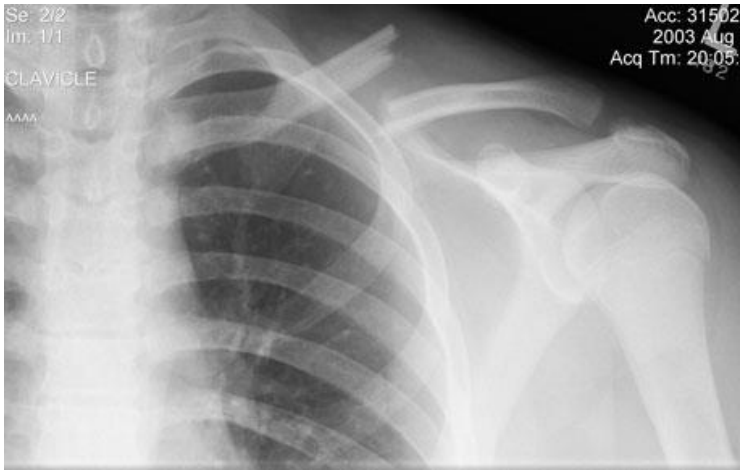
Clavicle and Scapular fractures in children

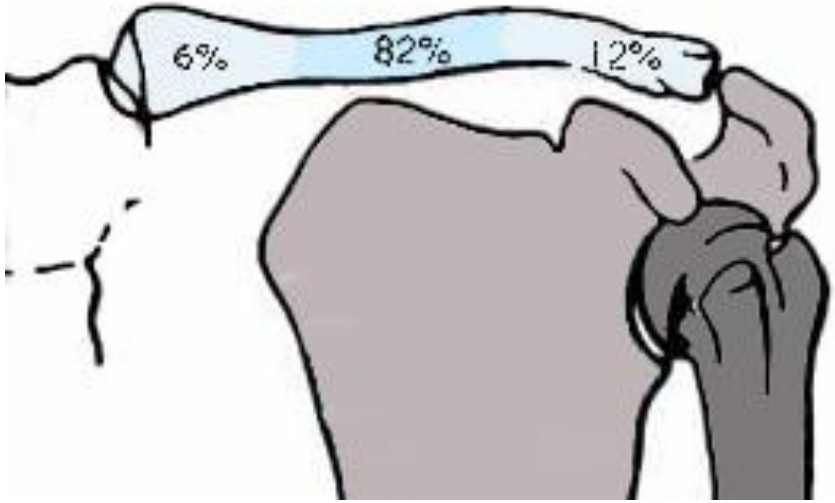
M.N. Naderi, MD

Pediatric Clavicle fractures

- **most common site of all obstetrical fractures**
  - 1% - 13% of all birth
  - Differential diagnosis with Congenital pseudarthrosis

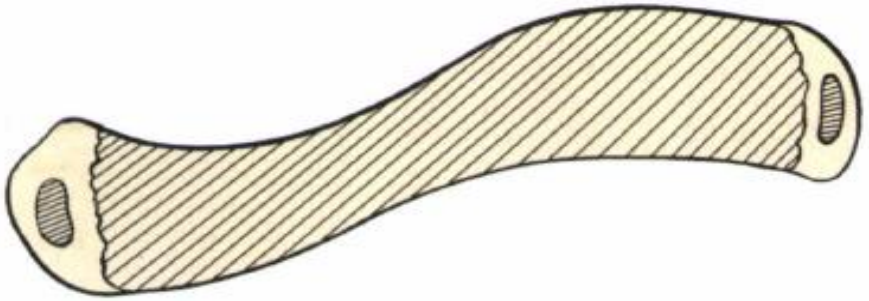
- **one of the most frequently fractured bones in the body**
  - 4% of all fractures





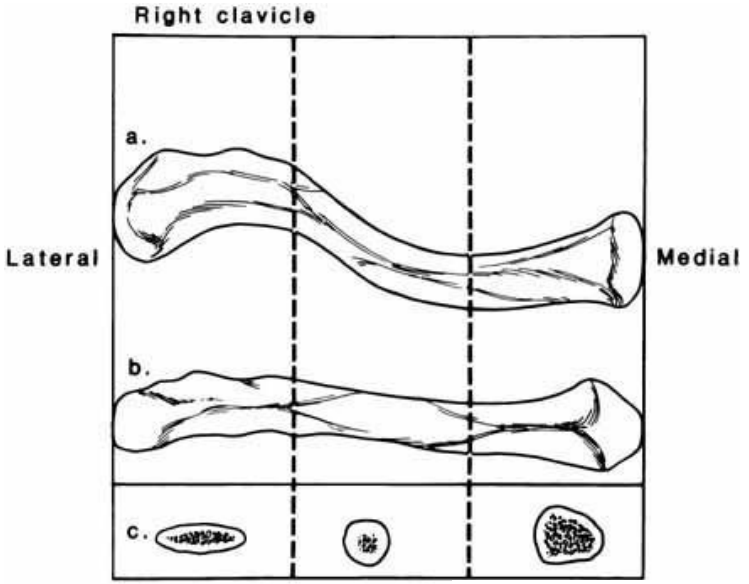
Anatomy

Clavicle, along with mandible, is the first bone in the body to ossify
(5th week of gestation)

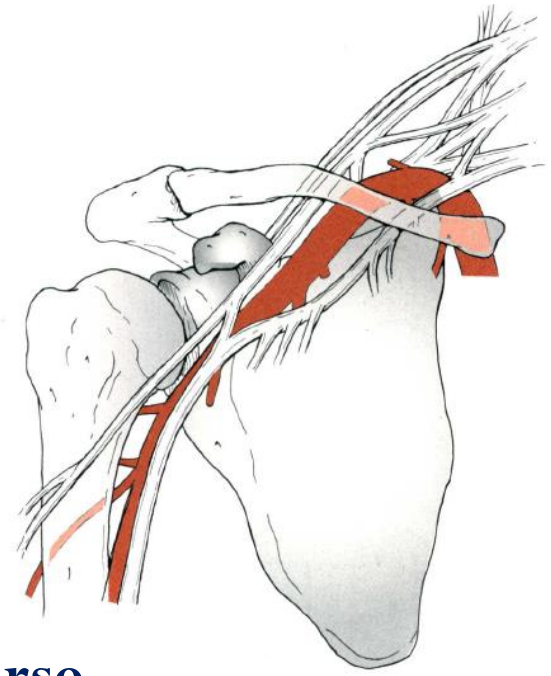


- **medial clavicular epiphysis**
  - **responsible for most of longitudinal growth of clavicle**
  - **ossify at 18 years**
  - **fuses at 22 to 25 years of age**
- **lateral epiphysis**
  - **less constant**
  - **often appears as a wafer-like edge of bone**
  - **may be confused with a fracture**

Anatomy



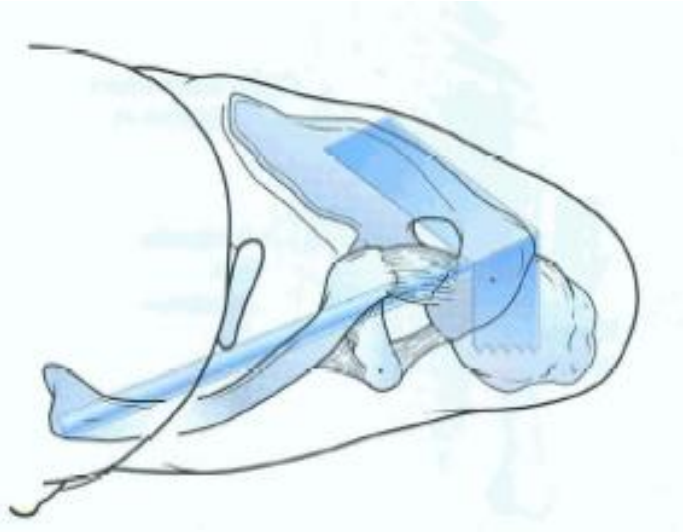
a.Superior view
b.Frontal view
c.Cross sections



- S-shaped bone
- base for muscular attachments
- Strongly held with ligaments at both ends
- protects vital neurovascular structures
- cross-sectional anatomy changes along its course

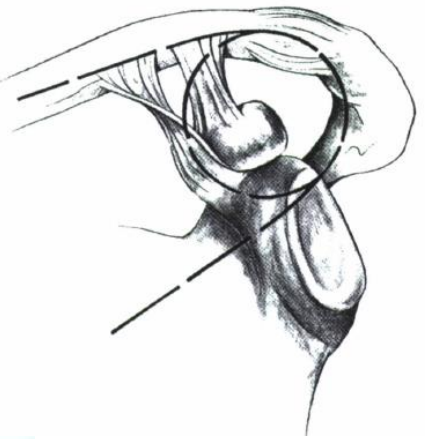
Normal Clavicular Functions

- **Strut *Function***
  - bracing the shoulder girdle optimal muscle-tendon unit length cosmesis and posture to the shoulder



- ***Suspensory Function***
  - stabilization against inferior displacement as static mechanisms

    (trapezius acts as a dynamic scapular elevator)



Mechanism

- fall onto the shoulder (most common mechanism)
- Direct trauma (accidents,,,,)
- Indirect trauma (falling on outstretched hand)
- Child abuse

Signs and Symptoms

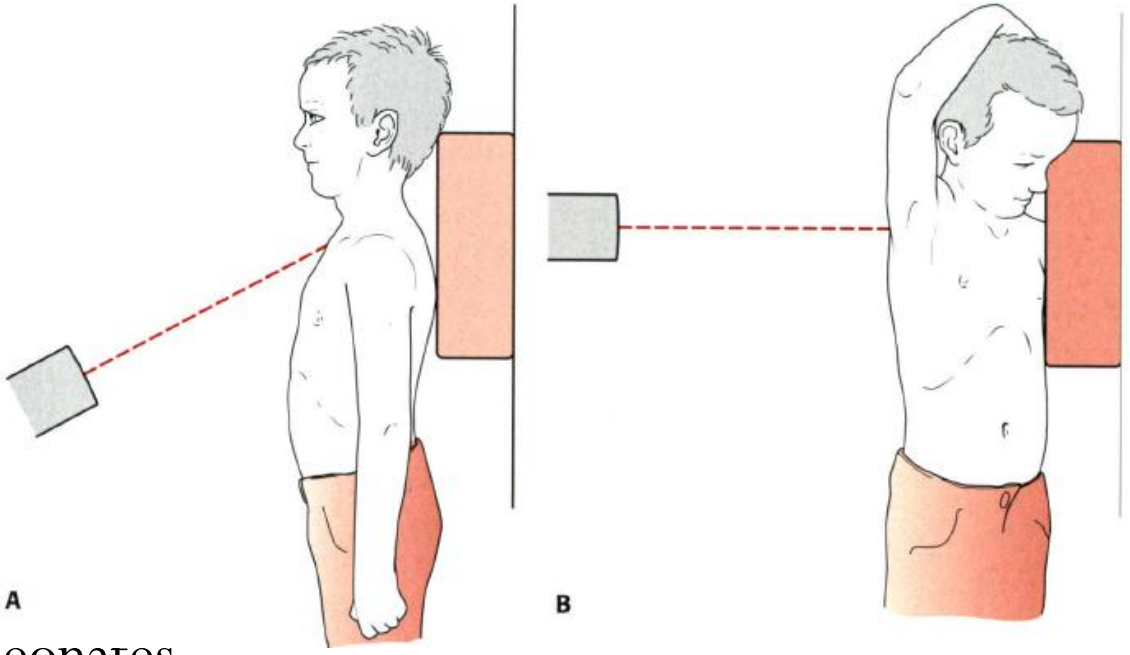
- **in newborns**
  - pseudoparalysis of the affected arm (To minimize pain)
  - asymmetric Moro reflex
  - mass (healing fracture callus 7 to 10 days after initial trauma)
- **in older children**
  - pain
  - Tenderness, ecchymosis, and edema
  - bony prominence or deformity
  - voluntarily immobilize the affected arm

Aware of Associated Injuries

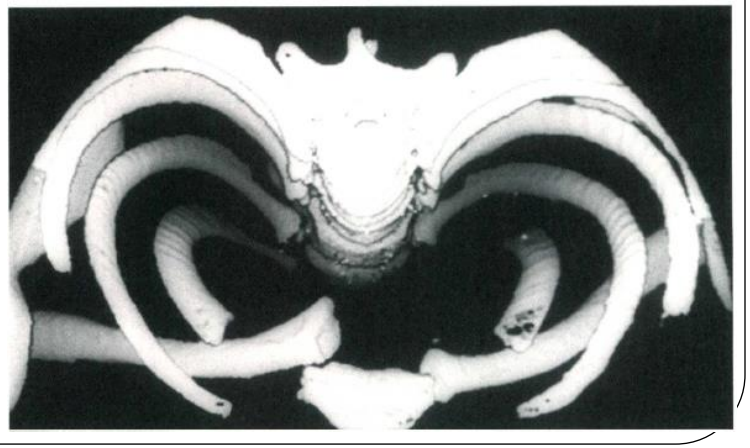
- Atlantoaxial (CI-C2) rotatory displacement
- Posterior fracture-dislocations of the medial clavicle

Evaluation

- **X-Ray**
  - AP view
  - Apical lordotic view

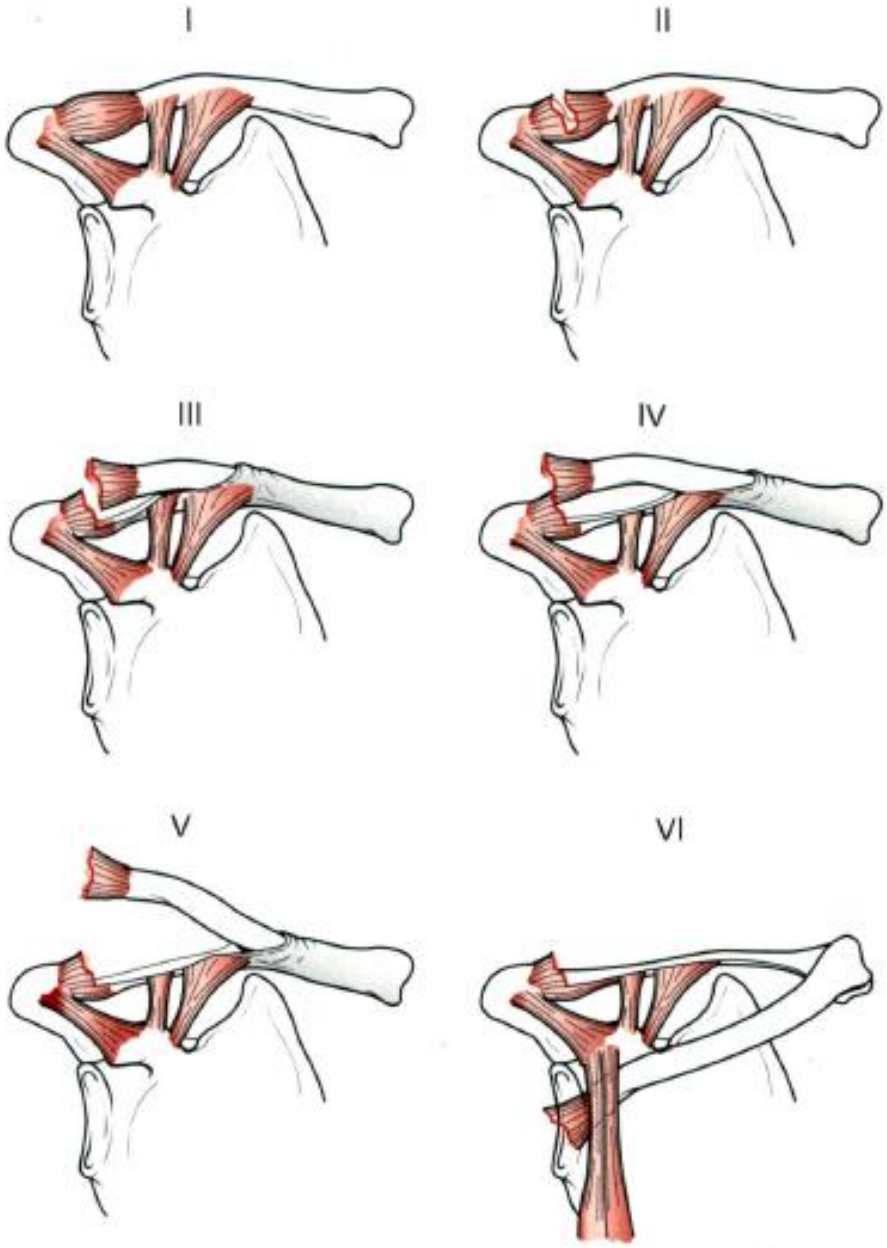


- **Ultrasonography**
  - valuable supplement in neonates
  - can detect occult clavicular fx
- **CT**
  - best method for evaluating injuries in medial third of clavicle



Distal Clavicular Injuries

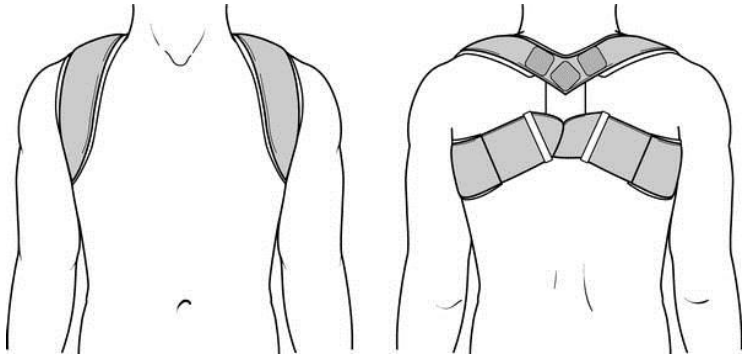
- Most injuries in this region are metaphyseal or physeal fx
- distal clavicular epiphyseal ossification does not occur until age 18
- → radiographic appearance as AC dx rather than a fx (pseudodislocation)



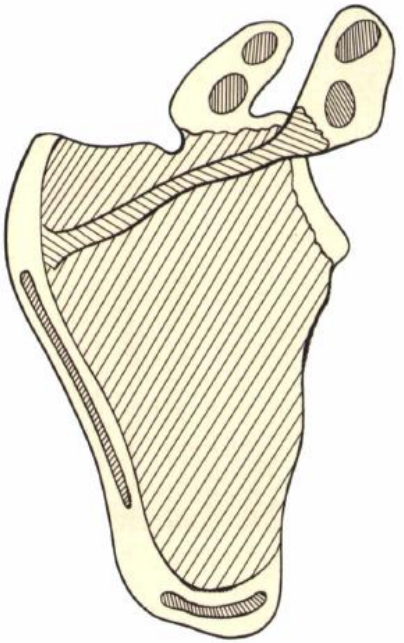
Dameron and Rockwood classification

Treatment

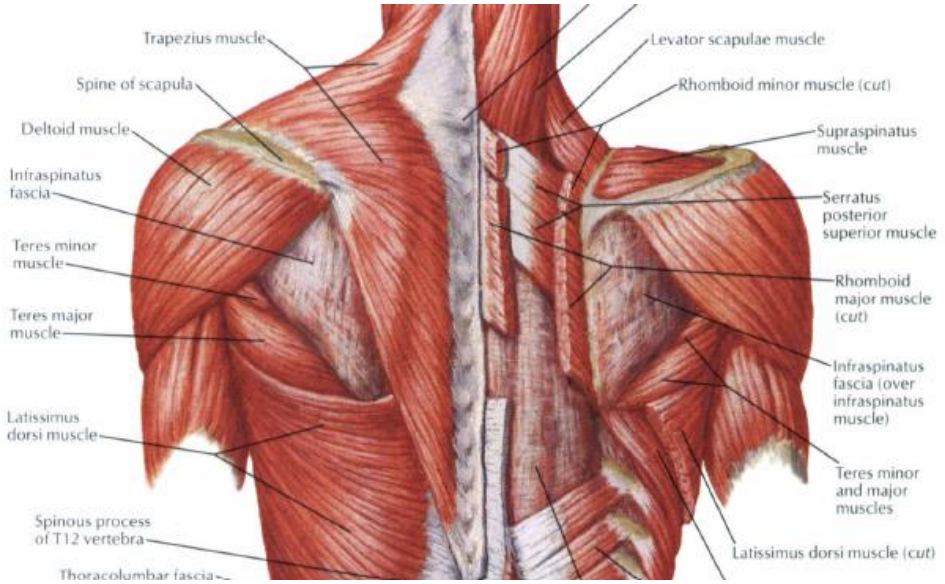
- generally nonoperative
- Indication for operation:
  - severely displaced
  - concomitant vascular Injury
  - compromise of the brachial plexus
  - open fracture
  - nonunion



Scapula

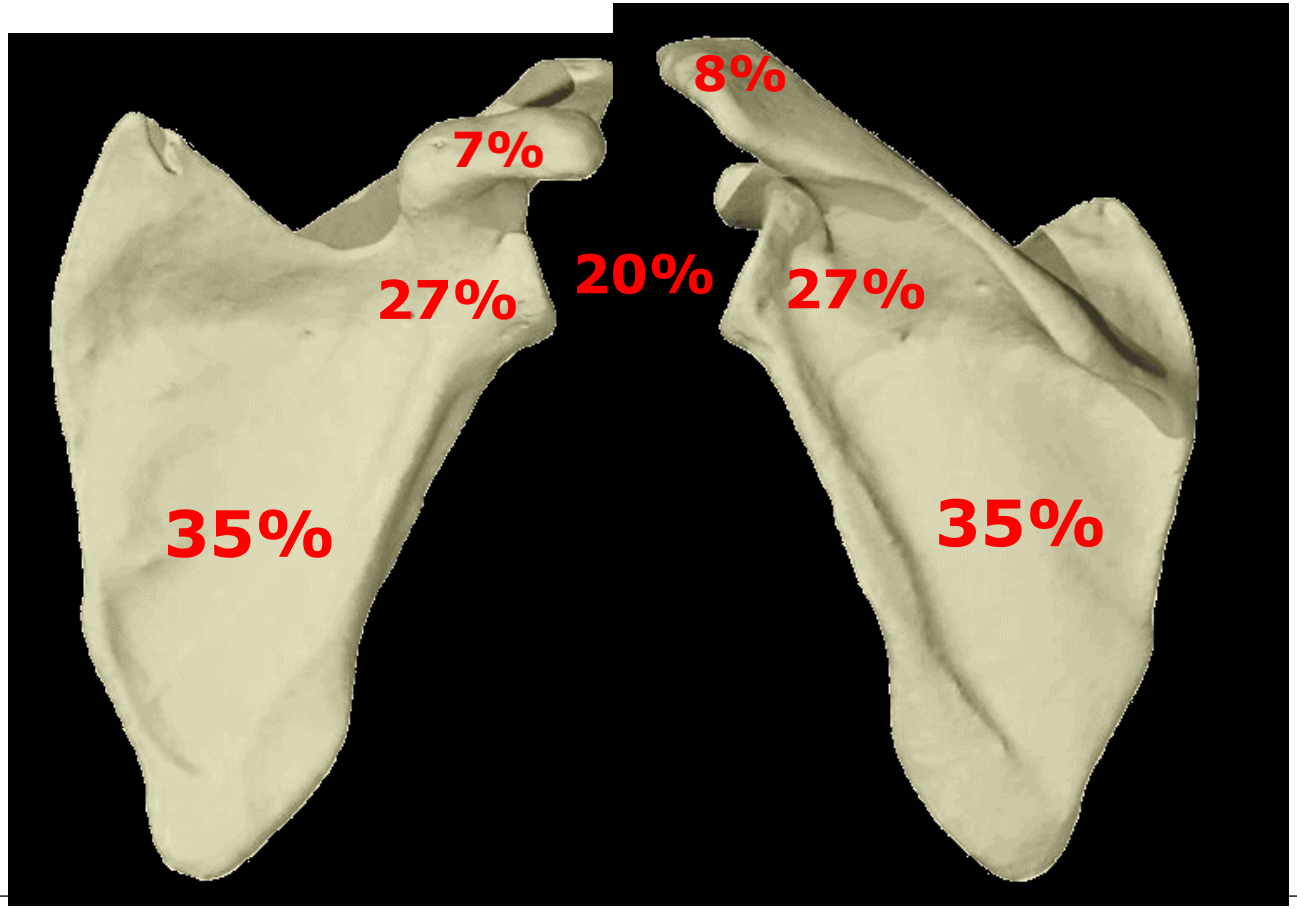


- Flat bone
- Intramembranous ossification
- At birth, the body and spine of scapula ossified
- Covered by muscles

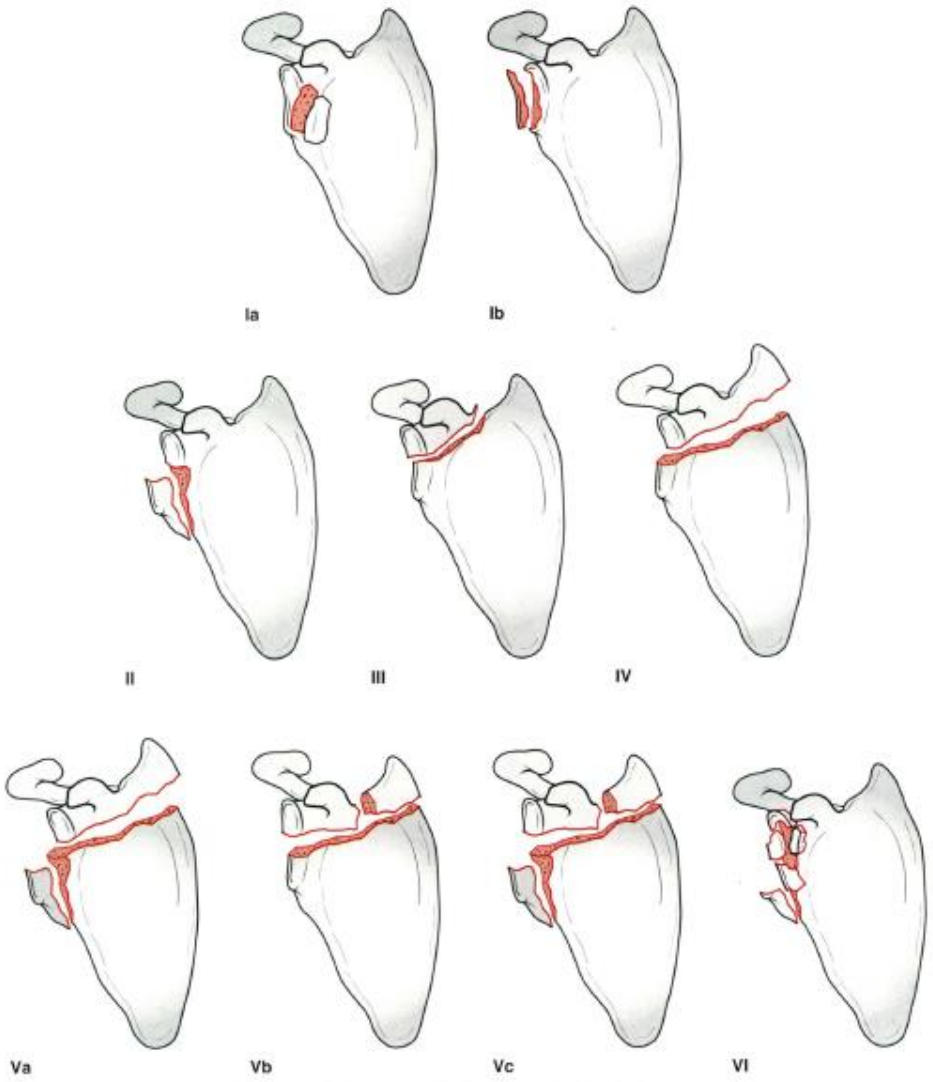


Scapula fractures in children

- Rare (1% of all fx)
- High energy trauma
- Beware of N/V & visceral injuries (high incidence)

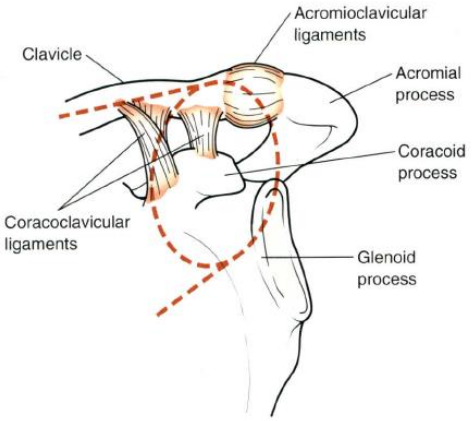


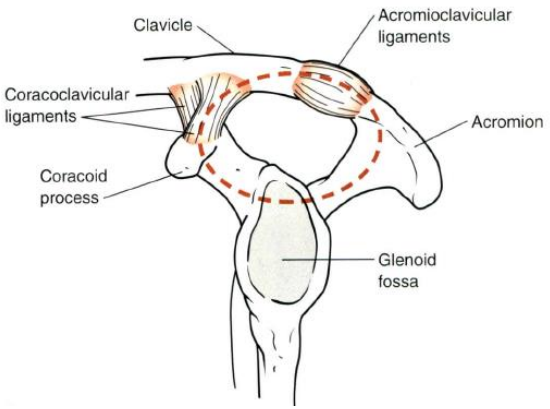
Fractures of glenoid (Ideberg /Goss)

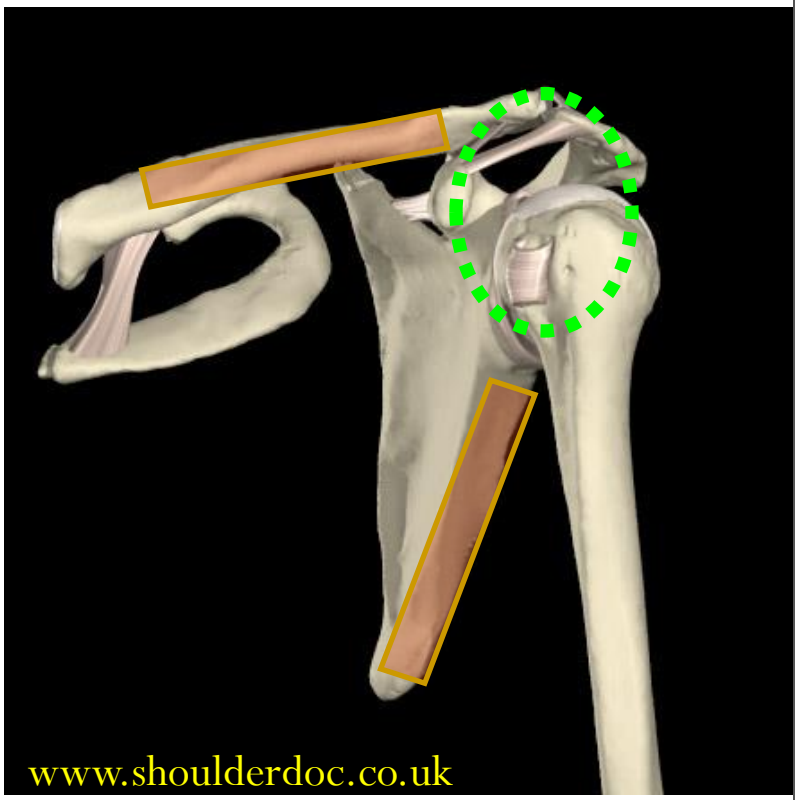


Superior shoulder suspensory complex

- SSSC is responsible for linking the upper extremity to the axial skeleton
- Double disruption of SSSC → unstable construct
- Treatment decisions for scapular injuries should be based on the maintenance of SSSC integrity







Treatment

TABLE 17-3 Interventions for Scapular Fractures

	Immobilization	Operative Reduction and Immobilization	Operative Reduction and Internal Fixation
Body of scapula	X		
Acromion	X		X
Glenoid rim/fossa	X		X
Scapula–thoracic dissociation	X	X	

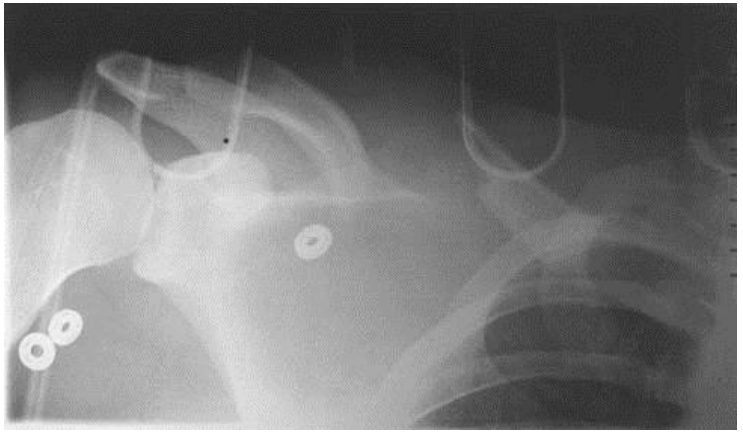
Treatment

With rare exception, scapula fx are treated without surgery

Beware of concomitant injury

Indications for operation:

- displaced glenoid intra-articular
- Disruption of integrity of SSSC
- highly displaced body fractures
- Scapulothoracic dissociation
  - High incidence of N/V injury




Thank you for attention