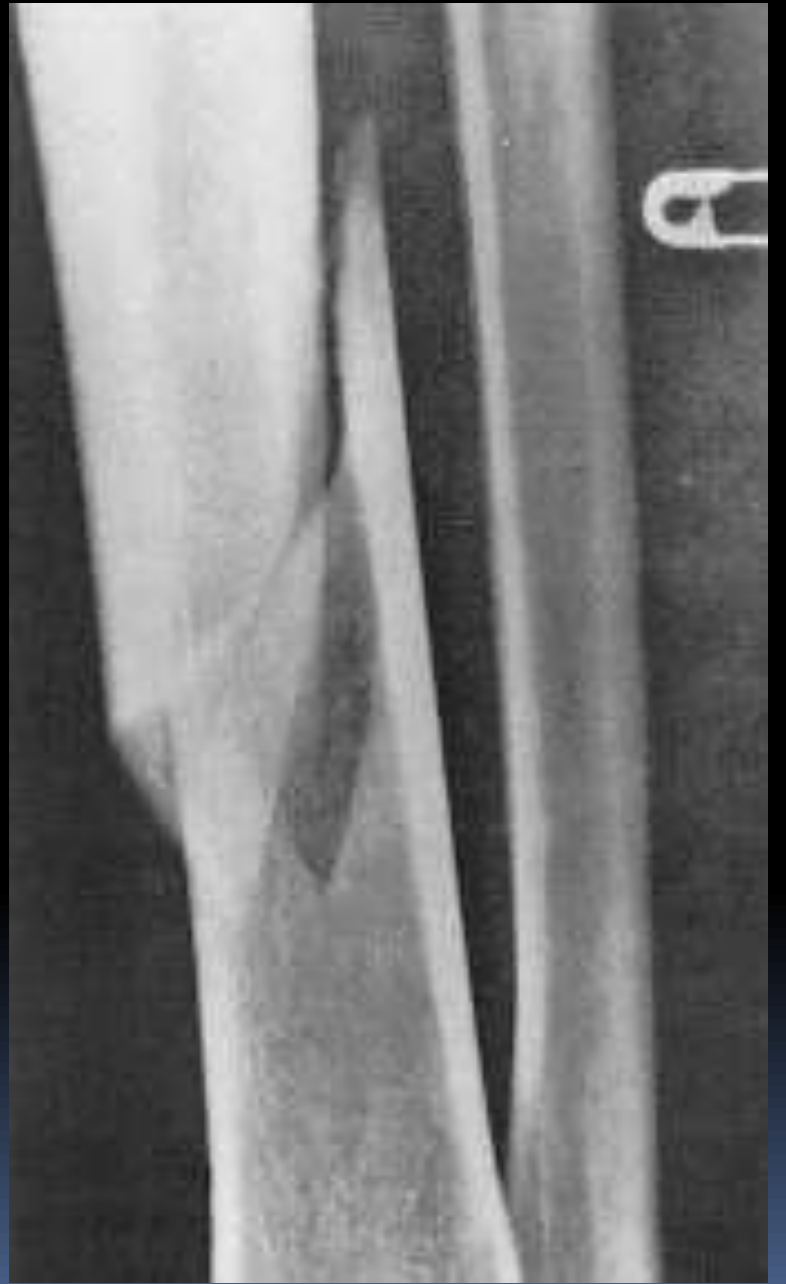
Buckle Fract.

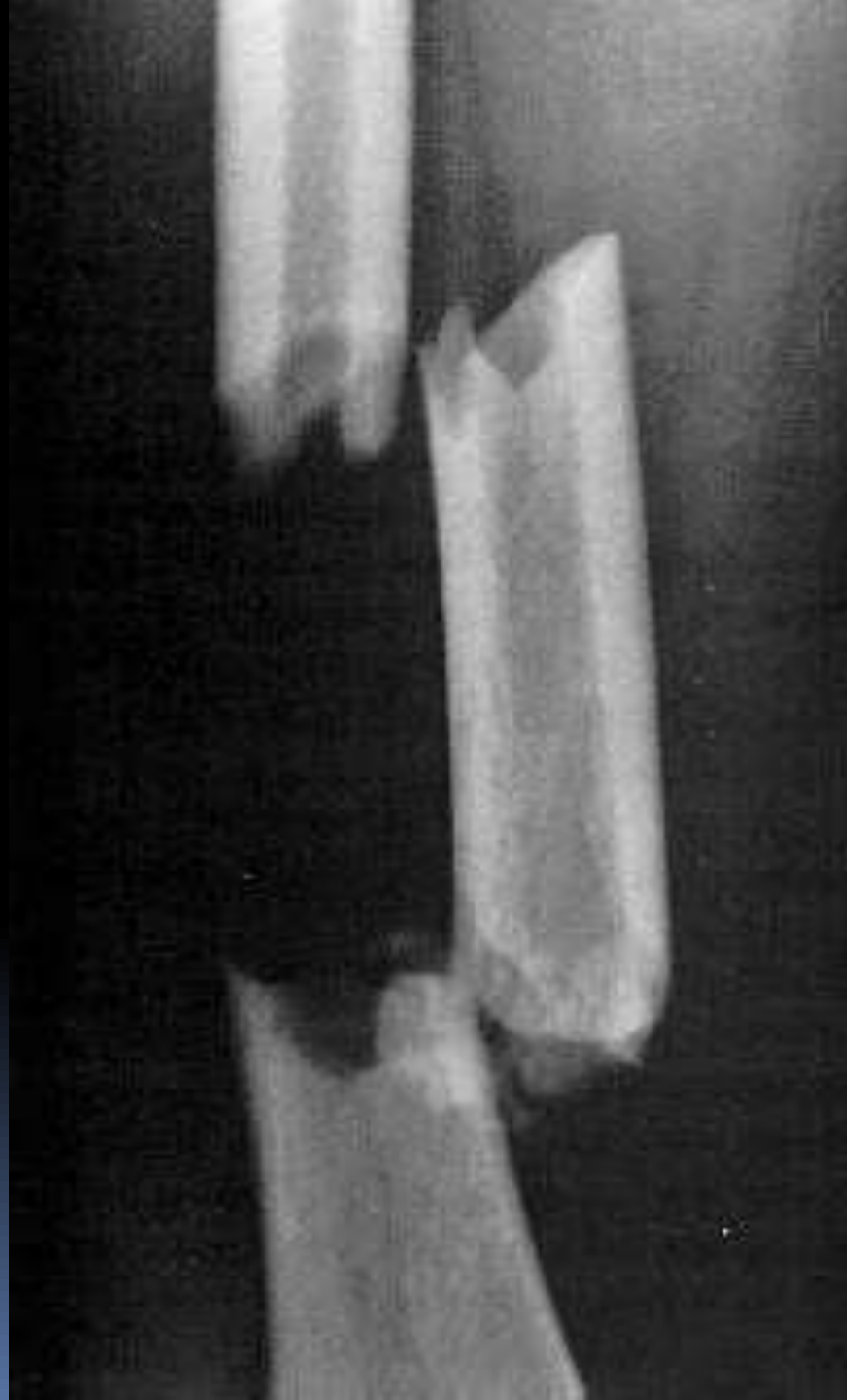
Greenstick Fract



Epiphyseal Fract.









DIAGNOSA FRAKTUR : CLINICAL !!

1. History

- When, How (M.O.I)
- Can be used soon after trauma?

2. Physical diagnostic

- Look
- Feel
- Move

3. Tools

- X-ray photo
- CT-scan
- MRI
- Three D CT

In doubt treat as fracture!!

MECHANISMS OF INJURY



I. How to make diagnosis?

Look

- **Deformity**
 - Discrepancy
 - Angulation
 - Rotation
- **Position**
- **Edema**
- **Appearance of the distal part**
 - Pale
 - Darken
- **Open fracture :**
 - Tepi perlukaan kulit tidak rata
 - Sifat perdarahan : oozing, venous & spotty fat.



I. How to make diagnosis?

- Feel

- Crepitation → attention pain↑

- Temperature

- Pulse

- Sensory

} of the distal part

- Move

- **Active**

- **Passive**

- **Power**

- **False movement → attention pain↑**

} Paresis -paralysis

- Measurement

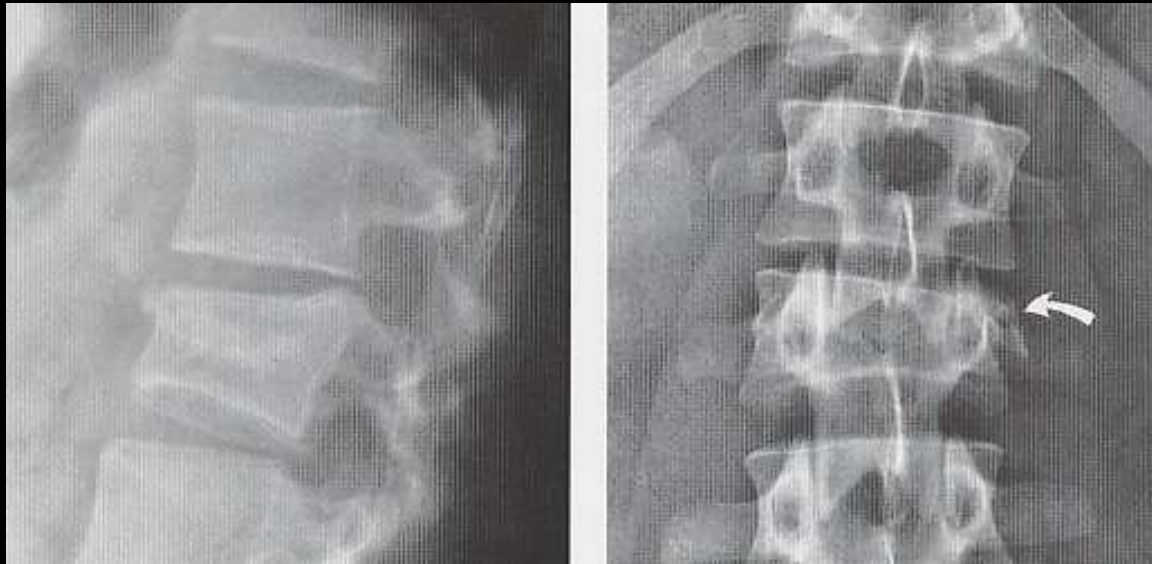
- True length

- Appearance

- Circumferencial

X-Ray photo :

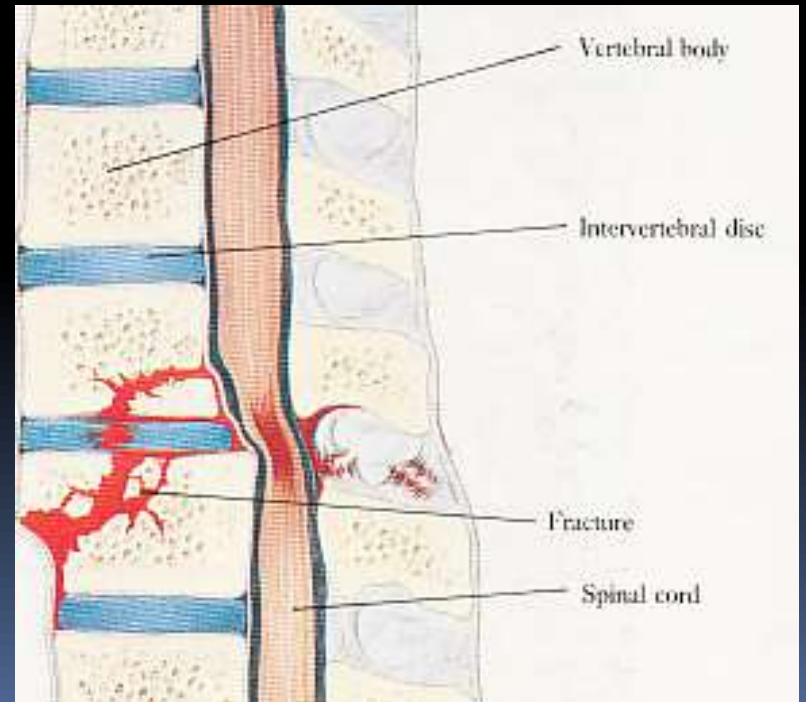
- Mencakup sendi proximal & distal tulang yang fraktur
- AP-Lat, "special order"
- Sisi normal untuk perbandingan

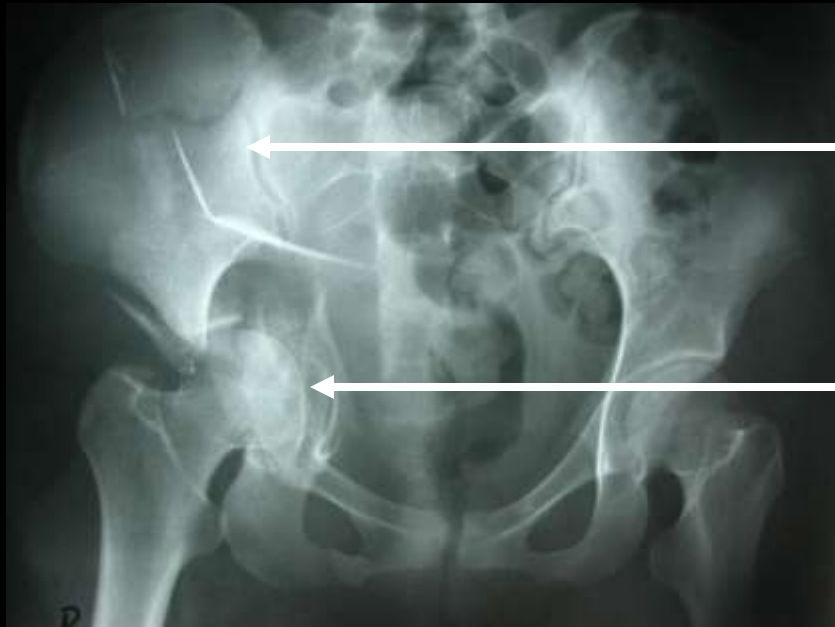


Lumbar Fracture



CT-Scan





Illiac Wing Fract

Acetabulun Central Dislocation



CT-three D

342
290

Pengobatan patah tulang

1. Terhadap nyeri : medicamentous, immobilisasi
2. Terhadap shock : neurogenic & hypovolumic
3. Patah tulang tertutup : TRIAS
 - a. reposisi
 - b. fixasi immobilisasi
 - c. rehabilitasi → mutlak
4. Patah tulang terbuka :
 - debridement dulu (luka kontaminasi=golden periode)
 - TRIAS therapy fracture
5. Observasi/check 24 jam neuro vascular?

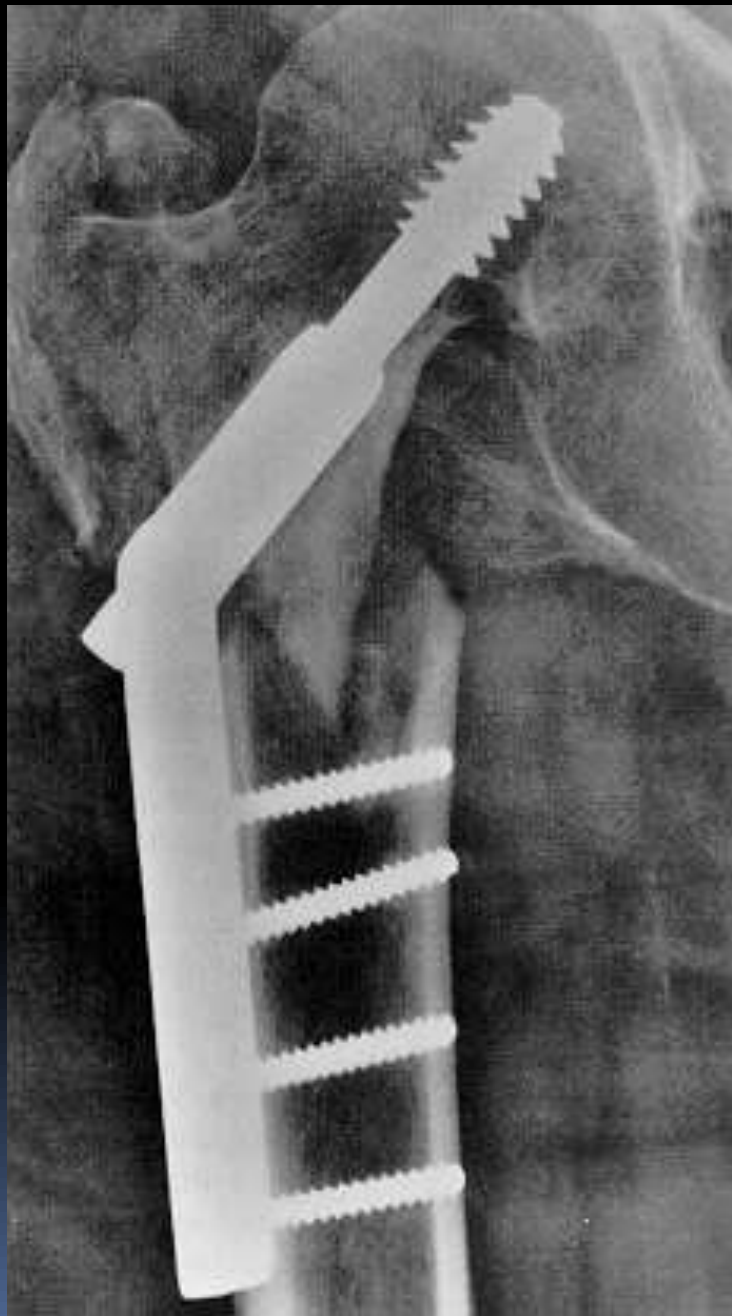
TRIAS PENGOBATAN FRAKTUR

A. **Reposisi** : periode tissue shock, acceptability

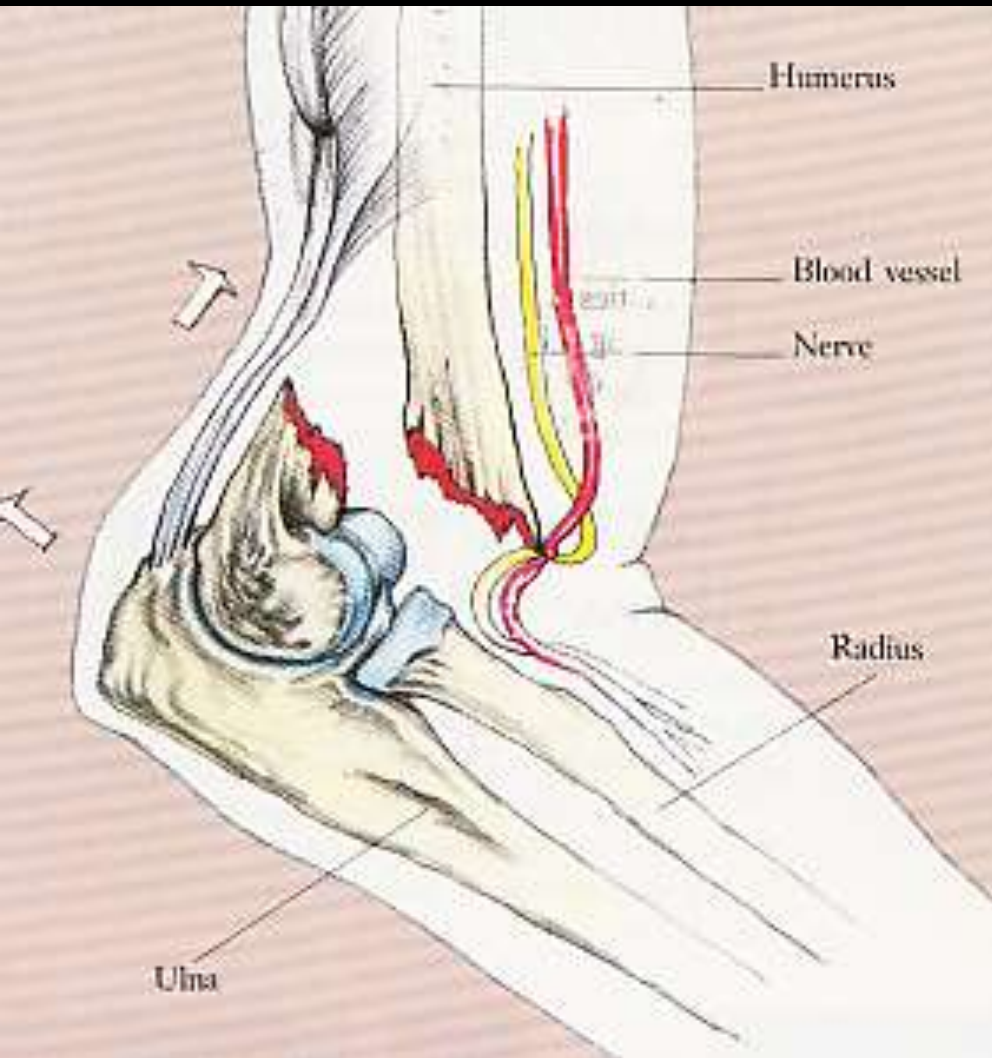
B. **Fiksasi-Immobilisasi**

- Casting/gips
- Traksi kontinue : Skeletal, Skin
- External : Ilizarov, Wagner, INOUE, Judet, etc
- Internal : implant

C. **Rehabilitasi** → mutlak



Komplikasi Patah Tulang



Dini :

- Pembuluh darah robek/ terjepit → compartment syndrome
- Syaraf/spinal cord
- Shock (neurologic & hypovolumic)

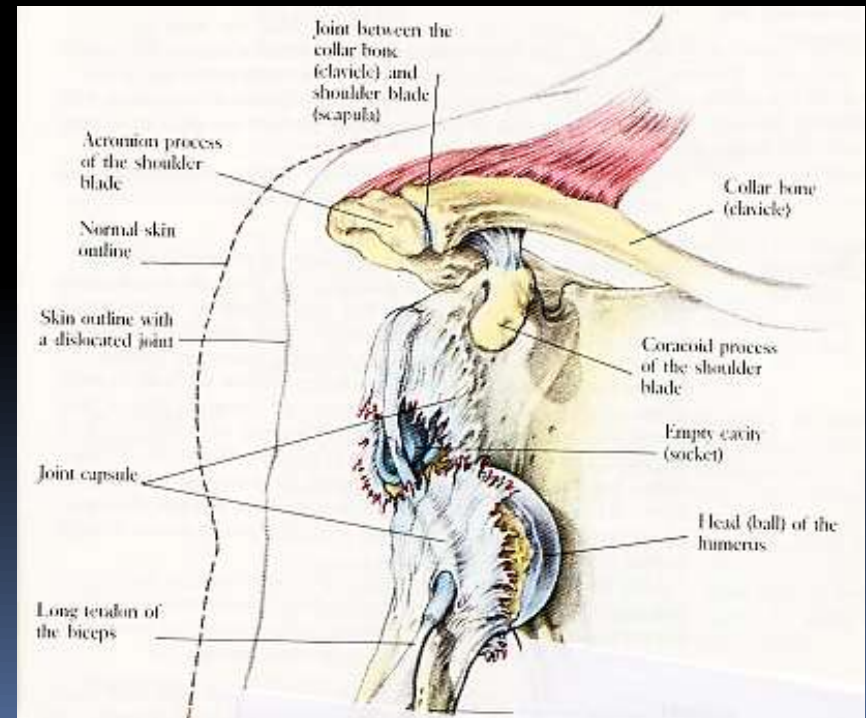
Lambat :

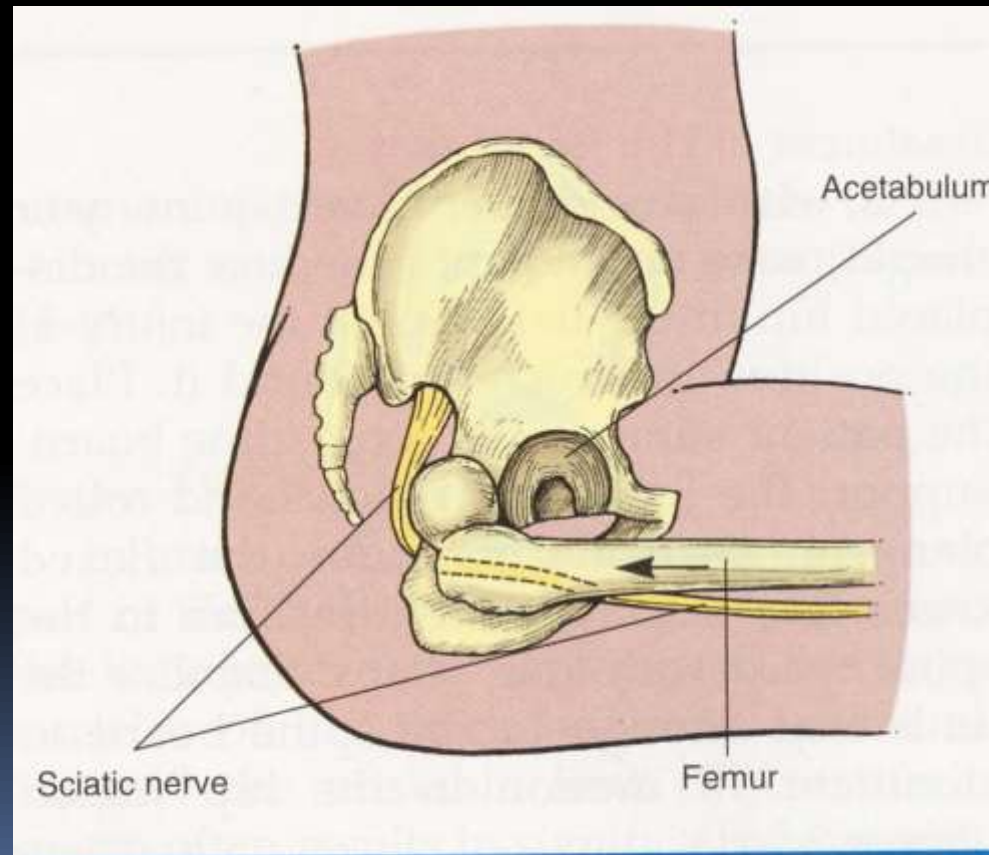
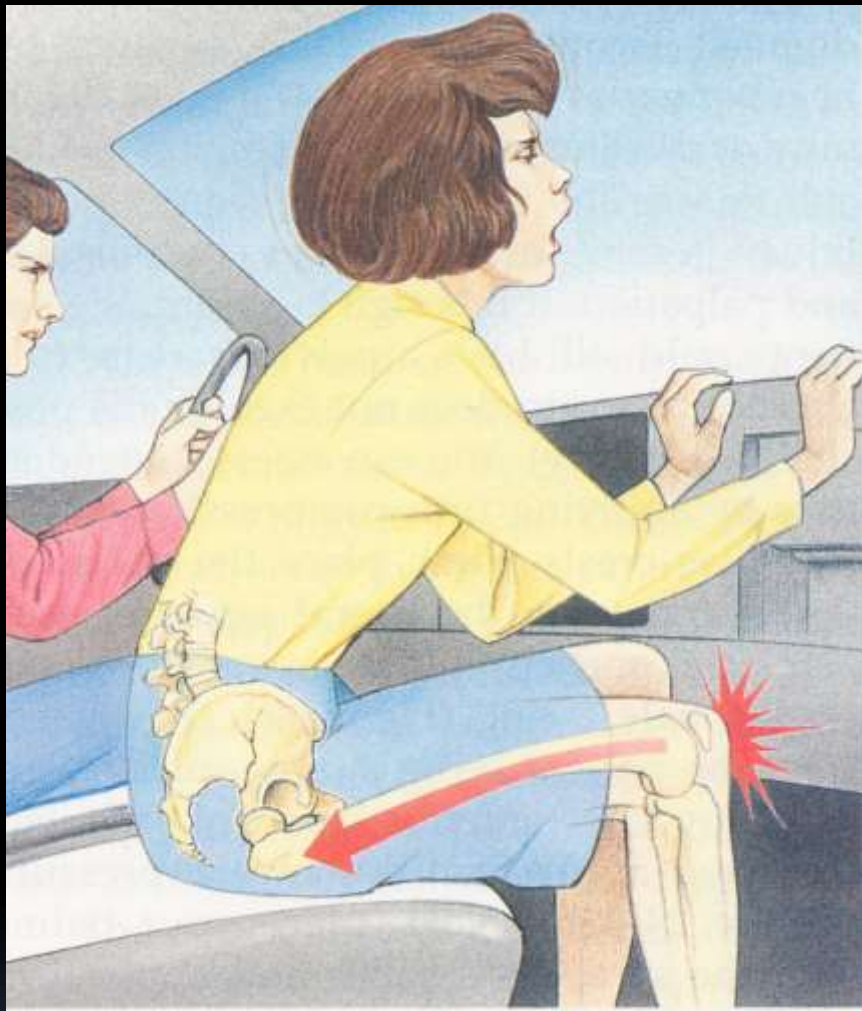
- Malunion
- Non union
- OA post fracture intraarticular

DISLOCATIONS (CERAI SENDI)

Discountinuity of joint

- At least a part of capsule and its ligaments must be torn
- Total dislocation : luxation
- Subluxation







Avascular necrosis ?



Subluxation

Cedera Tulang Belakang



Cervical Dislocation



Thorax Dislocation

- **Habitual Dislocation**
- **Recurrence dislocation**
- **Congenital dislocation hip**



FRACTURE - DISLOCATIONS



What is Multiple Trauma ?

- **Multiple Injury Cases :**
Trauma to the several part / structures of the body in the same moment
- **Polytrauma (AO) :**
A syndrome of multiple injuries (ISS > 17) with sequential traumatic reactions which may lead to dysfunction or failure of remote organs and vital system
- **Multiple Significant Trauma (MST):**
Multiple injured case who's threatening on life and disabled



TRAUMA/STRESS



Hypothalamus anterior



ACTH



Adrenal cortex



Kortisol



anti inflamasi



SIRS

- Sepsis
- MOF (multi organ failure)
- RDS (respiration Distress Syndrome)

CRF p.d. portal

Multi Trauma



I. Quick initial exam (ABBCS)

Air way - check for obstruction

Breathing - check thoracic-abdominal excursion

Bleeding- check for any major hemorrhage

Circulation - check pulse, blood-pressure
skin color, moistness

Sensorium-check quality and quantity of responsiveness , check responsiveness to pain stimuli

II. Systemic physical examination check general system

III. Examination completion

1. Life support and initial treatment
2. Priority classification (individual treatment)

- 2.1. Cessation of bleeding
- 2.2. Ventilation management
- 2.3. Restoration of circulation
- 2.4. Splinting of fractures of major bones
- 2.5. Treatment of shock including correction of severe endocrine and metabolic problems
- 2.6. Management of massive soft tissue injuries

Pre-Hospital Care

Prehospital Care of Fracture of Lower Limb



Fracture of shaft of femur. Injuries usually result from high-velocity impact. Considerable deformity often present. Sterile compression dressing applied to open wound before splinting.

Manual traction applied to align femoral shaft fracture and maintained as traction splint placed and secured. Splint supplies traction with windlass device and countertraction against tibial tuberosity.



Patient with traction splint placed on long spine board.



If injured knee found in traction, padded splints applied as A-frame from groin to below ankle.

Free injuries splinted in position found. If limb straight, padded board splints usually suffice for immobilization. Straps applied on medial and lateral aspects of limb from groin to below ankle.



Fractures of tibia and fibula aligned with manual traction if necessary and immobilized with air splint. Separately secured limbs elevated on pillows to minimize swelling.



Injured foot or ankle immobilized with air splint secured with safety pins or tape.

Pre-Hospital Care

Prehospital Care of Fracture of Forearm Bones



Forearm fractures often with angulation. May occur at any age but most common in children. Air splint provides good immobilization with little discomfort.



Emergency medical technicians should not splint on open fractures, and should splint a thumb, which may fracture as associated fracture injured limb.



Air splint slid into place over patient's hand, forearm, and arm. Fingers left protruding from splint.

Air splint inflated by mouth.



Neurovascular function tested and regularly monitored by capillary refill method.

Prehospital Care of Fracture of Wrist and Hand

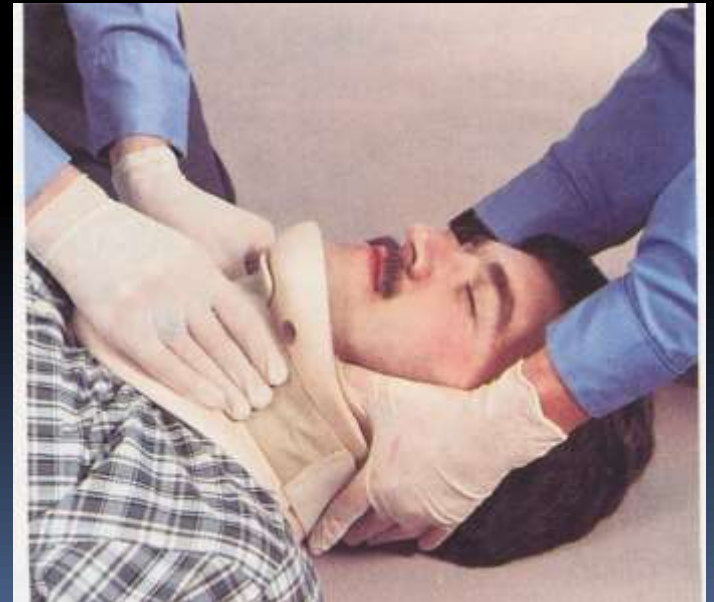


Wrist and hand splinted in functional (mid) back up position. Hand holding device not splinted as splinted hand splint extending to elbow.

Wounded limb and device not secured to splint with roller bandage.



Pre-Hospital Care Fract. Cervical



Pre Hospital Care Fract. Thoraco-Lumbal



Above knee or long leg cast

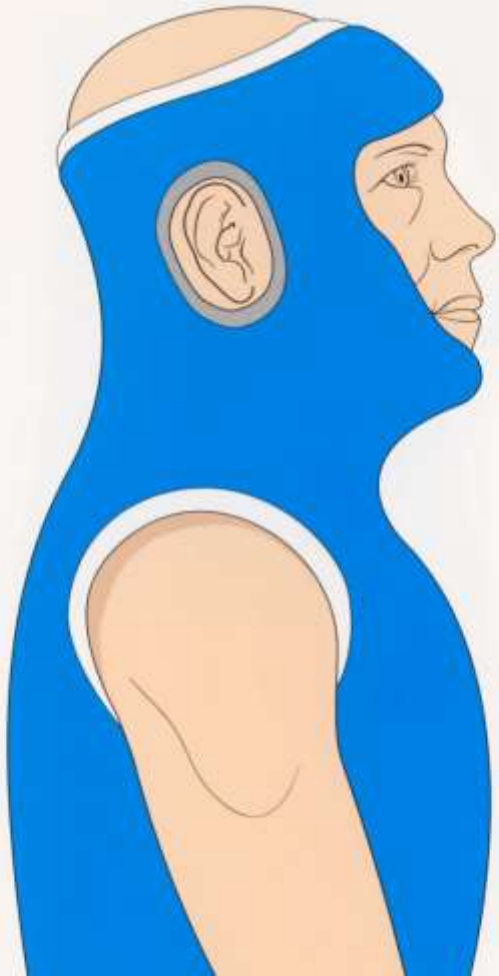
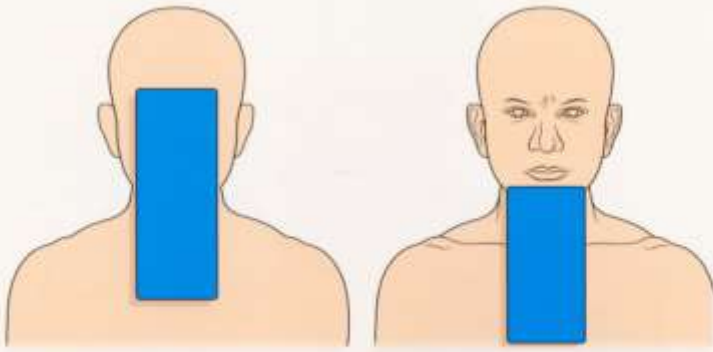




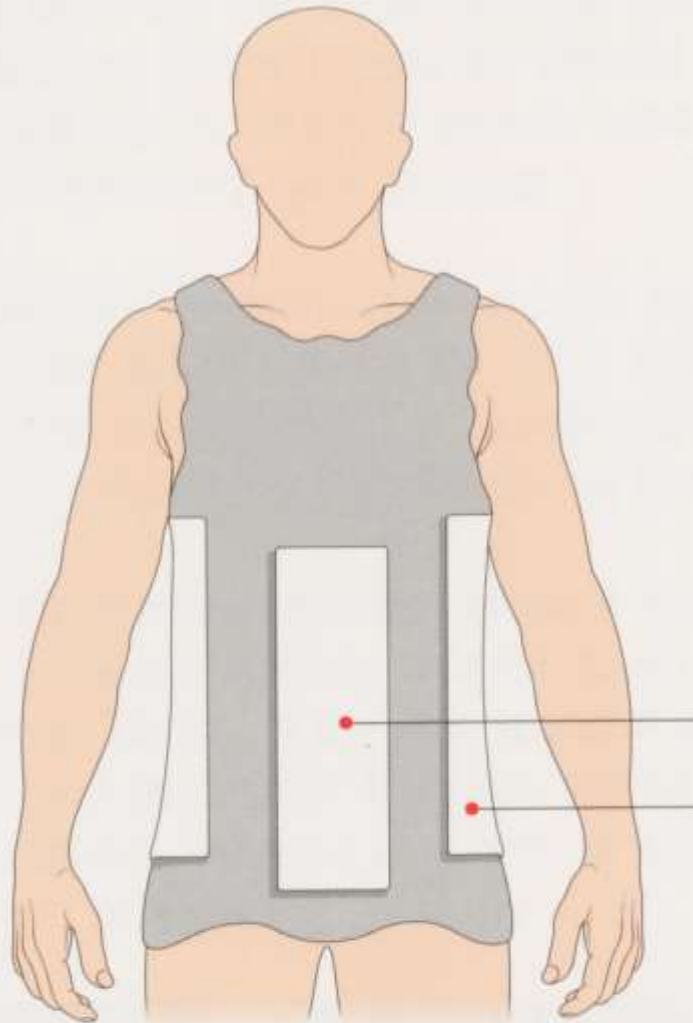
Colle's fracture



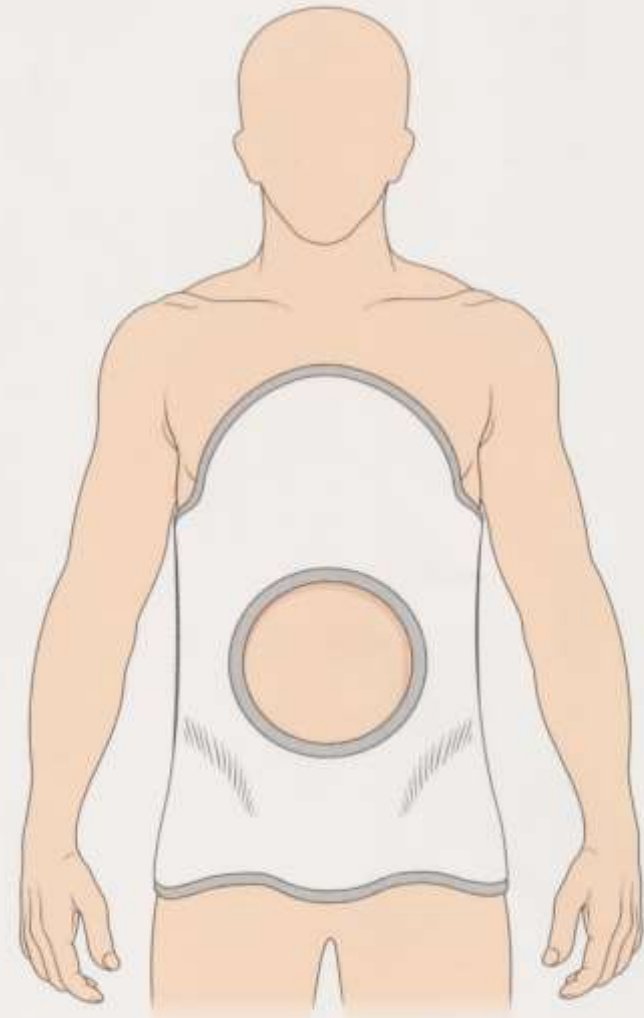
Minerva Jacket



Plaster Jacket or Body Jacket



Posterior view

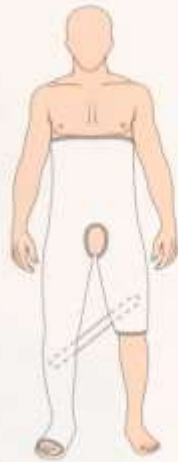


Anterior view

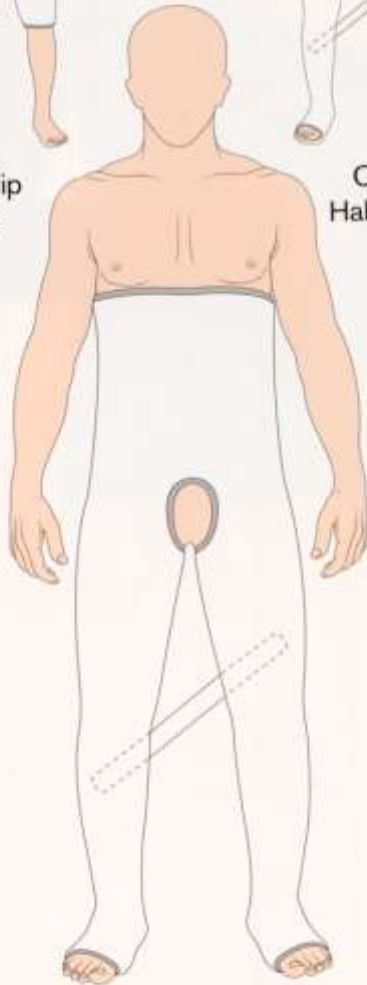
HIP Spicas



Single Hip Spica

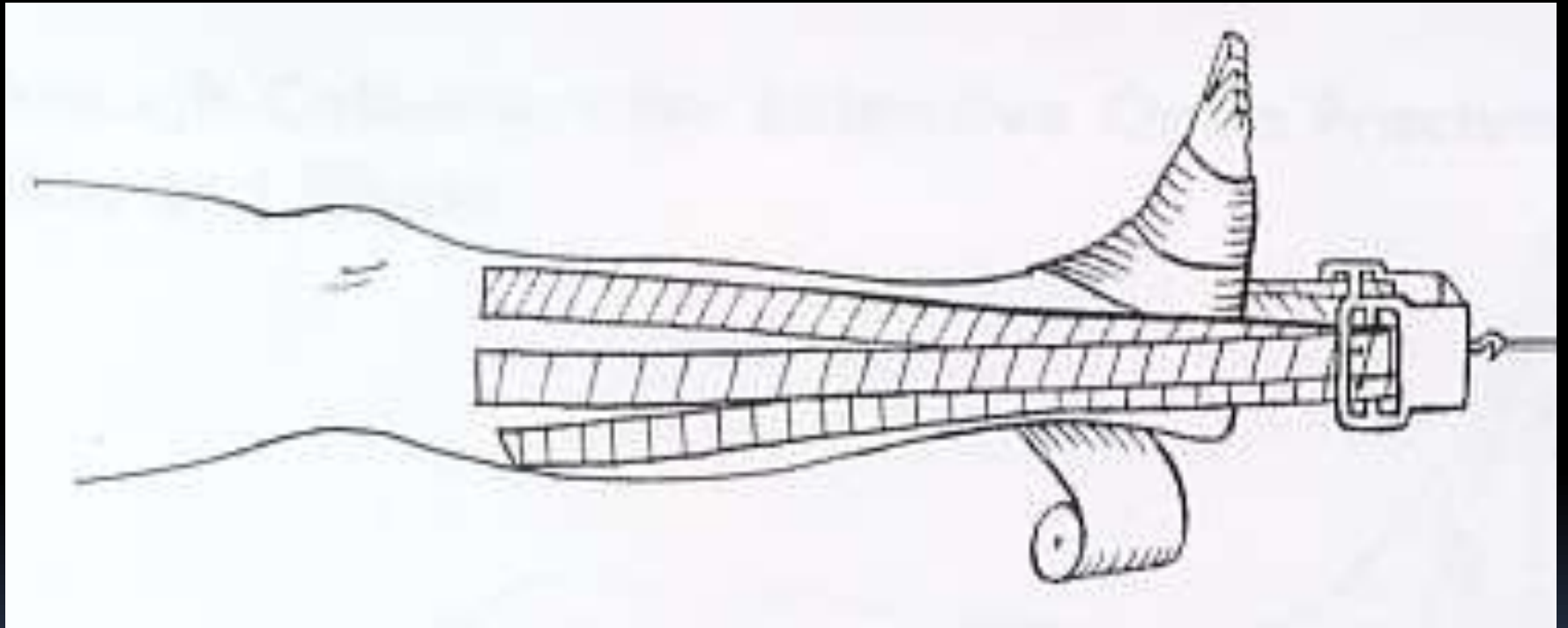


One and a Half Hip Spica



Double Hip Spica

Skin traction





**TRAKSI " ZERO " POSISI UNTUK FR.COLLUM
HUMERI**

Keuntungan skin traksi

- Mudah dipakai, bisa dilakukan dimana saja, kapan saja dan siapa saja
- Tidak perlu fasilitas kamar operasi

Kerugian skin traksi

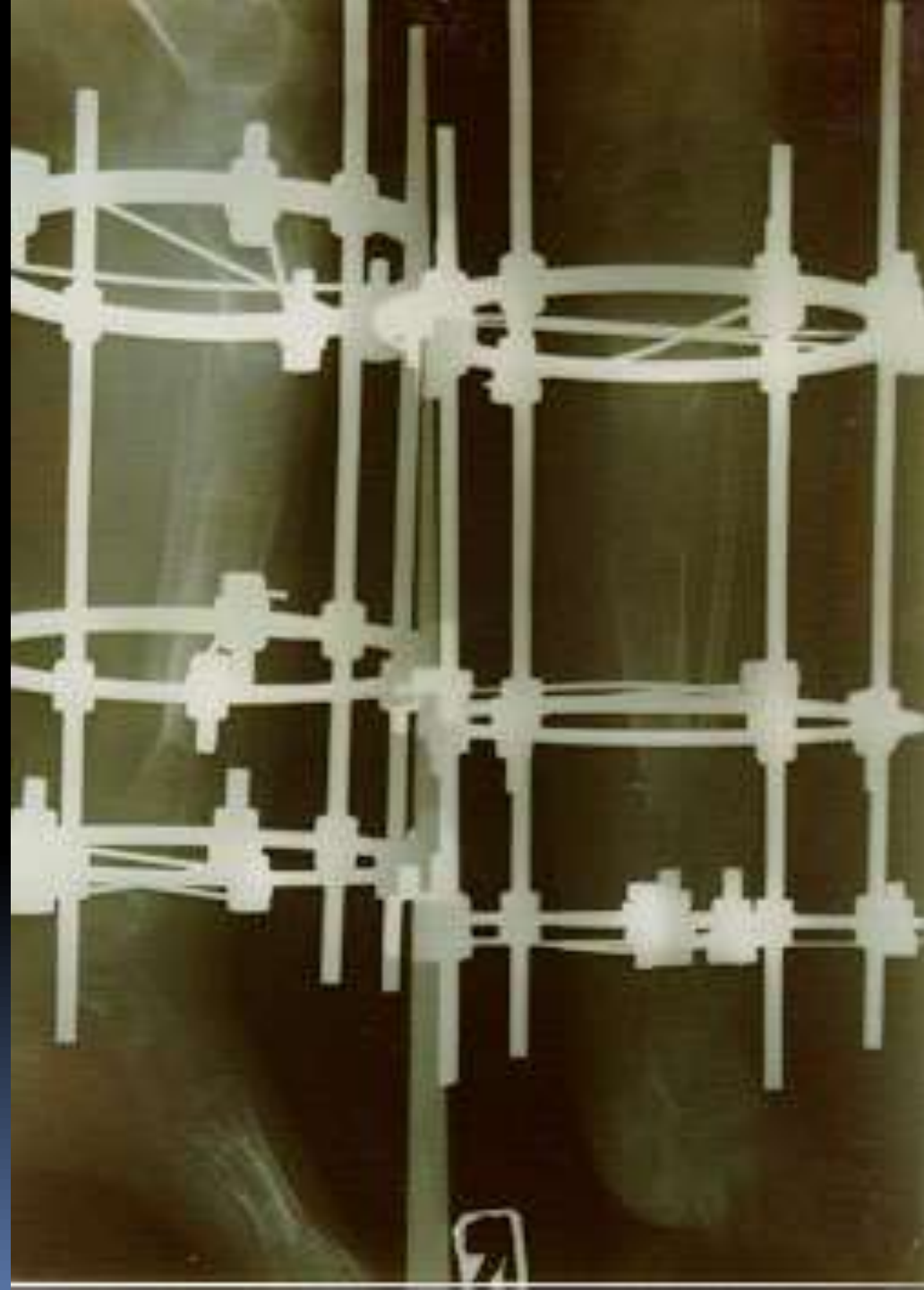
- Kulit harus utuh tidak ada luka dan tidak alergi terhadap adhesive plaster
- Beban terbatas $\leq 5\text{kg}$
- Waktu ≥ 4 minggu



**BOHLER BRAUN SKELETAL TRAKSI PADA
FRAKTUR FEMUR**







**THANK YOU
FOR
KIND YOUR ATTENTION**