ORTHOPEDICS BINGE REVISION

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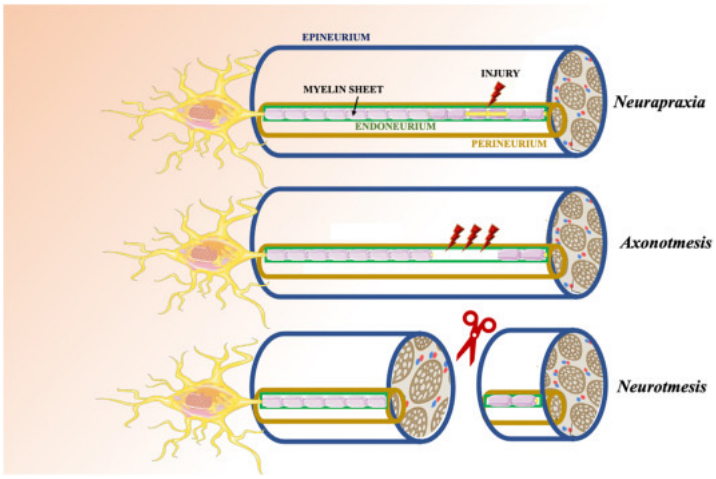

Gustilo and Anderson classification for open fracture

Grade	Characteristic feature
I	Clean wound of <1cm length
II	Wound >1cm in length but without any soft tissue damage and skin flap or avulsion
III	Wound associated with extensive soft tissue damage, comminution, contamination or segmental fractures
IIIA	Adequate Periosteal coverage is there
IIIB	Significant Periosteal stripping and it requires secondary bone covering procedures like skin flap or grafting.
IIIC	Open fracture with vascular injury that requires vascular repair

Salter-Harris (SH) Physeal Injury Classification	
Type	**Characteristics**
I	Separation through the physis, usually through areas of hypertrophic and degenerating cartilage cell columns.
II	Fracture through a portion of the physis that extends through the metaphyses.
III	Fracture through a portion of the physis that extends through the epiphysis and into the joint.
IV	Fracture across the metaphysis, physis and epiphysis.
V	Crush injury to the physis.

SH Classification from I - V

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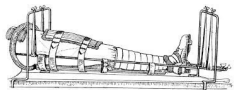
MEDSYNAPSE Where Concepts Meet Mnemonics

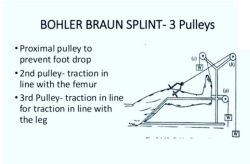
Acute Compartment Syndrome

Acute compartment syndrome is an elevation of the intracompartmental pressure (ICP) which increases the risk for tissue ischemia and necrosis.
Causes: Fractures (70%) and severe soft tissue injuries (30%). Common fractures causing compartment syndrome include tibial diaphyseal (most common), distal radius, and forearm fractures.
Pathology: Increased pressure in one of the osseofascial compartments due to bleeding, oedema or inflammation. A vicious cycle of ischemia → edema→ ischemia leading to necrosis of the muscles and nerves within the compartment in 6 hours or less.
Clinical features: Five Ps: Pain, Paraesthesia, Pallor, Paralysis and Pulselessness.
Management: Fasciotomy to decompress the threatened compartment if the differential pressure (ΔP) goes < 30 mmHg.

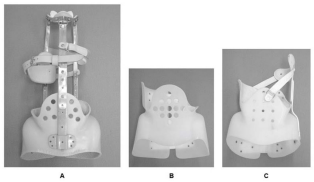
Fat embolism

SPLINTS





Name of the Splint	
Used in Lower Limbs	
Thomas Splint Bohler-Braun splint	Fracture femur
Toe raising splint	Foot drop
Dennis Brown splint	CTEV
Used in Upper Limbs	
Cock up splint	Radial nerve palsy
Volkmann's turn buckle splint	Volkmann's ischemic contracture
Knuckle bender splint	Claw hand (Ulnar Nerve)
Aeroplane splint	Brachial plexus injury
Used for Spine	
Milwaukee brace	Scoliosis
Boston brace	Scoliosis
SOMI brace	Cervical spine injury
ASHE (anterior spinal hyperextension) brace	Dorso lumbar spinal injury



Fracture/Dislocation	Nerve injured
Fracture clavicle	Brachial plexus
Anterior or inferior shoulder dislocation	Axillary (circumflex humeral) nerve
Proximal humerus fracture	Axillary nerve
Shaft of humerus fracture	Radial nerve
Supracondylar fracture humerus	Anterior interosseous nerve > Median nerve > Radial nerve
Medial condyle of humerus	Ulnar nerve
Posterior dislocation elbow	Ulnar nerve >Median nerve
Monteggia fracture	Posterior interosseous nerve
Volkman's ischemic contracture	Anterior interosseous nerve
Hook of hamate fracture	Deep branch of the ulnar nerve
Lunate dislocation	Median nerve
Wrist injury	Median nerve
Posterior hip dislocation	Sciatic nerve
Anterior dislocation of hip and shaft femur fracture	Femoral nerve
Knee dislocation	Common peroneal nerve
Proximal tibial fractures and ankle injury	Posterior tibial nerve
Fracture neck of the fibula	Lateral popliteal nerve (common peroneal nerve)

Syndrome	Nerve involved
Pronator teres syndrome	Median nerve (proximally compressed beneath ligament of
Radial tunnel (Arcade of Frohse) syndrome	Struthers, bicipital aponeurosis, or origins of pronator teres) Posterior Interosseous nerve (in proximal forearm)
Cubital tunnel syndrome	Ulnar nerve behind medial epicondyle
Tarsal tunnel syndrome	Posterior tibial nerve
Carpal tunnel syndrome	Median nerve (at wrist)
Guyon's canal syndrome	Ulnar nerve(at wrist)
Thoracic outlet syndrome	Lower trunk of brachial plexus
Piriformis syndrome	Sciatic nerve
Meralgia paresthetica	Lateral cutaneous nerve of thigh
Cheiralgia Paresthetica (Wartenburg syndrome)	Superficial sensory branch of radial nerve
Mortons Metatarsalgia	Interdigital plantar nerve
Notalgia Paresthetica	Superficial sensory neuropathy in the infrascapular area (Pruritus + Dysaesthesia)

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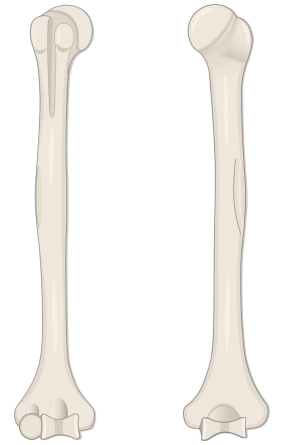
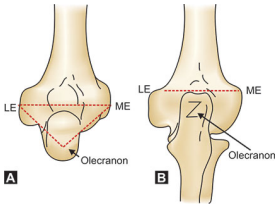
MEDSYNAPSE
Where Concepts Meet Mnemonics



Three point bony relationship



The **tips of medial** and **lateral epicondyles** and **the olecranon**(the three bony points): Form isosceles triangle-in elbow flexion of 90 degrees.
Lie transversely in a straight line on elbow extension.
The three-point bony relationship is **maintained** in the case of **supracondylar fracture of humerus** as the fracture occurs above the level of these bony landmarks.

Conditions where it is distorted:
Fracture medial condyle and epicondyle

Fracture lateral condyle and epicondyle

Intercondylar fracture of humerus

Fracture olecranon

Elbow dislocation

SCH fracture

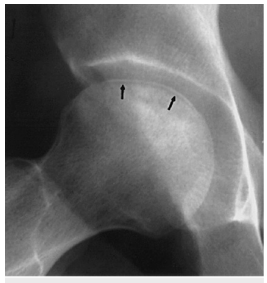
- Gartland classification
- M/c complication – malunion
- AIN
- Brachial artery
- Cubitus varus – gunstock deformity
- Fishtail humerus

Elbow Vs patellar bursitis

. Tennis elbow	prepatellar
Golfer's elbow	infrapatellar

AVN

- Femur head – crescent sign
- Scaphoid – proximal pole
- Talus – Hawkin sign

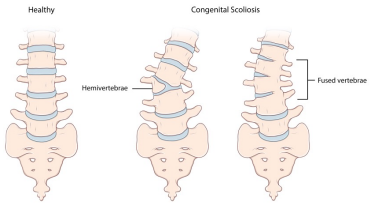


Osteochondritis

Kienbock	Lunate
Scheuermann	Ring epiphysis of vertebra
Perthes	Proximal femoral epiphysis
Osgood Schlatter Sever	Tibial tuberosity
Sever	Calcaneum
Kohler	Navicular
Freiberg	Second (or 3rd,4th,5th)metatarsal head
Iselin disease	Fifth metatarsal base

Angles

Carrying angle	Cubitus varus and cubitus valgus
Baumann's angle	Elbow fractures
Cobb's angle	Scoliosis
Alpha angle Beta angle	Developmental dysplasia of hip
Southwick angle	Slipped capital femoral epiphysis
Neck shaft angle	Coxa vara
Q angle	Patellar alignment
Kite's angle	Congenital talipes equinus varus
Meary's angle	Pes cavus
Bohler's angle	
Gissane's angle	Fracture of calcaneum



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Hip dislocation

Hip dislocation	Anterior dislocation	Posterior dislocatiom
Prevalence	Less common	Most common
Type of injury	Deceleration injury/ Fall from height	Dashboard injury
Attitude of the limb	Flexion, abduction, external rotation (FABER) Lengthened	Flexion, adduction, internal rotation (FADIR) Shortened
Length of the limb	**Femoral head may be seen inferior to the acetabulum Femoral head appears larger than normal**	**Femoral head is displaced superiorly and laterally Femoral head appears smaller than normal Lesser trochanter is not visualised**
Radiological findings	**Lesser trochanter is prominent**	**Femoral head appears smaller than normal**
Nerve injured	**Femoral nerve**	**Sciatic nerve**

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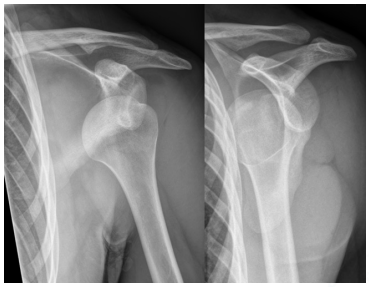

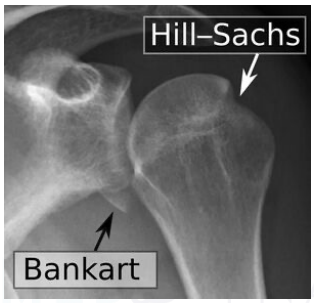

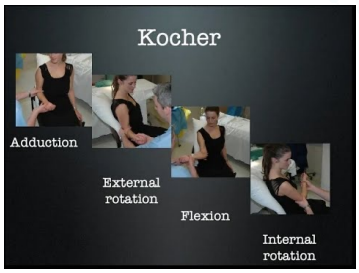

- Absence of normal contour of shoulder
- Bryant's sign – Anterior axillary fold looks elongated
- Callaway's sign – Axillary girth get increased
- Duga's test – Inability to touch the opposite shoulder by affected hand
- Displaced head is palpable below clavicle or coracoid process of axilla
- Deformity- Shoulder extended,abducted, external rotation
- Hamilton ruler test – A ruler can touch acromion process and lateral epicondyle at the same time.

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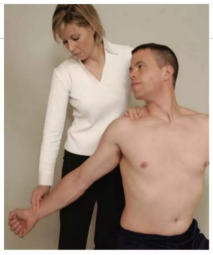
MEDSYNAPSE Where Concepts Meet Mnemonics

Thoracic outlet syndrome

Provocative tests: Adson's test, Halstead's maneuver, Wright's test, Roos test.

Adson Maneuver

- One of the most common test of TOS
- The examiner locates the Pulse.
- Rotates head towards affected/test side shoulder.
- Then ask patient to extend head while Therapist laterally rotates and extends the patient's shoulder.
- The patient is instructed to deep breathe and hold it.
- Positive Test: Disappereance of Pulse.



Wright Test or Maneuver

- palpate the Radial pulse, Hyper abduct shoulder with lateral rotation. Test can vary in siting and supine as well as with holding breathe.
- This test is used to detect costoclavicular compression.
- Modification- **Allen maneuver:** examiner flexes the patients elbow to 90* while the shoulder is extended horizontally and rotated laterally.
- The patient then rotates the head away from the test side.
- Absense of radial pulse Is indication of Positive test.

Halsted maneuver

- The examiner finds the radial pulse and applies a downward traction on the test exteremity.
- While the patients neck is hyper extended and head is rotated to the opposite side.
- Absense or disappearance of pulse is indicate positive test for TOS.

Roos test /Elevated Arm Stress Test

- Also known As Positive abduction and external Rotation(AER) , the Hands up test and EAST.
- The patient stands and abducts the arm to 90*
- Laterally rotates the shoulder and flexes elbow to 90*
- So that elbow are slightly behind the frontal plane.
- The patient open-close hand slowly for 3 minutes.
- If the patient is unable to keep the arms in the starting position for 3 minutes or suffers from ischemic pain, heaviness or profound weakness of the arm or numbness and tingling of hand during the 3 minute, the test is considered as positive.
- Minor fatigue and distress is common and taken as Negative test.

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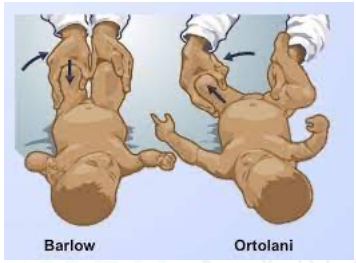

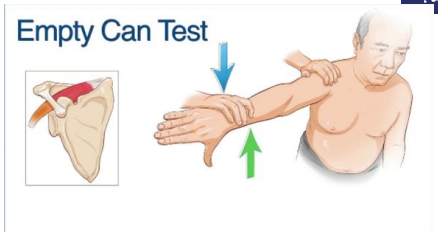

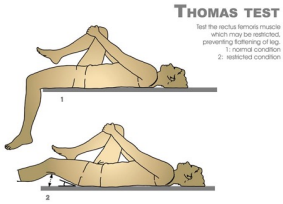

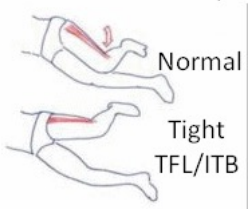

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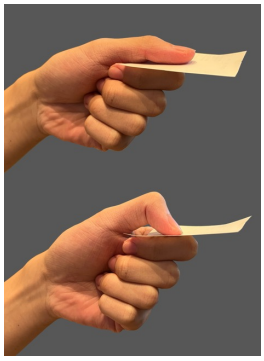

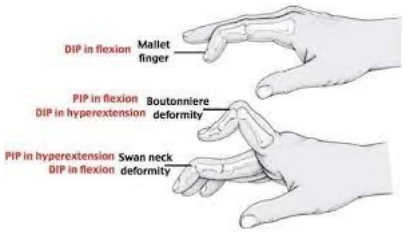

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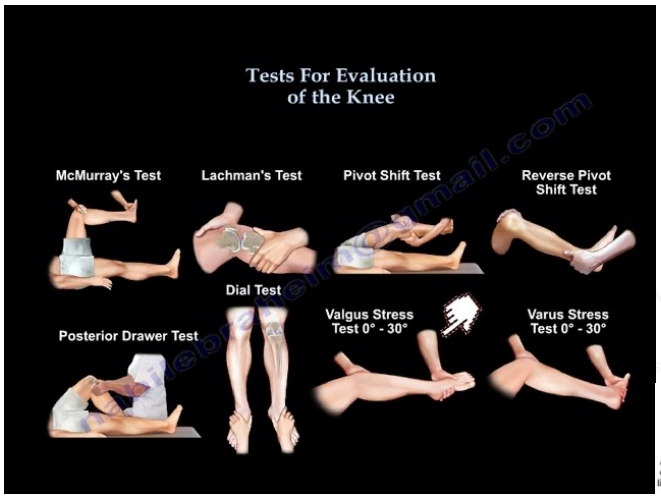

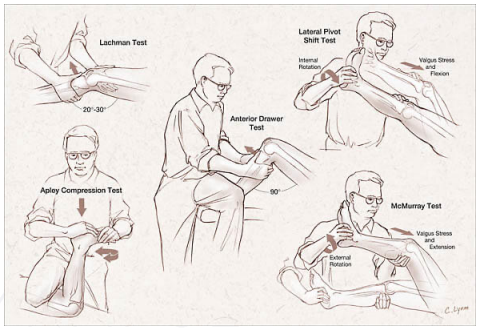

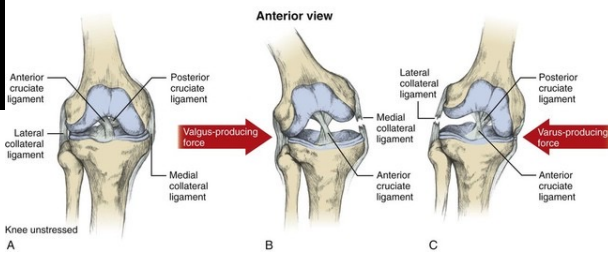

Structures	Mechanism of injury	Tests
Menisci	Rotational force	McMurray test Apley's grinding test Squat test Thessaly test
Medial collateral ligament	Valgus force	Valgus stress test
Lateral collateral ligament	Varus force	Varus stress test
Anterior cruciate ligament	Anterior tibial displacement	Anterior drawer test Lachman test Pivot shift test
Posterior cruciate ligament	Posterior tibial displacement	Posterior drawer test Sag sign

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Named UL fractures

Colle's fracture: Fracture of the distal radius with dorsal angulation of the distal bone fragment.

Smith's fracture: Reverse Colles' fracture. Fracture of the distal one-third of the radius with palmar displacement.

Barton's fracture: Intra-articular fracture of the distal radius.

Galeazzi fracture-dislocation: Fracture of the lower third of the radius and subluxation of the distal radio-ulnar joint.

Monteggia fracture-dislocation: Fracture of the shaft of the ulna with dislocation of a proximal radio-ulnar joint.

Rolando's fracture: Intra-articular comminuted fracture of the base of the first metacarpal with a T or Y configuration.

Chauffeur's fracture or the Hutchinson fracture: Fracture of the radial styloid.

Essex–Lopresti lesion: Fracture of the radial head with disruption of the interosseous membrane and distal radial ulnar joint ligaments.

Nightstick fracture: Isolated fracture of radial or ulnar bone.