fracuters of UL

1) Salter and harris classification for fractures in children

Grade 1: the whole epihysis id saperated from the shaft , dignosed clinically more than radiologically

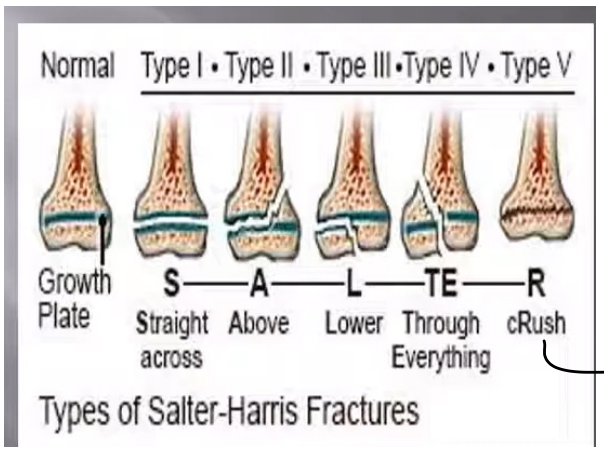
Grade 2: the epiphysis is diplaced carrying with it a small triangular metaphysial fregment called (Thurston-hilland sign) 🚩 The most common

Grade 3: sepration of part of the epiphysis

Grade4: separation of part of the epiphysis with a Metaphyseal fragment

Grade5: crushing part of epiphysis

Grade6 : bruising f the epiphysis (Rang)



صعبة نشوفها بالـ x-ray

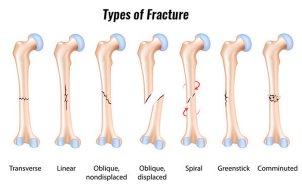
Fractures : discontinuation characterized by swelling, tenderness, cripitation and pathological movment

Anatomically classifed 3 sites:
1. metaphyseal
2. disphyseal (shaft)
3. epiphyseal

or according to pattern:

CLASSIFICATION

Based on fracture pattern
1. Transverse
2. Oblique
3. Spiral
4. Comminuted → more than 2-3 fragment at fracture side
5. Segmental
6. Stellate
7. Butterfly



or Can Be classified fracture with displacment or without

Clavicular fracture:

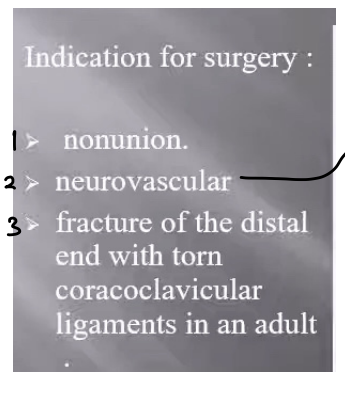
One of the most common

Rarely to need open reduction or fixation

Cause: 94% direct injury , 6% fall on out streatched hand

ttt: sling or figure of 8 bandages and immbolization for 6-8 weeks

Complications: shortening of the clavicle or deformity

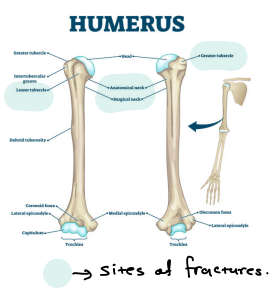


4 Angulation > 2 degress
5 Shortening more than 2 cm

Subclavin A. or Brachial Plexus is injured

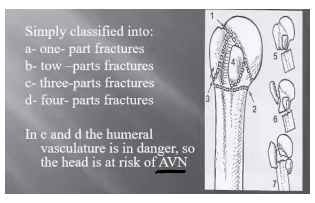
Fracture of the proximal Humerus:

Causes: Minor truma or falling down or osteoporosis in old age



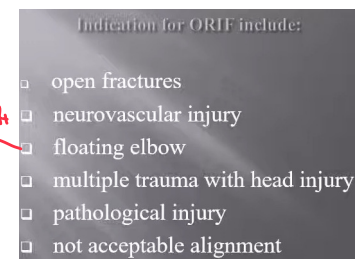
→ sites of fractures.

Neers classification:



TTT: operative or non operative
- U shaped cast
- Sling

↓
- Closed reductiom percutaneous pinning
- Open reduction internal fixation
- Intermedullary nailing (مسمار نخاعي)
- Arthroplasty



fracture at Heumeral shaft + Distal radius or ulnar.

Humeral shaft fractures:

↓ classification +

Proximal 1/3
Middle 1/3
distal 1/3

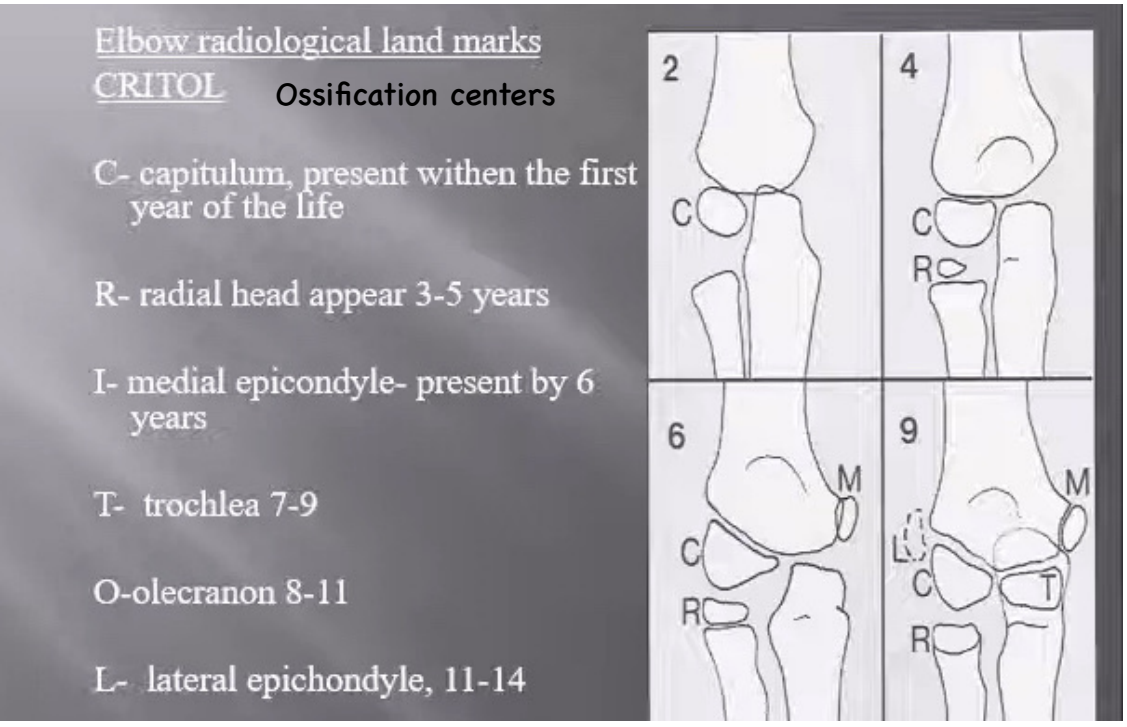
Conservative treatment (u shaped cast, hanging cast method , shoulder spica method)

Deformity :

in case of proximal 1/3 fractures when the pectoralis major pulled into adducrtion and distal fragment angulated inward

If the fracture in mid third , proximal fragment tend to be abducted due to the deltoid pull become fail and supported by other hand

If the distal 1/3 and the radial nerve is injured ⟶ Drop wrist called Holstein lewis syndrom

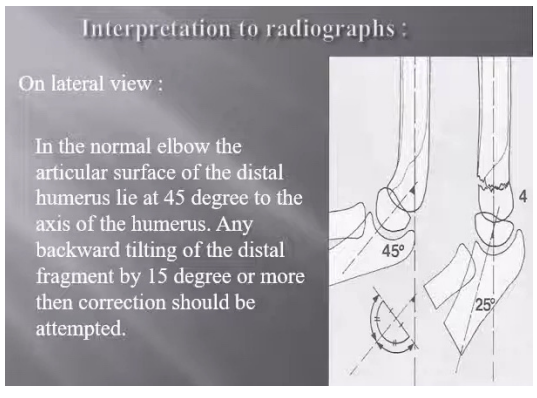


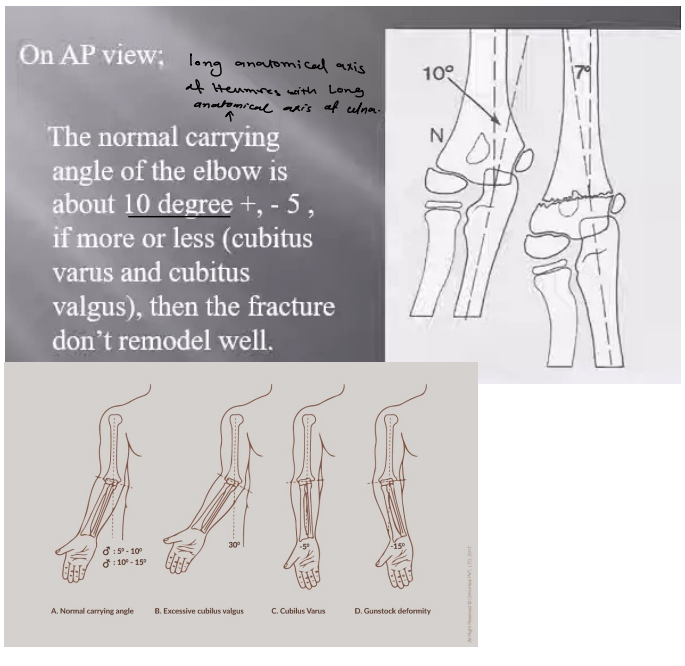
Suprachondylar fracture :

When the fracture is above the trocheal and olecranon fossa

Dignosis: examination and x-ray

In all cases we should check out (radial and ulnar pulse and neurological examination for all nerve [median , ulnar, radial]





Suprachondylar fracture 2 types : flexion and extension

2-3%. 98%

Extension type : go for close reduction with percutaneous fixation

3 types:

Non-displaced = communication of medial part cause cabitus varus , treated with cast for 3-4 weeks with xray check up at 1 st week

Displaced : post. Cortex and post periosteal hinge intact deformitay in sagittal plane only , treated with closed reduction percutaneous fixation

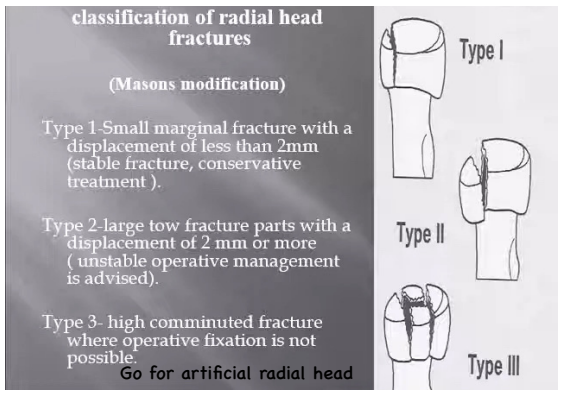
type 3: displacement in 2-3 planes

Treated with closed reduction percutaneous fixation Or open reduction if needed

Radial head fractures :

Cause: direction of the force or falling down on out stretched hand

S/S : swelling , pain , no supination or pronation and ecchymosis



Forearm fracture:

Contain 2 bones : radial and ulnar

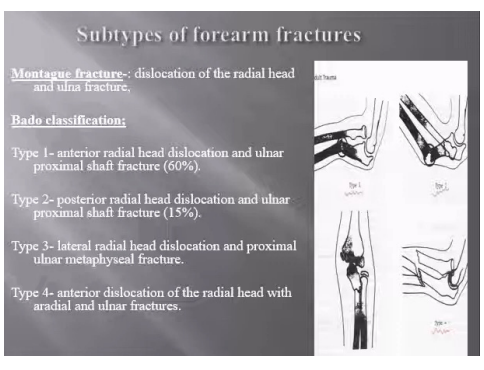
Bound together by: interosseous membrane , anular ligament , radiounular ligament ,TFCC , bundel of sticks , a linked parallelogram

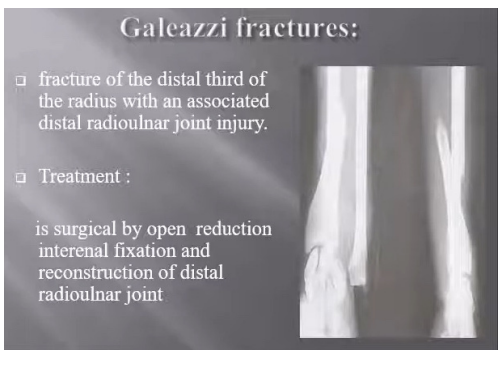
Medial part of radius and ulnar	Radial head and olecranoun	Distal part of ulna and radius	Articulation of ulnar head with wrist

Fracture in Proximal , midlle , distal 1/3

If the fracture in one level its unstable and need fixation by cast

But in adult if the fracture in both bone need to be fixed by plate and screw





Distal radius fractures:

17.5 % of adults fracture

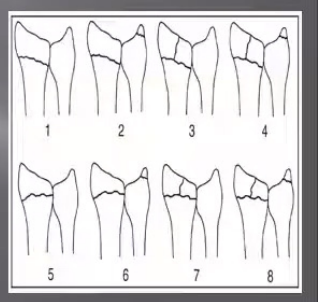
More common in females (3:1)

In young age cause is high energy mechanism and for older pts the cause is low energy mechanism

In 50% the fracture is intraarticular

Frykman classification

- Type I: transverse metaphyseal fracture
- Type II: type I + ulnar styloid fracture
- Type III: fracture involves the radiocarpal joint
- Type IV: type III + ulnar styloid fracture



- type V: transverse fracture involves distal radioulnar joint
- type VI: type V + ulnar styloid fracture
- type VII: comminuted fracture with the involvement of both the radiocarpal and radioulnar joints
- type VIII: type VII + ulnar styloid fracture

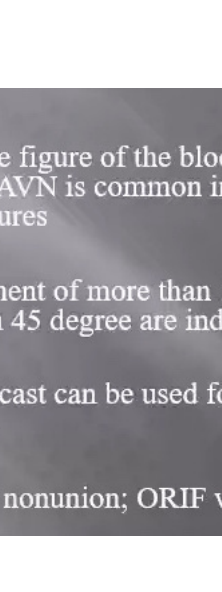
Eponyms:

- Colles fracture: Dorsal displacement of the distal radial fragment
- Smiths fracture: Volar displacement of the distal radial fragment
- Dorsal Barton fracture: Dorsal radial rim
- Volar Barton fracture : Volar radial rim
- Chauffeurs fracture: Radial styloid

- Evaluation- through neurovascular examination should be carried out.
- The median nerve is the most commonly injured and primarily neuropraxic.
- Distal radio-ulnar joint injury with an irreducible joint is usually due to extensor carpi ulnaris tendon entrapment.
- Reduction is closed and always reverse the mechanism

Radiographic evaluation:

- On the lateral view normal volar tilt is 11 degree.
- On PA view the normal radial length is 12mm.
- Radial inclination is 23 degree



Criteria for an acceptable reduction:

- palmar tilt less than 10 degree
- radial shortening less than 2mm
- change in the radial inclination angle less than 5 degree
- less than 2 mm articular stepoff.

In case of a non acceptable close reduction after 3 trials open reduction with a various types of fixations can be used.

Complications

* malunion
* medial nerve lesion
* sudeks atrophy/ complex regional pain syndrome
* stepoff associated radiocarpal arthrosis
* scaphoid fracture

Scaphoid fracture:

- usually present as a pain in the snuff box
- initial x-ray sensitive 64%
- if x –ray is normal and there is a high suspicion
- x-ray should be repeated after 10-14 days
- if its still negative CT scan or MRI can be used.
- A delay in the diagnosis of more than 28 days is associated with 45% of nonunion.

* Due to the figure of the blood supply of the scaphoid AVN is common in waist and proximal pole fractures
* Displacement of more than 1mm and angulations of more than 45 degree are indicative for surgery.
* Scaphoid cast can be used for non displaced fractures.
* In case of nonunion; ORIF with grafting .

Thumb metacarpal fractures

Three major types:

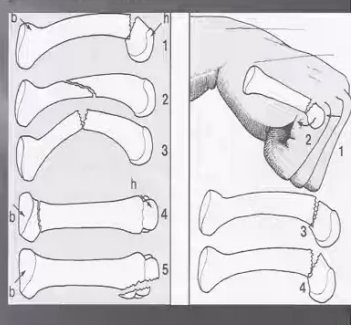
- Bennetts fracture intraarticular.
- Rolandos intraarticular fracture, either T or Y or comminuted.
- Extraarticular fractures either transverse or oblique.

Close reduction with casting should be tried otherwise ORIF for unstable fractures

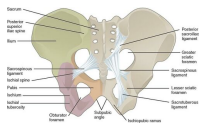


Metacarpal fractures:

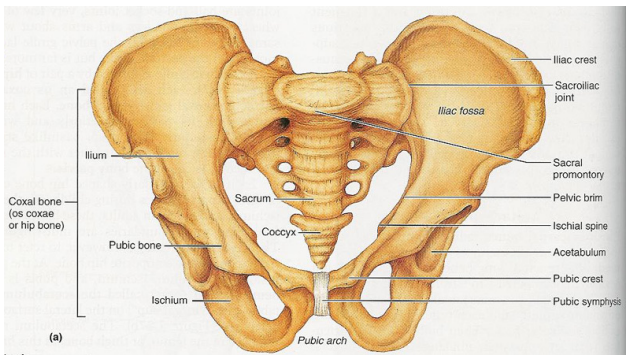
According to the anatomical distribution of the metacarpal bone.



Fractures of lower extremity:

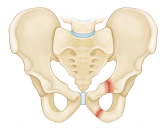


Pelvis :



The sacroiliac joint is strong and it's not easy to be dislocated

The pelvic ring if **broken at 2 levels** , the pelis may be freeto open out or displace proximally (the **isolated fracture** doesn't have this tendency



Pelvis protect interal organs as: UB , uterus, rectum and blood vessels

The fracture occur due to high energy truma

Mechanism of injury
- AP compression.
- Lateral compression.
- Vertical shear.
- Combination.

AP compression
- Frontal collision between pedestrian and acar.
- Innominate bone or pubic rami are fractured or externally rotated.
- Disruption of symphysis pubis. Open book.
- Sacroiliac ligament torn.
- Symphsis pubis disruption mor 2cm mean unstable fracture.
- Displacement of sacroiliac joint mean instability.
- Need surgical fixation

Lateral compression.
- Side to side compression.
- Pubic rami are fracture.
- Sacroiliac strain.
- Fracture ilium or sacrum.
- If the sacroiliac joint is displaced mean unstable .

Vertical shear.
- Innominate bone in one side is displaced vertically.
- Fractur pubic rami and sacroiliac joint on the same side.
- Sever injury .
- Unstable.
- Soft tissue injury and retroperitoneal hematoma.

Urogenital diaphragm form the base of pelvis which is piercied by 2 membranes (Urethra and bladder) behind the pupbic bone which may injured especially **if the fracture is in pubic rami or symbsis pubis**

Rectum rarely to be injured because its protected by the sacrum PR exam is mandatory

the plevis is reach in blood supply if injured that lead to **internal hemorrhage may lead to shock** Up to 3 L

So the initial step if blood or fluid replacement with pelvis stabilisation

If the injury in sacroiliac joint the **lumbosacral trunk and sacral nerves** can be also susceptible to injury So we should perform neurological examinations

Dignosis : history (faling from height , crush injury , road accident)

Xray of pelvis , if pt is unconscious go for pelvis xray

Pelvis instability requires 2 veiw: inlet and outlet view and CT scan is more significant

Clinical feature
- Sever pain.
- Shock state.
- Canot urinate,bleeding per urethra.
- High ridding prostate.
- Tenderness and crepitus.
- Assessment of neurological stat.

Iv urogram if there's heaematuria

Treatment: first Shock management (ABC) then stable or not if not go for sling or external fixator

The definitive treatment depends on the type of fracture:

A) stable fracture

B) rotationally unstable but vertically stable

C) rotationally vertically unstable

Early managment
- ATLS policy.
- Fixation by compression belt or external fixator.
- All stable fracture need 4-6 weeks rest.
- May use traction.
- Walking with crutches for few weeks.

- Open book with 2cm diastasis can treated by rest for 6 weeks with compression belt.
- More diastasis need external fixator.fo12 weeks.
- Pubic rami fracture treated by bed rest

- Vertical shear fracture treated by;
1. External fixator.
2. Symphisis pubis plating.
3. Sacroiliac screw.

complication
- Acute as bleeding ,urological injury.
- Chronic pain due to sacroiliac joint injury.
- Neurological injury

Types

① Avulsion fracture: piece of bone is pulled by violent muscle contraction, due to sport

Pulled by
- ASIS by sartoriuos.
- AIIS by rectus femoris.
- Piece of pupis by adductor longus.
- Piece of ischium by hamistring.
- Treated by rest,ice and NSAIDS

② Direct fracture: by direct falling down
May affect : ischium , iliac, wing
Treated: rest , analgesia, walking with aid

③ Stress fractures : minimal truma can cause fracture in a weakened bone as osteoporotic bone or metastatic bone cancer ,pubic rami is the common affected bone , quite painless

Coccygeal injury :

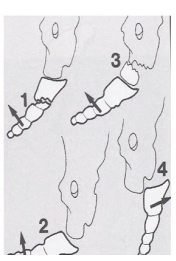
Fracture occur when the pt fall in **seated position, position against hard surface**

Local pain in sacrolical are , pain during deification or sitting

Coccygeal pain may also be caused by
- ❑lumbar disc prolapse
- ❑pelvic inflammatory disease
- ❑chordoma and other tumors
- ❑coccygodynia

The main patterns of injury

fracture of the coccyx with a varying degree of anteversion.
(1) Anterior subluxation of the coccyx.
(2) Anterior displacement of the coccyx secondary to a (3) fracture of the end piece of the sacrum.
(4) Rarely posterior subluxation of the coccyx



Dignosis :

History and by exam local tenderness

By PR exam may show displacement

Plain x-ray

Treatment:

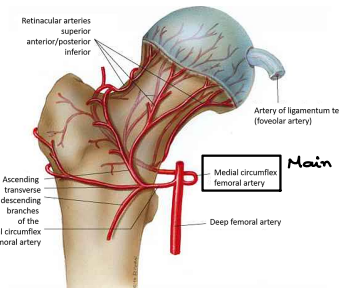
1- Conservative: avoid sitting on hard surfaces

2- avoid constipation , fiber diet

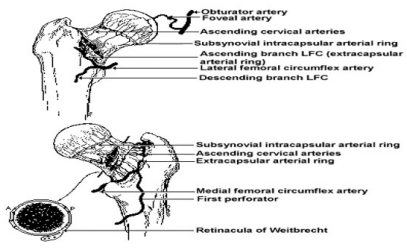
3-if syptoms don't improved by 1,2 go for US or wave diathermy or inject painful area by long acting local anastheia as (2% bupivacaine hydrochloride)

4- if all failed go for surgical management

Fractures around head of femur:



Rich in Blood supply so if fractured Lead to AVN



Affect elderly pt if male (industrial trauma) if female due to osteoporosis and osteomalacia after menopause

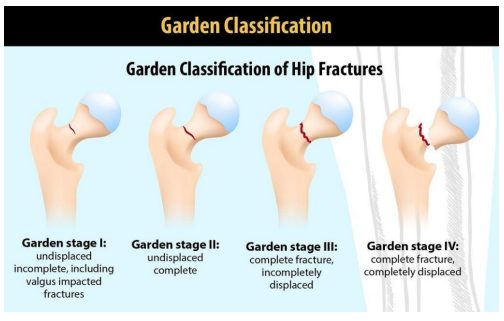
- ❖Usually a fall on the side is the commonest cause.
  Diagnosis: - tenderness over the femoral neck
  -pain is produced by rotation of the hip
  - pain on heel test
  -inability to bear weight after a fall.
  -external rotation of the limb with a little shortening.
- ❖ look for any fragmentation or cortical discontinuity.
- ❖If doubt persists CT scanning well be helpful.

Intracapsular fracture of neck of femur high tendency for AVN due to

1) rich blood supply
2) old age with fragile bone so the fixation if difficult and unstable
3)delusional hematoma by synovial fluid and compressed fracture side so increase intraosses pressure so difficult diffusion and prefusion to

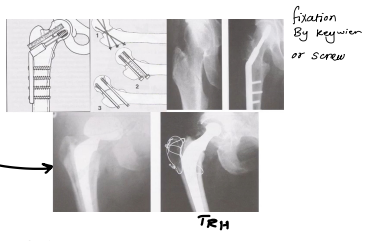
Fractures of the femoral neck:
Collum femoris fracture can be either
*subcapital
* Transcervical
*cervucobasillar





Garden classification of the femoral neck fracture
which takes into account the disturbance of the weight bearing trabecula of calcar femrale;
* Garden type 1 : the inferior cortex is not broken but the trabecula is angulated.
* Garden type 2: the fracture is complete , the inferior cortex is broken , the trabecula line is interrupted but not angulated.
* Garden type 3: the fracture line is complete and there is rotation of the femoral head and the fracture is slightly displaced.
* Garden type 4:the fracture is fully displaced
Type 3 and type 4 carry the worst prognosis..

Management
* reduction and internal fixation
* hemiarthroplasty
* THR
* Conservative measures



If thr pt is not fit for surgery

Other proximal shaft fractures includes:

* Intertrochanteric fracture
* Peritrochanteric fractures
* Subtrochanteric fractures

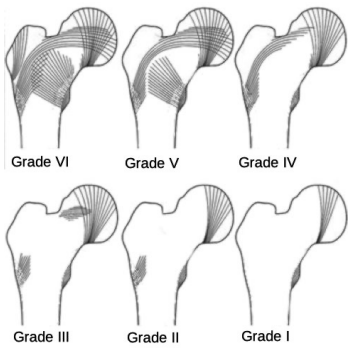
Between the line of lesser trochanter and greater trochanter
Extracapsular fracture (4 times more than femoral neck)
Also occur through cancellous bone which have excellent Blood supply
The fracture will completely heal if untreated
Stablization within 8 weeks and weight bearing within 12 weeks

Management

* reduction and internal fixation
* hemiarthroplasty
* THR
* Conservative measures

Snighs index of osteoporosis

(A) Grade6 all trabecula are preserved
(B) Grade 5 the structure of principal tensile and principal compressive trabecula are attenuated Ward triangle is prominent
(C) Grade 4 the principal tensile trabecula is greatly reduced
(D) Grade 3 there is a break in the continuity of the principal tensile trabecual opposite the great trochanter, this grade indicates definite osteoporosis.
(E) Grade 2 only the principal compressive trabecula stand out prominently and the others are resorbed.
(F) Grade 1 even the principal compressive trabecula are greatly reduced



Subtrochanteric fracture:

Occur 5cm distally to lesser trochanter may extended to intratrochanteric area
Mechanism: direct truma in eldery pts with minor truma and inyoung age due to high energy truma
problems that noted in treating malunion or delayed union and nonunion



It is important to emphasize that the farther down the shaft of the femur the primary fracture line is located the greater is the incidence of delayed union and implant failure.
Stable subtrochanteric fractures are those in which it is possible to reestablish bone-to-bone contact of the medial and posterior femoral cortex anatomically.

Femoral shaft fracture:

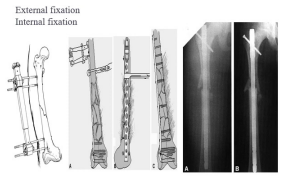
Due to major truma (after 250NM the fracture occur and need additional 183Nm to dissipated on the soft tissue
Raerly to be comminuted or associated with sever tissue damage

- Femoral shaft fractures can be categorized geographically as proximal third, midshaft, distal third
- Because the isthmus of the medullary canal usually is located in the midshaft, distal-third fractures also are called infraisthmal fractures.
- Fractures also can be classified according to the geometry of the major fracture line: transverse, oblique, spiral, segmental

Dignosis
History
May blood loss reach 1200 ml so go for hemodynamic stability

Treatment:
Non operative: Traction (temporarily or definitive)
Or skin traction or skeletal traction

Operative



Complications of femoral fracture:

- Origami shock
- Fat embolism
- Compartment syndromes
- Slow or delayed union
- Nonunion
- Malunion (ie. 25 degree..)
- Limb shortening
- Knee stiffness
- Infections

Truma around the knee:

The knee joint is composed of three bones
femur
tibia
patella

- Static stabilizers of the knee (meniscus, ACL,PCL, MCL,LCL…etc)
- Dynamic stabilizer of the knee (muscles)

-Intraarticular fracture= articular CT
-Benign looking malignant fractures

As a rule in all intraarticular fractures 2mm of articular stepping and obvious separation of the fragments are not acceptable.

Distal femoral fracture:
- lateral condyle
- medial condyle
- epicondyle

Patellar fracture

Can be classified according to the configuration of the fracture
-Transverse
-comminuted
- upper pole
- lower pole

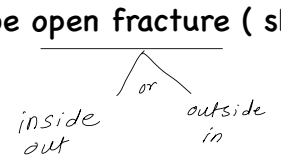
good alignment of the patellar reduction is very necessary for the function of the quadriceps mechanism, otherwise patellofemoral arthritis will be the result and permanent anterior knee pain will take place.

Acceptable reduction criteria :
- articular stepping of less than 2 mm .
- rotation of less than 45 degrees
- separation of less than 4-5 mm

- when reduction meets all these criteria a long cylindrical cast can be made in extension.
- Otherwise open reduction internal fixation with a tension band.
- Tibial platue fractures
- Medial condyle
- Lateral condyle
- Any obvious displacement or articular stepping of more than 2 mm are not acceptable, and should be corrected surgically, otherwise cast immobilization can be done.

Tibial shaft fracture:

Due to tersonial stressed transmitted through the feet or due to direct violence
A third of tibia is subcutaneous so the fracture tend to be open fracture (skin is readily split)



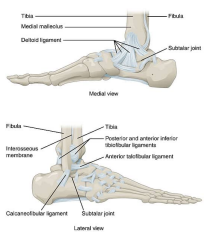
Even the facture is open a long leg plaster is enough
Leg elevation for 2-3 days with post NV follow is important with non weight bearing
X ray every week to check displacement

In adults

The acceptable alignment criteria are
-10 degrees of AP angulation
-10 degrees of valgus and varus
-Less than 20% of opposition

Fractures around the ankel joint :

The ankle joint is a mortise and ten on joint ; the talus is held in the mortise on the medial side by the deltoid ligament and on the lateral side by the lateral ligaments.
The ankle is like a ring; if this ring brakes from one side the injury is stable and conservative treatment is indicated but additional breaks in the ring lead to farther instability and often surgery is required.



Potts classification of the ankle fractures

* Degree one is one malleoli fracture
* Degree tow is tow malleoli fracture (bimalleolar fracture)
* Degree three is the posterior rim of the tibia is fractured (trimalleolar fracture).

Management : open reduction internal fixation by malleolar screw
Lateral malleouls fracture by plate screws
Mortise view to show relation between talus and tibia
Look for medial clear space normally 4-5 mm if more so there's ankle instability

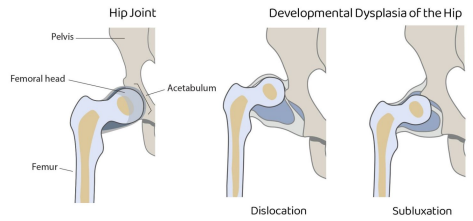
Foot fracture: affect 5th metatarsal bome , calcaneus , talus , navicular or metatarsal bones

Development hip dysplasia: = congenital hip dislocation

Malarticulation between acetabulum and femoral head
Acetabular or femoral head abnormalities still unknown but both are involved
1/1000 per live birth
Garils are common than boys (7:1)
Left side more affected than right side
20% are bilateral

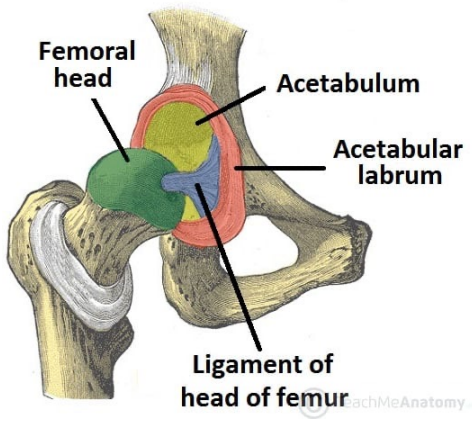
Aetiology and pathogenesis

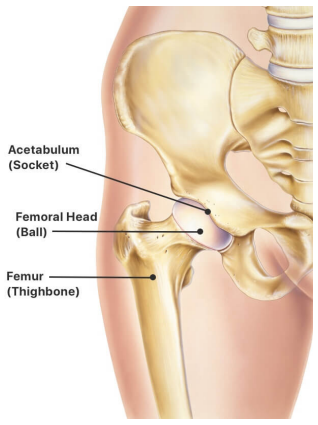
- Genetic factor:- as associated with hyperlaxity syndrome.
- Hormonal factor:- maternal origin(less in premature baby).
- Intrauterine malposition:- breech with extended leg packaging disorder.(plagiocephaly,torticollis,metatarsus adductus).
- Post natal factor :-swadlle and wrapping.



Abnormalities:

Hip joint capsule is stretched and redundant
The cartilaginous socket of acetabulum is shallow and anteverted
Ligamentum teres is elongated and hypertrophied
Acetabular socket filled with fibrofatty tissue prevent reduction
Labrum and capsule pushed into the socket
Femoral head dislocated posteriorly

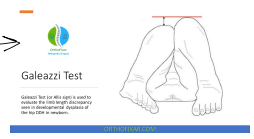




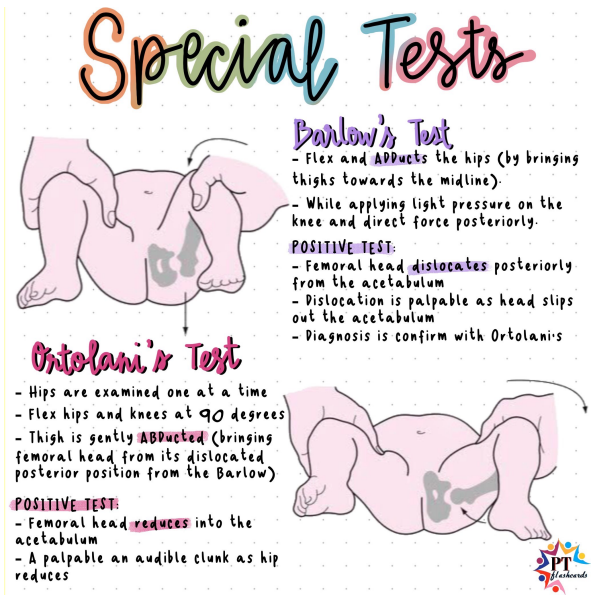
Clinical pictures:

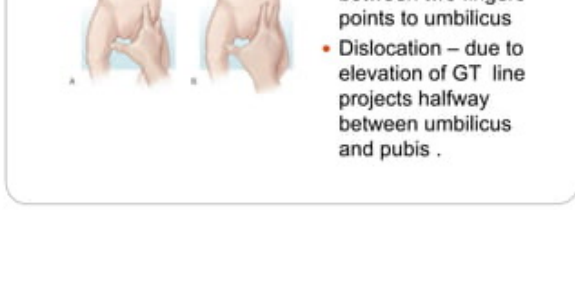
1) +ve family history considers high risky baby
2) Asymmetrical gluteal fold
3) leg is slightly short (Galeazzi's sign) and externally rotatd
4) difficulty in napkin application
5) wadding gait
6) associated packaging disorders







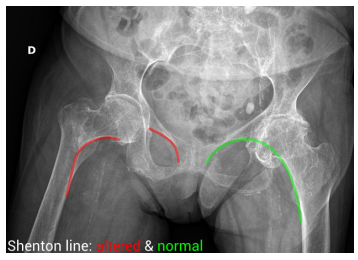




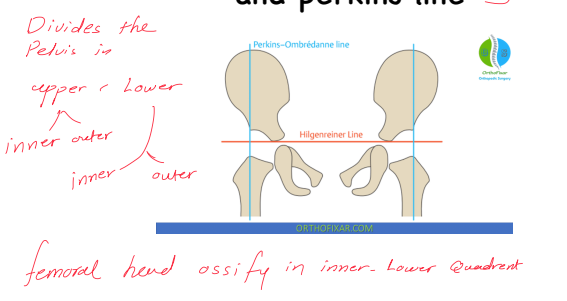
Dignosis:

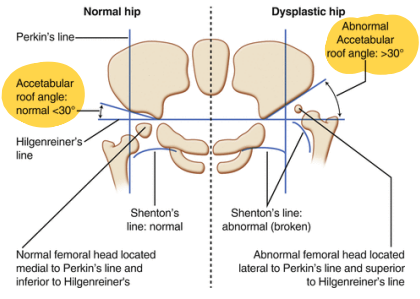
Xray and US
Graf-Us used in the first 4months
Xray used after 4months which show femoral head ossification

1) Interrupted shenton line



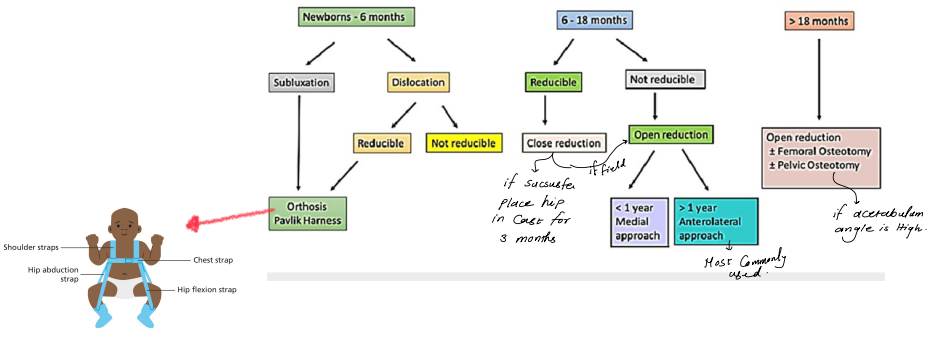
2) Hilgenreiners line and perkins line





Treatment:

Depends on age

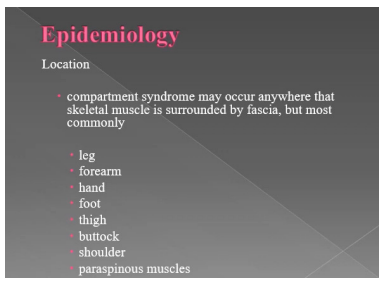


complication

- Fauiler of reduction.
- Avascular necrosis.
- Early osteoarthritic changes.
- Chronic disability and pain.
- Later for hip replacement

Compartment syndrom:

Muscles and blood vessels and neves surround by strong membrane called fascia
This fascia doesn't exapsnd so when there's a muscle swelling or B.V injury all lead to swelling and increase in volum which lead to increase the pressure inside the compartment that prevent blood flow to rhe compartment
Which lead to cell death and if untreated lead to irreversible ischemia and amputation
So ischemia of muscles , nerve and blood vessels injury



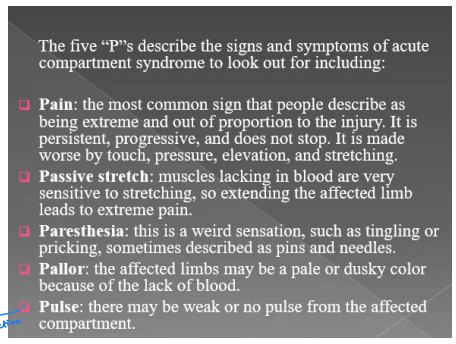
There's 2 Types : acute and chronic

Acute :
Causes / post major or minor injury
Fracture , crush injury , severely brusied muscle
From waring cast or thight bandage , from alchol and drug abuse

Chronic also called exertional :
Causes/ excersis, repetitve motion or truma
Common to occur in age less than 40 years
The reisk increased with increasing activities (swimming , tennis ...)

Syptoms :
sever pain not improved with elevation or medications and increase with passive stretching
Thightness and tingling or burning sensation at the skin of affected area
numbness and paralysis in advanced acute compartment syndrome (sign of permennt damage)

In chronic cases : pain and cramping during exercise and when stop disappear in 30 min
Trouble movment , numbness adn bulge affected muscle



كل ما زادت مدة التدريب
وحدته يزيد الوقت
إلى الأعراض بتحقق منه

Dignosis :
History and examination (s/s and squeeze the injured area to determine the severity of pain)
Measurment of compartment pressure (done firstly to protect the pt from necrosis)

Normally less than 30 mmHg
if >30 mmHg → Compartment syndrom

or Diastolic Bp - Compartment pressure
if <30 mmHg ⇒ Compartment syndrome

Treatment:
Operative or non operative:

Non operative :
1- Observation if distolic differantial pressure > 30 or presentation not consistent with CS
2- bi-valving the cast or if there's dressing remove it (for pain and swelling)
3- Ankel splinting between neutral and resting plantar flexion(37 degree). that decrease pressure
4- Hyperbaric oxfen therapy that increase the o2 diffusion gradien

Fasciotomy
Indication :
Clinically and by exam it's compartment (5 p's)
distolic differential pressure <30

pre and post op
anasthesia

Contraindications: missed compartment syndrome

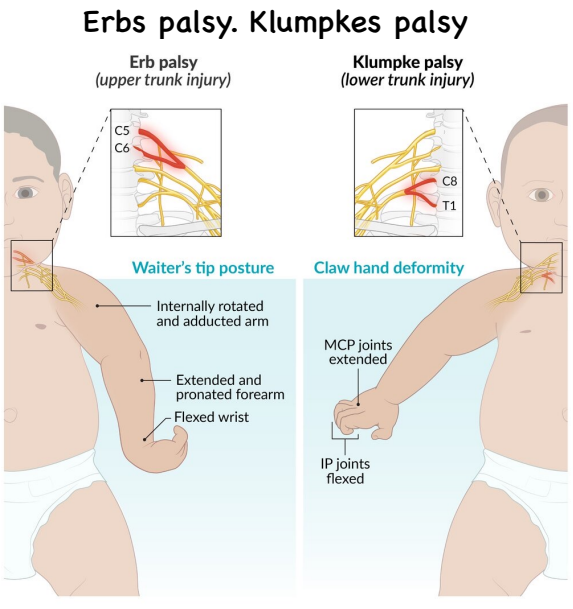
In pediatric should be aware of it because they arent able to vebalixe feelings (if suspecion the compartment preesure should be measure under sedation)
In Hemophiliacs ots sould do factor 8 replacment befor measure compartment pressure

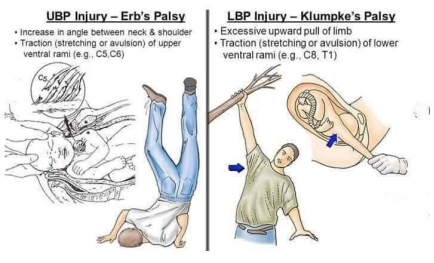
How to prevent compartment:
In acute cases early dignosis and management prevent complications
In pt with cast and there's pain or swelling even after medication go for doctor
In chronic cases Wearning comfortable shoes, altering gait pattern in runners , improve flexability (decrease the severity)

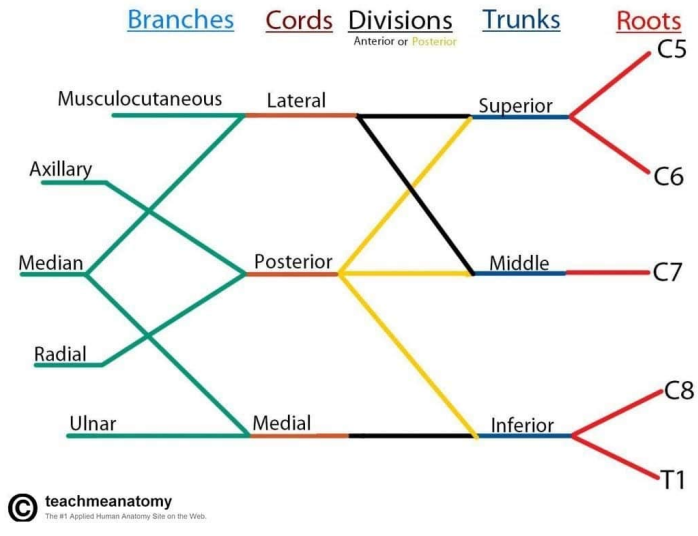
acute cases need immediately fasciotomy if delayed or missed lead to permanent damage of muscles and nerves within hours and go for amputation

Chronic compartment isn't an emergency case but no excercise when there's pain
To prevent muscle and nerve damage

Brachial plexus injuries:







Provide movements and feeling to arm and hand

Occurs during birth due difficult vaginal delivery which cause stretching injury and rarely from CS

1to 4 per 1000 live births and the frequency decreased by improvement obstetric care
Often affect Rt side and bilaterally

risk factors

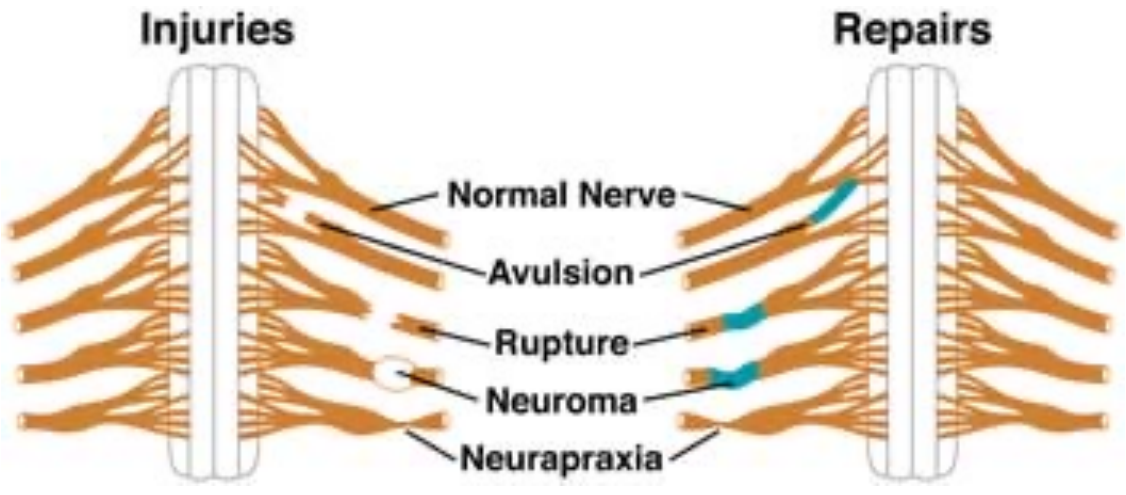
- large for gestational age (macrosomia)
- multiparous pregnancy
- difficult presentation
- shoulder dystocia
- forceps delivery
- breech position
- prolonged labor

Classification:

Group1 : Duchenne erbs palsy –> c5 and c6 paralysis of deltoid and biceps , intact wrist and digital flexion and extension
Group 2: intermediate paralysi –> c5-c7 paralysis of deltoid , biceps wrist, digital extension and digital flexion
Grade3 : Total palsy –> c5-T1 , flail extremity without Horner's syndrome
Grade4 : Total brachial plexus palsy with Horner's syndrome –> c5-T1 , flail extremity with Horner's syndrome

Common terminology	Root/nerve deficits	Typical posture
Erb's palsy	C5–C6	Shoulder Adduction, Shoulder internal rotation, Elbow extension and forearm prona-tion (Erb's posture)
Extended Erb's palsy	C5–C7(or C5–C8)	Erb's posture with wrist flexion ("wait-ers tip")
Pan plexus without Horner syndrome	C5–T1	Flail arm
Pan plexus with Horner syndrome	C5–T1 and sympa-thetic chain	Flail arm with Horner syndrome
Klumpke	C8–T1	Paralyzed hand

Types of injury:



Presentation General

- Symptoms
  - lack of active hand and arm motion
- Physical exam
  - upper extremity exam
    - arm hangs limp at side in an adducted and internally rotated position
    - decreased shoulder external rotation
    - affected shoulder subluxates posteriorly
  - provocative testing
    - stimulate neonatal reflexes including Moro, asymmetric tonic neck and Vojta reflexes
    - pain with gentle shaking of a flail arm may indicate pseudoparalysis from infection or fracture rather than nerve palsy

Imaging

- Radiographs
  - may be useful for evaluation of clavicle or humerus fractures
  - limited utility in infant given minimal ossification of humeral head and glenoid
  - axillary view to evaluate position of humeral head if patient is older and suspicion is high for joint subluxation
- Myelography/CT myelography/MRI
  - may be used to distinguish between root avulsion and extraforaminal rupture
- EMG/NCV
  - poor reliability and often underestimate the severity of injury
- Ultrasound
  - allows for assessment of joint subluxation or dislocation

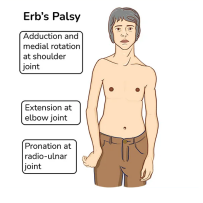
Neurapraxia: injury shocks the nerve but doesn't tear it
Neuroma : dama of some nerve fibers with scar tissue this press on the remaining healthy tissue
Rupture: nerve rupture with torn itself
Avulsion: most serious, complete torn of the nerve from spinal cord

Erbs palsy:

Most common type affect upper lesion (c5,c6)
result from lateral flexion of the head towards the contralateral shoulder with depression of ipsilateral shoulder producing traction on plexus

Occur in infants during difficult delivery

By physical exam : adducted , internally rotated , pronated forearm , extended elbon(witer's tip)



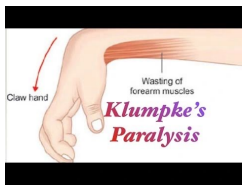
- C5 deficiency
  - axilllary nerve deficiency
    - deltoid, teres minor weakness
  - suprascapular nerve deficiency
    - supraspinatus, infraspinatus weakness
  - musculocutaneous nerve deficiency
    - biceps and brachialis weakness C6 deficiency
  - radial nerve deficiency
    - brachioradialis, supinator weakness
- Prognosis
  - best prognosis for spontaneous recovery

Klumpkes palsy:

Injury at level c8-T1 Lower trunk

- Mechanism
  - rare in obstetric palsy
  - usually arm presentation with subsequent traction/abduction from trunk
- Physical exam
  - deficit of all of the small muscles of the hand (ulnar and median nerves)
  - "claw hand"
    - wrist in extreme extension because of the unopposed wrist extensors
    - hyperextension of MCP due to loss of hand intrinsics
    - flexion of IP joints due to loss of hand intrinsics

- Prognosis
  - poor prognosis for spontaneous recovery
  - frequently associated with a preganglionic injury and Horner's Syndrome



Total plexus palsy: (c5-T1)

Total Plexus Palsy (C5-T1)

- Mechanism
  - stretch, rupture, and avulsion injury
- Physical exam
  - flaccid arm
  - both motor and sensory deficits
- Imaging
  - chest radiograph to look for ipsilateral hemidiaphragm paralysis from phrenic nerve injury
- Prognosis
  - worst prognosis

Treatment generally for palsies:
1) physiotherapy early in newborn only prevent joint stiffness
2) surgery : when no recovery for 9months

- Primary surgical treatment includes removing scar tissue and nerve grafting.
- Operative soft tissue procedures
  - latissimus dorsi and teres major transfer (Hoffer procedure)
  - pectoralis major and +/- subscapularis lengthening
  - arthroscopic release for internal rotation contractures
- bony procedures
  - proximal humeral derotation osteotomy (Wickstrom)
  - arthrodesis

Treatment - Elbow Flexion Contracture

- Nonoperative
  - serial nighttime elbow extension splinting
  - serial elbow extension casting
- Operative
  - anterior capsular release, biceps/brachialis tendon lengthening
    - indications
      - for severe, persistent contracture
    - outcomes
      - may have high recurrence rate

Prognosis

- 90% of cases will resolve without intervention
  - spontaneous recovery may occur for up to 2 years
- prognostic variables for spontaneous recovery
  - favorable
    - Erb's Palsy
    - complete recovery possible if biceps and deltoid are anti-gravity by 3 months
  - poor
    - lack of biceps function by 3 months
    - preganglionic injuries (worst prognosis)
    - Horner's syndrome (ptosis, miosis, anhydrosis)
      - less than 10% recover spontaneous motor function
    - C7 involvement
    - Klumpke's Palsy

Rickets :

لين العظام

Bone problem affecr children
Occurs when bone don't form correctly
So the bone become hurt and easy to bend or break

Rickets risk factors

- premature birth (low levels of vitamin D, calcium, and phosphorus);
- limited sun exposure (especially in high and low latitudes);
- hereditary metabolic diseases (for example, X-linked hypophosphotemic rickets);
- darkly pigmented individuals;
- infants born to vitamin D-deficient mothers;
- renal (kidney) diseases that affect calcium and phosphorus absorption; and
- nutrition -- suboptimal calcium and phosphorus intake or low vitamin D intake (seen in certainvegan diets due to avoidance of milk/dairy products). Soy milk and breakfast cereals fortified with vitamin D are helpful.

Types

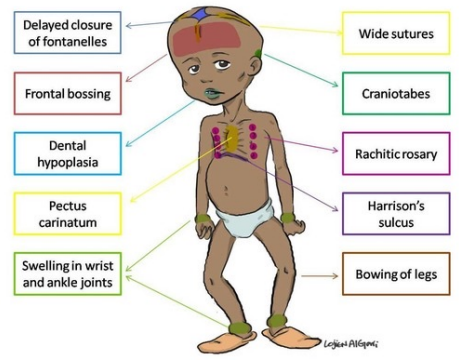
- Vitamin D-related rickets
  - Vitamin D deficiency
  - Vitamin D-dependent rickets
    - Type 1 (25-Hydroxyvitamin D3 1-alpha-hydroxylase deficiency)
    - Type 2 (calcitriol receptor mutation)
- Hypocalcemia-related rickets
  - Hypocalcemia
  - Chronic kidney failure
- Hypophosphatemia-related rickets
  - Congenital
    - Vitamin D-resistant rickets
    - Autosomal dominant hypophosphatemic rickets
    - Autosomal recessive hypophosphatemic rickets
  - Hypophosphatemia (typically secondary to malabsorption)
  - Fanconi's syndrome

- Secondary to other diseases
  - Tumor-induced osteomalacia
  - McCune-Albright syndrome
  - Epidermal nevus syndrome
  - Dent's disease

symptoms and signs

- bone pain or tenderness
- dental deformities, delayed formation of teeth
- decreased muscle strength
- predisposition to infections
- impaired growth, short stature
- a number of skeletal deformities, including abnormally shaped skull (craniotabes), bowlegs, rib-cage abnormalities (rachitic rosary), and breastbone, pelvic, and spinal deformities.
- Occasionally, in very severe rickets, patients may develop even more serious signs and symptoms associated with very low levels of calcium or phosphate. These might include tetany (involuntary muscle contractions) or seizures.

Regardless the type the cause of rickets is vit D , Ca or phosphate deficiency



Osteomalacia which is nutritional rickets

Is due VitD deficiency (fat soluble vitamens need for bone , teeth formation and ca absorption)
Some food contain vit D (Salt water fish , salmon ...)
And also synthesis by skin cells in response to sunlight exposure
Infants and children have more risk to develop it specifically the dark skinned children an Breastfeeded children who born to vit D deficiency mothers
Treatment; vit d , ca , ph replacement and Dite rich in vit D , correction of deformity if not corrected by replament treatment , sunlight exposure, taking fish oil

- The Office of Dietary Supplements (ODS) recommend a daily intake of: (of vit D)
- 400 IU (10 mcg) for infants aged 0–12 months
- 600 IU (15 mcg) for people aged 1–70 years
- 800 IU (20 mcg) for those above 70

Hypophosphatemic rickets :

Painful , soft and pliable bone
Caused by congenital defect in x linked defect (the kidney loss control for ammount of ph excreted in urine)
The pts body absorbe ca and ph from gut but the kidney releas it in urine
Syptoms are abvious by 1 year of age

Renal kidney Rickets :

Same as hypophosphatmic rickets caused by kidney disorders
Diseased kidney —> no contol for electrolytes and release it in urine as(ca, ph)
Syptoms similar to sever nutritional rickets

Dignosis :

history and examination , x-ray
Blood test : ca and ph(normal or decrease) , ALP increased
ABG

findings =

- Widening or abnormally shaped metaphysis (most actively growing part of the bone below the growth plate)
- Obvious bowing of the femurs
- Osteopenia (bones which are not as dense, a sign of decreased mineralization)
- Rib flaring (rachitic rosary)
- Multiple fractures at different healing stages
- **A bone biopsy**: This can confirm rickets

Preventing rickets

- Rickets can easily be prevented by eating a diet that includes vitamin D and calcium.
- spending some time in sunlight.
- if necessary, taking vitamin D supplements.

prognosis

- Outcomes for children with nutritional rickets are excellent, especially if diagnosed early.
- Appropriate supplementation with calcium and vitamin D will lead to healing of the bony defects within days to months.
- Severe bowing, seen in longer-standing cases of rickets, may also resolve over a number years without requiring surgical intervention.
- In patients with very advanced disease, however, the bony changes may be permanent.

Osteporsis:

dz caused by reduction of bone mass per unit of volume

Osteomalacia : caused by defect in organic matrix mineralization

Osteoporosis : low bone mass + structural deterioration of bone tissue which lead to bone fragility and susceptibility to fracture (commonly in spine , hip , wrist)

Silent until fracture occur F: M 4:1

Significant morbidity and mortality is associated with this condition. The general clinical features of osteoporosis include fractures of vertebrae (lower thoracic and upper lumbar), wrist, hip, humerus and tibia, which can occur suddenly with trivial movements, as well as poor posture due to spinal deformities leading to mechanical pain.

Pathophysiology

- Osteoporosis is characterized by loss in both cortical thickness and in number and size of the trabeculae of cancellous bone.

Classification of Osteoporosis

	Type I (Post menopausal)	*Type II (Senile)*
Age group	Post menopausal (highest incidence in 50-70 years old)	>70 years old
Bone affected	Almost exclusively trabecular	Trabecular > cortical
Bones fractured	Distal radius and vertebral	Hip and pelvis
Effect on calcium	Net negative change in calcium levels because of decreased intestinal absorption and increased urinary excretion of calcium.	Poor calcium absorption
Effect on Vit D	Reduced circulating levels of total (but not free) 1,25 dihydroxyvitamin D	-

Osteoporosis can be classified into
1) idopathic
2) associated with disorders with knowm pathophysiology
3) associated with disorder without known pathophysiology

Cases and ridk factors :
1) age : the older the more risk
2) gender: female in menopause more risky due to low level of estrogen
3)Genetics: can be inhereted
4) Body type: small, slender more risky
5) Medications as phenytoin
6)Thyroid problem
7) low Vit D and ca
8) lack of exercise and bed rest cause weak bones
9) Smoking and alcohol

Lifestyle	Medications
• Sedentary lifestyle • Caucasian woman of northern European descent • Smokers • Low body weight • Low protein intake • Heavy drinkers • Positive family history • Premature menopause • Breast feeders with low vitamin D diets	• Phenytoin (Dilantin) therapy • reduces vitamin D metabolism • Cytotoxic/antineoplastic drugs • Selective serotonin reuptake inhibitors (SSRIs) • e.g. fluoxetine, sertraline, paroxetine • Antiretroviral therapy • Cyclosporine • Furosemide • High dose methotrexate • Oversupplementation with Levothyroxine • Omeprazole • Glucocorticoids • Unfractionated heparin and LMWH • Vitamin A • Thiazolidinediones • rosiglitazone (Avandia)
Genetic Polymorphisms	**Diseases**
• Calcitonin receptor • Estrogen receptor-1 • Type I collagen alpha-1 chain (COL1A1) • osteogenesis imperfecta in adults • Vitamin D receptor • LRP5 (low-density lipoprotein receptor-related protein)	• Malabsorption syndromes • Liver disease • Hyperthyroidism • Type I diabetes mellitus • Cancer • Chronic renal failure • COPD • Rheumatoid arthritis • Sarcoidosis

Associated conditions

- fragility fractures
- direct relationship between degree of bone loss and fractures
- kyphotic deformity can arise from verteberal body fractures
- pelvic ring insufficiency fractures most often treated with bed rest and analgesia
- total hip arthroplasty with constrained components are a risk factor for fragility fractures

Dignosis :
Measurement of bone mineral density (BMD) using Dual energy xray absorpitometry (DEXA) — convert into Bone density

- BMD
absolute, patient-specific score determined from certain anatomic areas
- T score BMD
relative to normal young matched controls (30-year-old women)
- Z score
BMD relative to similar aged patients.
- Osteopenia
L2-4 lumbar density of 1 to 2.5 standard of deviations (T score -1 to -2.5) below the peak bone mass of a 25 year old individual
- Osteoporosis
L2-4 lumbar density > 2.5 standard of deviations (T score <-2.5) below the peak bone mass of a 25 year old individual

[1] T score ↓ amount of Bone you Have Comparison to amount of bone in normal population at younger people
Risk of developing fracture and need for Drug Therapy

[2] Z-Score: amount of Bone you Have in Comparison to these in your age group.

Ask for X-rays in cases of fracture
Ask for CT of the spine if vertebral fractures are likely to occur and measure bone density , look for spinal fractures and alignment
Ask for MRI : ecaluate vertebral fractures for evidence of underlying diseases as cancer , also determine if the fracture in old or new and better response by kyphoplasty or vertebroplasty

Treatment and prevention

- Nonoperative
  - lifestyle modification & vitamins
    - indications
      - calcium and Vitamin D
  - pharmacologic treatment
    - indications
      - 2008 National Osteoporosis Foundation Guidelines for Pharmacologic Treatment of Osteoporosis suggests that pharmacologic treatment be considered for
  - postmenopausal women and men >= 50yrs old with:
  - hip/vertebral fracture
  - T score between -1.0 and -2.5 at the femoral neck/spine and
  - 10-year risk of hip fracture ≥ 3% or
  - T score -2.5 or less at the femoral neck/spine.

pharmacologic agents

- calcium and Vitamin D
- bisphosphonates
- Conjugated Estrogen-progestin hormone replacement (HRT)
- Estrogen-only replacement (ERT)
- Salmon calcitonin (Fortical or Miacalcin)
- Raloxifene (Evista)
- Teriparatide (Forte

- Medications can also help with osteoporosis. Antiresorptive medications slow the rate of bone loss. Anabolic medications promote bone growth.
- For women in menopause, estrogen therapy can help prevent bone loss and strengthen bones. For women in post-menopause, bisphosphonates are the preferred treatment for osteoporosis.

Operative :

- osteoporotic vertebral compression fracture.
- femoral neck fracture.
- distal radius fracture

Prognosis

- prior fragility fracture is the strongest predictor of a future fracture from low energy trauma
- vertebral fractures
- associated with 15% increase in 5-year mortality
- associated with increased morbidity
- back pain
- loss of height
- poor balance
- respiratory compromise
- restrictive lung disease
- pneumonia

- hip fractures
- associated with 20% increase in mortality
- men have higher mortality rates following hip fractures than women
- associated with increased morbidity
- reduced quality of life
- only one third of patients with hip fractures return to their previous level of function

Congenital Talipes equinovarus = CLUB foot

Foot is 3 parts : hindfoot , midfoot, forfoot



50% of cases bilateral

1:1000 incidence per live births

M:F 3:1

Associated with : (arthrogryposis , Down, Larsons) in stiff bilateral club

EPIDEMOLOGY

- 1 in 1000 birth
- M: F: 2.5:1
- 50% Bilateral
- 20 - 30 times common if one child affected
- 1 - 4% if one parent affected
- 15 - 20% if both parents affected
- 32% in case of monozygotic twins
- 3% in case of dizygotic twins.

The deformatiy

Equinus - At the ankle joint plantar flexion of the forefoot.

Varus - primary at sub talar joint but entire tarsus rotated except talus.

Adduction - talonavicular and tarso metatarsal joint

Cavus- forefoot plantar flexion

CTEV may be

1)Idopathic and non-idopathic

Idiopathic CTEV

1. Mechanical pressure in utero e.g.: Oligohydraminos
2. Neuromuscular defect
— Spina bifida
— Weak peroneal muscles
3. Germ cell defect
4. Intrauterine arrest of the growth.
5. Hereditary.
6. Multifactorial.

Non-idiopathic causes:

- Arthrogryphosis
- Nail patella syndrome
- Streeter syndrome
- Muscular dystrophy
- Myelomeningocele, Spina bifida, Spinal cord defects

Pathological anatomy

- Neck of talus pointed downward and medially.
- Body of talus rotated out ward.
- Navicular and forfoot shifted medially and go into supination.
- Skin and soft tissue in foot and calf are underdeveloprd.
- Defect in vasular supply is present.

Clinical Examination

- Smaller stubby feet with shortened first metatarsal ray.
- Equinus deformity with inversion of the heel, adduction and varus of the fore foot.
- Medial border of the foot is concave and elevated, its plantar surface face up ward.
- Lateral border of the foot is convex and depressed down.

- The posterior tuberosity of the heel is upwards, difficult to palpate and less visible.
- Callosity on the dorsal aspect of the fifth metatarsal.
- Boney prominence visible and palpable over the dorsolateral aspect of the foot represents the head and neck of the talus which are partially uncovered by the navicular

This dz is dignosed clinically

X-rays:

1 Simulated weight bearing A-P view
Tibio calcaneal angle normal range 20-40 degrees, abnormal if less than 20 degrees.
Talo 1st metatarsal angle.
2. Lateral film in maximum dorsiflexion:
Talocalcaneal angle normal range 25-50 degrees, abnormal if less than 25 degrees.
Tibio calcaneal angle normal range 5-15 degrees, abnormal if less than 5 degrees or negative.

The goal of treatment to correct the deformaity early and fully and hold the correction until growth stops

Non-operative treatment:

- Manipulation and serial casting
- Stretching and adhesive strapping
- Dennis - Browne splinting.

Manipulation befor the casting , and is the most important part the objective is to stretch soft tissue contracture to maintain the strtching put the plaster of pairs cast

Methods of casting :

Ponsetti: correct begin in cavus and end by equines and lengthening of tendon Achilles

gradually abducted under the talus, which is secured against rotation, in the ankle mortise by applying counter pressure with thumb against the lateral part of the talus

Heel varus will get corrected when the entire foot is entirely abducted. Finally equinus is corrected by dorsiflexing the foot, which can be facilitated by simple percutaneous tenotomy of the tend Achilles. Well molded plaster cast applied after manipulation is complete

Change of cast every week

Complete correction by 6-8 months

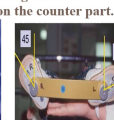
After that the pt will wear Dennis Brown bar with attached pronator shoe for 24 hour without any rest until the baby age of 7 years

بالليل

بالنهار

Denis Browne Splint - A dynamic splint in which the kicking movement of each leg exerts a corrective force on the counter part.





Non operative management:

When a plateau has been reached in non operative treatment.

The child is old enough for the anatomy of foot to be recognized usually by ten months.

Potential Complications:

- Infection and wound breakdown
- AVN of talus
- Overcorrection
- Residual deformity

Some cases have partial correction or no correction so

Observed for 3 months with manipulation and cast

If no correction , requier surgery at 10 months

الأناتومي صارت أوضح والقدم صارت أكبر

complication

- Relapsed foot - The deformity recurred after Fair correction.
- Resistant foot- foot is considered resistant when the deformity shows no evidences of further improvement with manipulation the radiograph and the X rays confirming the persistence of equinovarus deformity.

Tratment.

- Serial cast since birth to correct deformity.
- Poseti technique.
- CAVE IS the order of treating the deformity.
- Last correction followed by achilles tendon lengethening .
- Then Dennis brown shoes till walking age.

Flat Foot: ①

Congnital vertical talus

Rare condition , often is bilateral and rigid
it is opposite the club foot
Rocker bottom foot
Calcaneum isequins , talus point to the sole
Treated by surgical tendon release before age of 2 years

Stiff flat foot:

Can't correct passively
Causes: neurological disorder, inflammatory joint condition, Tarsal coalation

Note Flat Foot in adult is due to post .tibial tendon insufficiency

---

Pes cavus :

Medical arch higher than than normal , with claw toes
Tight soft tissue in the sole
Initially correctable then become fixed
Callosities usually develop
Underlying neuromuscular dz should looked for
Treatment is rarely needed because it's asymptomatic
Need shoe modification
If persistent pain develop triple arthrodesis after age 16 years If done before maturity that will lead to stantec foot growth

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②

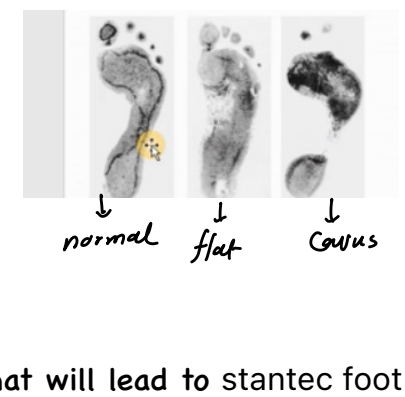
Flexiable flat foot in chlidren and adolescent:

In toddler are normal development disappear after few years
So to dignose chlid with flat foot that done after age of 4 years before that the rach isn't will developed

If the child is has ligament laxity or family history usually it persist till adult life

No treatment may some medical arch support is needed



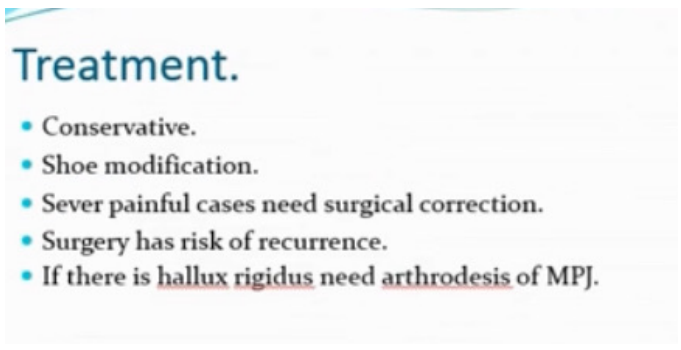


Hallux valgus

Commonest foot disorder for unknown etiology
Due to genetic predisposition and shoe wear habits and muscle imbalance
Lateral deviation and rotation of the great toe
Associated with exostosis of the medial joint is present than bursa formation
Overriding of the lateral toes
Female 50-70 are the common age and bilateral
Presented with deformity only later on can lead to persistant pain

Dignosis : Ap and lateral view xray





Hammer toe:

Flexion deformity of the lesser toe 2nd 3rd toe PIJ
Surgery indicated if pain or ulceration develop
DIP remain straight or extend



Claw toe:

Metatarsophalangeal joint are hyperextended and interphalangeL joint flex
Neurological dz is the underlying pathology



Overriding toes

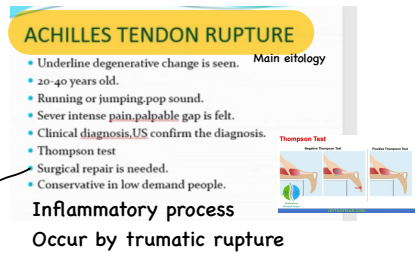
For unknown eitology



Sever's disease:

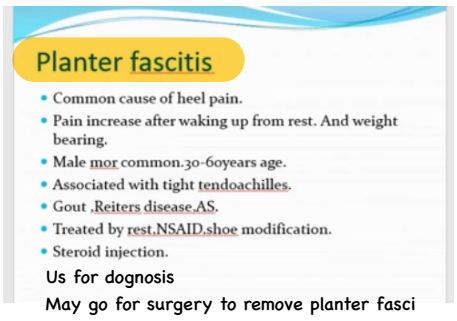
Fragmentation and sclerosis of calcanus apophysis





needed in young active ppl.

Inflammatory process
Occur by trumatic rupture



Us for dognosis
May go for surgery to remove planter fasci

Transient synovitits of the hip joint:

Self limitng conditionin which there's an inflammation of thr inner lining (synovium) of capsule of the hip joint

Irritabel hip = syndrome of acute hip pain , joint stiffness, limbing or non-weight bearing

The indicative of an underlying condition as (transient synovitis , orthopaedic infection as septic arthritis or osteomyelitis)

↓

Most Common Cause of irratible hip.

Transient hip osteoporosis

- This is a well-recognized, though uncommon, syndrome characterized by pain and rapidly emerging osteoporosis of the femoral head and adjacent pelvis.
- originally described in women in the last trimester of pregnancy, but it is now seen in patients of both sexes and all ages from early adulthood onwards.

- The cause is unknown.
- Last for 6-12monthes.
- No relation to AVN.
- treatment is symptomatic analgesia.
- So adviced for core decompression.

AVN : localized , well demarcated

Transient osteoporosis: involbe head , neck ,adjacent pelvis

Transient synovitis affect children between 3-10 years

Boys are affected 2-4 times more than girls

One of most common cause of sudden hip pain , limping in children

The cause is unknown, but may due to viral infection (upper r tract infection the most common) or truma

Dignosis of exclusion

CLINICAL PICTURE

- *pain* in the hip, thigh, groin or knee on the affected side
- There may be a *limp* (or abnormal crawling in infants) with or without pain .
- unexplained *crying* .
- Some children may have a *slightly raised temperature*; high fever and general malaise point to other, more .serious conditions

EXAMINATION OF THE HIP

✓ During physical examination, hold the hip in *flexion with slight abduction and external rotation*. → Rest position ↑ volum in hip.

✓ Examination of the individual with transient synovitis usually reveals *mild restriction of motion*, especially to abduction and internal rotation, although one third of patients .with transient synovitis demonstrate no limitation of motion

✓ The hip may be *painful* even with passive movement.

✓ The hip may be *tender* to palpation.

✓The most sensitive test for transient synovitis is *the log roll, in which the patient lies supine and the examiner gently rolls the involved limb from side to side.*This may detect involuntary muscle guarding of one side when compared to the other .side

✓Any effusion or joint abnormality within the knee should suggest another disease process.

✓The lumbar spine, sacroiliac joint, knee, and abdomen should also be examined. A complete musculoskeletal examination to look for joint swelling should be performed if there is a history of inflammatory symptoms

When hip join affected during examination must exam joint below and above

DIFFERENTIAL DIAGNOSIS

- *Septic arthritis* .
- Osteomyelitis .
- Bone fractures, such as a toddler's fracture (spiral fracture of the shin bone) .
- Soft tissue injuries .
- Muscle or ligament injuries .
- Slipped capital femoral epiphysis .
- Avascular necrosis of the femoral head (Legg-Calvé-Perthes disease) .
- Neurological conditions
- developmental dysplasia of the hip .(DDH)
- diseases of the organs in the abdomen (such as a psoas abscess) or by testicular disease.
- rheumatic condition (juvenile idiopathic arthritis, Lyme arthritis, gonococcal arthritis, ...).
- bone tumour.

By analysis: no standerd analysis

CRP normally or slightly elevated

The X-ray require to exclude bone lesions(osteomas , osteoid tumors) , occult fracture

Ap and frog lateral view of pelvis and both hips

Xray is most often unremarkable:

Shadowing pericapsular

Widening of medial joint space

Lateral displacement of the femoral epiphysis with surface flattening (waldenström sign)

Prominent obturator shadow

Diminution of soft tissue planes atound the hip joint

slightly demineralisation of the proxiaml femur

Us shows if there's fluid accumulation in joint capsule (Fabella sign)

Not in all cases of synovitis have fluid accumulation (DDx with septic arthritis)

If there's fluid go for needle aspiration

In septic arthrits the accumulated fluid is turbid with pus go for culture and stain

, in transient synovitis is clear

MRI no role in dignosis

May show there's bone marrow edema , synovitis? , amount of fluid

Skeletal scintography no role to deferentiat betwwen septic arthritis and transient synovitis

CT No role

TREATMENT

- rest .
- non-weightbearing .
- painkillers when needed.
- A small study showed that the nonsteroidal anti-inflammatory drug ibuprofen could shorten the disease course (from ٤,٥ to ٢ days) and provide pain control with minimal side effects (mainly gastrointestinal disturbances).
- If fever occurs or the symptoms persist, other diagnoses need to be considered .
  - The condition usually clears by itself within seven to ten days, but a small group of patients will continue to have symptoms for several weeks .
  - The recurrence rate is , most of which ١٧%–٤ is in the first six months .

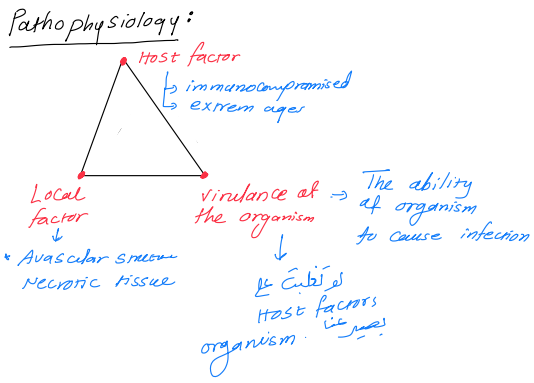
Septic arthritis

Pyoarthrosis is infection of joint

Orthopaedic emergency and leading cause of morbidity and mortality

Organism enter the joint: blood spread , direct spread, surgical procedure

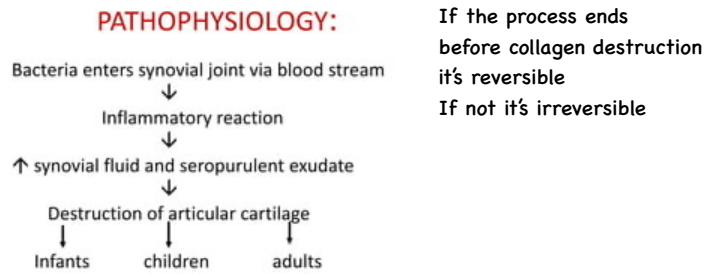
- distant
  - from skin near the Joint
  - from dental abscess
- adjucent
- 1- ruptured wound
- 2- gun-shoot
- from → arthroscope or intra-articular fixation.



Incidence increased after usage of methymethacylate which have profound effect on PML , chemotaxis and phagocytosis

Arthritis can be classified in gonococcal and non gonococcal

- gonococcal → By sexual spread
- non gonococcal → The most Common



If the process ends before collagen destruction it's reversible
If not it's irreversible

Affect any age specially neonate and elderly

Often multiarticular

hottnes , swelling , erythema ,loss of function (general symptoms)

4 out of 13 pts with RA will develop septic arthritis

In neonatal: pseudoparalysis , poor feeding

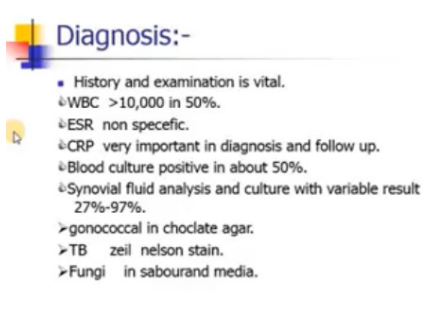
In older: pain , limbing , no weight bearing

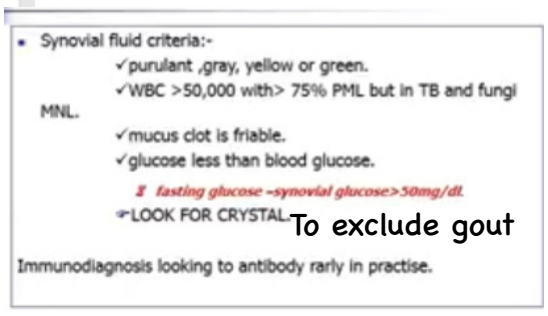
febrile at 78% of cases about 39 degree

Gonococcal arthritis affecr healty persons above 40 year

More in females

Blood and joint qspirate are frequently +ve in nongonococcal arthritis





To exclude gout

X ray is not helpful in the dignosis because that in first 2-3 weeks could be normal and nothing be detected

Only can show evidance of soft rissue swelling , synovial distension, osteopenia in subchondral region , joint laxity and subluxation

Also can show gas if the organism is gas forming organism also show osteolysis and loosing

Bone scan : 95% sensetive and 85% specific

MRI low specific can't differentiate between fluid and pus

Organism :

S.aures is the most common in all age groups

N.genorrhea most common seen in sexually active less than 40

Pseudomonas aerogenoisa seen with IV drug abuser

Streptococcal.G negative bacilli and H.influenzea also could seen

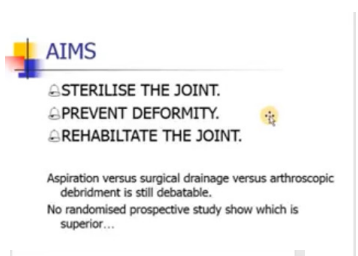
Viral arthritis as rubella and HB usually transient and nondestructive → abscence of Protolytic enzymes.

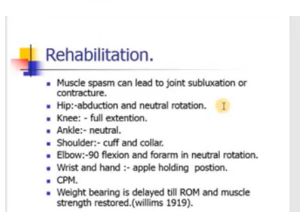
ttt: Stop treatment 1-3 months

Is a top emergency case

The treatment

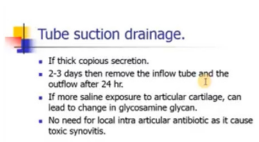
1) supportive (dehydration is one of the compications so need Iv fluids, painkillers)
2) rest (because movment cause more sever syptoms)
3) IV antibiotics
4) surgical (pus removing by aspiration and injection or arthrotomy) done if the observative treatment failed to show good result after 36 hours





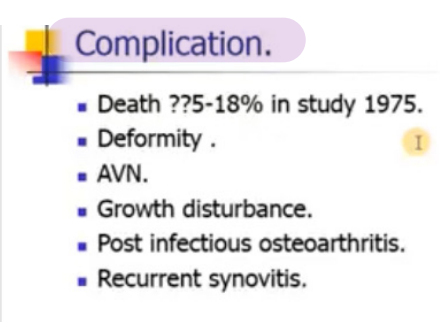
1. 1-2 daily
2. Larg Bone gauge needle
3. culture the aspirate
4. Continue till little exudate.
5. if Thick pus Comes → change your approchen.





Poor Prognosis :

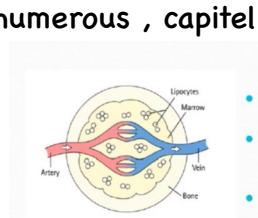
immunocompromised, associated with osteomyelitis, hip or prosthetic joint , +ve blood cultures, Age less than 6 months



Osteonecrosis:

Syptoms : pain ,loss of function

Main sites : head of femoral,head of humerous , capitellum , scaphoid and talus and this is becauses it's the most distant site of bone vascular supply and due to a high cartilage envelope



6.1 Avascular necrosis – pathogenesis The medullary cavity of bone is virtually a closed compartment containing myeloid tissue, marrow fat and capillary blood vessels. Any increase in fat cell volume will reduce capillary circulation and may result in bone ischaemia.

- Severence of local blood supply.
- Venous stasis and retrograde arterial stoppage.
- Intravascular thrombosis.
- Compression of capillary and sinusoids.
- ***Ischemia is multifactorial***

MAIN CONDITIONS ASSOCIATED WITH NON-TRAUMATIC OSTEONECROSIS

Infections
- Osteomyelitis
- Septic arthritis

Haemoglobinopathy
- Sickle cell disease

Storage disorders
- Gaucher's disease

Caisson disease
- Dysbaric osteonecrosis

Coagulation disorders
- Familial thrombophilia
- Hypofibrinolysis
- Hypolipoproteinaemia
- Thrombocytopenic purpura

Other
- Perthes' disease
- Cortisone administration
- Alcohol abuse
- SLE (? increase in antiphospholipid antibodies)
- Pregnancy (? decreased fibrinolysis; ? fatty liver)
- Anaphylactic shock
- Ionizing radiation

Causes : Idopath (most common) , infection (after osteomyelitis or septic arthritis) , hemoglobinopathry (sickle cell anemia)

Osteonecrosis could be **traumatic** after fractures and dislocation due to disrupted and compromised of vascular arrangement which lead to ischemic changes

Non trumatic osteonecrosis : more complex , due to intravascular thrombosis or extravascular compression

- Bone cell die after 48hr post anoxia leading to loss of fat cell ,inflammatoy cell infiltration,marrow odema and histiocyte cell and necrosis



6.2 Avascular necrosis Algorithm showing how various disorders may enter the vicious cycle of capillary stasis and marrow engorgement.

Bone necrosis occur in 48 hours after thar the bone enters new phase

Regeneration and neovascularization within few weeks and it starts with interface between dead and no dead bone

And its. Slow reparative process 8-10 mm into necrotic bone

The necrotic bone is more brittle so if the pt remain in daily activity and daily loading the necrotic bone will collapse and lead to structural failure and fragmentation of the necrotic bone and deformation of thr involved segment to avoid that the pt should go for bed rest

Clinical picture:

Pain with activity and could be with rest in sever cases

Click sue to articular fragment

Limitation of movement

Tenderness

Rarely Asymptomatic

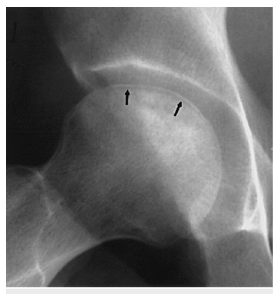
Dignosis :

1) History

2) X-ray (at the first 3 months is normal) ,

after that when inflammatory processes start crescent sign will appear in fracture,

Normal joint space till late stages



Diagnosis of the underlying disorder
- History of drugs,occupation,family history of Gaucher's disease or sickle-cell disease.
- Coagulation profile.

3) isotope scanning (increase up take seen in hyperemia and new bone at bthe interface betweendied and live bone)

4) CT scan is not adding more and considrable radiation risk

5) MRI is a gold standard for dignosis

- The first sign is a band-like low-intensity signal on the T1 weighted spin echo (SE) image (and a similar but high-intensity signal on the short-tau inversion recovery (STIR)

staging
- Ficat and Arlet (1980).
- ***Stage 1*** showed nox-ray change and the diagnosis was based on measurement of intraosseous pressure and histological features of bone biopsy (or nowadays on MRI).
- ***Stage 2*** the femoral head contour was still normal but there were early signs of reactive change in the subchondral area.
- ***Stage 3*** was defined by clearcut x-ray signs of osteonecrosis with evidence of structural damage and distortion of the bone outline.
- ***Stage 4*** there were collapse of the articular surface and signs of secondary OA.

Stage 0	Patient asymptomatic and all clinical investigations 'normal' Biopsy shows osteonecrosis
Stage 1	X-rays normal. MRI or radionuclide scan shows osteonecrosis
Stage 2	X-rays and/or MRI show early signs of osteonecrosis but no distortion of bone shape or subchondral 'crescent sign' Subclassification by area of articular surface involved: A = less than 15 per cent B = 15–30 per cent C = more than 30 per cent
Stage 3	X-ray shows 'crescent sign' but femoral head still spherical Subclassification by length of 'crescent'/articular surface: A = less than 15 per cent B = 15–30 per cent C = more than 30 per cent
Stage 4	Signs of flattening or collapse of femoral head A = less than 15 per cent of articular surface B = 15–30 per cent of articular surface C = more than 30 per cent of articular surface
Stage 5	Changes as above plus loss of 'joint space' (secondary OA)
Stage 6	Changes as above plus marked destruction of articular

Treatment:

Early osteonecrosis: (aim: reduce structural collapse) , unloading the joint , core decompression, oral bisphosphonates , casting

By Rest osteotomy

Intermediate stage (2,3) : realignment osteotomy alone or with curettage and bone grafting of the necrotic segment

Late stage : Non oberative management as pain control , modification of daily activities , splintage of the joint

Also arthrodesis or partial or total joint replacement

Perthes disease :

Affects hip joint in paediatric age group (4-10 years) the early the dz in age the good prognosis

Painful hip (irritable hip)
Type of AVN of femoral head
1-10000 incidence, M:F 4:1
Unknown cause may associated with Thrombophilia , antithrombotic factor deficiency, hypofibrinolysis

Blood supply of femoral head:

1) metaphyseal blood vessel disappears by age of 7 2) lateral epiphysial B.V 3) ligament teres B.V developed at age of 7
so in age 4-7 the femoral head have scanty Blood supply make it easy to develop ischemia
Any efusion caused capsular destination which cause pressure in B.V so can add more ischemia to femoral head

Pathological stages

- ***Ischemia and bone death:***-all or part of femoral head looks normal on x-ray.
- ***Revascularization and repair:***-new bone formation and fibrosis and granulation tissue appear on x-ray as fragmentation,metaphseal cystic changes.
- ***Distortion and remodling:***-depend on time of repair if longtime the femoral head will be distorted mushroom head

Is there's an axial loading or pressure at the phase of revascularization and repair that cause pressuer on the necrotic dead bone which lead to more distortion

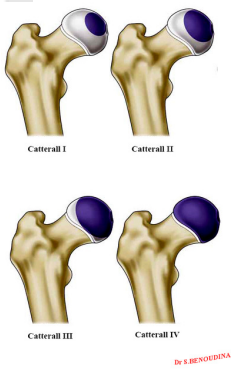
If the remodiling phase happen quickly that mean the deformity will have no risk

Clinical picture

- Pain and limping continue for weeks or recure intermittentently.
- Well being child,or undersized or urogenital problem.
- Muscle wasting may seen
- Limitation of all movement(abduction in flexion).
- Radiography,bone scan,MRI

The Catterall classification

- *group 1* the epiphysis has retained its height and less than half the nucleus is sclerotic.
- *group 2* up to half the nucleus is sclerotic and there may be some collapse of the central portion.
- *group 3* most of the nucleus is involved, with sclerosis, fragmentation and collapse of the head. Metaphyseal resorption may be present.
- *group 4* is the worst: the whole head is involved, the ossific nucleus is flat and dense and metaphyseal resorption is marked.



Prognosis::

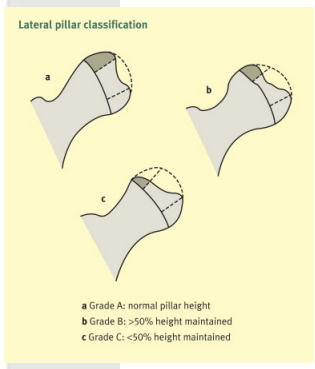
Age: <6 years : good prognosis more than 10 or less than 4 worse
Gender: women worse prognosis
More femoral head involvement more risk

If one of the 4 are present the prognosis is worse:

1. progressive uncovering of epiphysis
2. Calcification lateral to nucles
3. Sever metaphysial resorption
4. Radiolucent area at lat edge of bony epiphysis (gage's sign)

Lateral pillar classification

- Group A are those with normal height of the lateral pillar.
- Group B are patients with partial collapse (but still more than 50 percent height) of the lateral pillar.
- Group C cases show more severe collapse of the lateral pillar (less than 50 per cent of normal height)



Management:

Depends of stage and compline
Erarly stage : observation (rest, painkillers, hospitalisation and some traction , muscle strengthening and keep ROM mainly abduction)
Late stage : Casting in abduction , surgery varus osteotomy

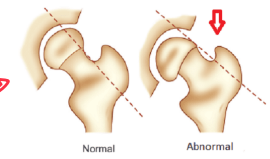
Slipped capital femoral epiphysis: SCFE

Also called femoral capital epiphysiolysis
Is a displacement of proximal femoral epiphysis
Ages : 14-16 years olds
Boys more than girls who are in 2-3 years younger
More common Left , bilateral in 40% of cases
Unknown eitology ↴ Risk factors

- The slip occurs through the hypertrophic zone of the growth plate.
- Sexual immature,fatty,tall and thin.
- ***hormonal imbalance.***
- *Hypothyrodisim.*
- Craniopharyngioma.
- Ostrogen has protective effect.
- ***Trauma***.

Clinical picture:
Minor episods rather than sudden acute events
Pain at groin sometimes knee pain only
Leg is externally rotated
1-2 cm short
Abnormal BMI around puberty

Dignosis :
Xray
May normal or
Trethowan's sign



the metaphyseal blanch sign of steel is a (doubel-density) seen at level of netaphysis on AP xray

Grading

- Pre-slip: The child complains of groin or knee pain,particularly on exertion, and there may be a limp.Examination is often normal, but may demonstrate reduced internal rotation. The x-ray may show widening or irregularity of the physis.
- Acute slip: Symptoms present for less than 3 weeks; painful hip movements with an external rotation deformity, shortening and marked limitation of rotation (the greater the limitation of motion, the greater the degree of slip). Symptoms last for less than 3 months.
- Chronic slip: The child has pain in the groin, thigh or knee lasting more than 3 weeks; episodes of deterioration and remission; loss of internal rotation, abduction and flexion of the hip and limb shortening.
- Acute-on-chronic slip: Long prodromal history and an acute, severe exacerbation.

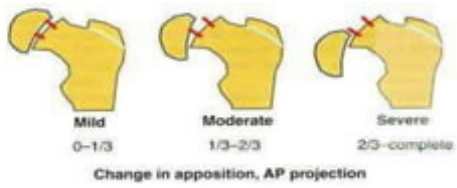
Grading on lat.frog view

- Mild: Displacement is less than one-third of the width of the femoral neck.
- Moderate: Displacement is between one-third and a half.
- Severe: Displacement is greater than half ofthe femoral neck width.

WILSON GRADING

Based on displacement of physis in proportion to neck width

Grade I (mild): less than one-third.
Grade II (moderate): between one-third and two-thirds.
Grade III (severe): greater than two thirds

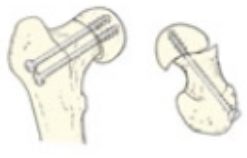


Change in apposition, AP projection

- stable:-
  able to bear weight,and less risk to progress.
- Unstable:-
  unable to bear weight more risk to progress.

Treatment.

- Fixation insitu.



Peripheral nerve injury

Causes : ischemia , compression, Traction,laceration
Injury is variable from mild to sever loss of function

Transient ischemia

- Acute nerve compression causes numbness and tingling within 15 minutes, loss of pain sensibility after 30 minutes and muscle weakness after 45 minutes.
- Relief of compression is followed by intens paraesthesiae lasting up to 5 minutes feeling is restored within 30 seconds and full muscle power after about 10 minutes.

Seddon classification:

Neurapraxia: reversible physiological nerve conduction block loss of some sensation and muscle power
Followed by spontaneous recovery after day to weeks
Due to mechanical pressure causing segmental demyelination
is seen typically in ① crutch palsy
Pressure paralysis in states of drunkenness ② (saturday night palsy)
Milder types of tourniquet ③ palsy

Axonotmesis:
sever form , post fracture or dislocation with axonal interruption
Loss of conduction but nerve still in continuity and intact neural tube
Distal part of the nerve resobed by phagocytes (wallerian degeneration)
Axonal regeneration start within 2 hr post injury 1-2 mm per day
Spontaneous recovary is low in possibility

Neurotmesis:
Nerve trunk is divided totally or remain in tube
No return to function
spontaneous recovery impossible but recovery may done by surgical intervention

sunderland1978

- *First degree injury* This embraces transient ischaemia and neurapraxia, the effects of which are reversible.
- *Second degree injury* This corresponds to Seddon's axonotmesis. Axonal degeneration takes place but, because the endoneurium is preserved, regeneration can lead to complete, or near complete, recovery.
- *Third degree injury* This is worse than axonotmesis. The endoneurium is disrupted but the perineurial sheaths are intact and internal damage is limited. The chances of the axons reaching their targets are good, but fibrosis and crossed connections will limit recovery.
- *Fourth degree injury* Only the epineurium is intact. The nerve trunk is still in continuity but internal damage is severe. Recovery is unlikely; the injured segment should be excised and the nerve repaired or grafted.
- *Fifth degree injury* The nerve is divided and will have to be repaired.



The doubel crush phenomenon that proximally compression of a peripheral nerve renders it more susceptible to the effects of a sec more peripheral injury

Prognosis: according to
1) type of lesion
2) level of lesion (high lesion is worse)
3)Type of nerve (pure nerve better than mixed)
4) size of gap
5) Age
6)Delay in repair (first 6 months is very important)
7)associated injuries
8) surgical technique

Brachial plexus injury:

causes

- Penetrating injury either stab or gunshot.
- Traction injury
  1-supraclavicular 65%in RTA with subclavian a
  2-infraclavicular25%fracture dislocation .axillary a
  3-combined10%.

- Preganglionic:-injury proximal to dorsal root ganglion,poor prognosis and surgicaly irreparable.
- Post ganglionic:-injury distal to dorsal root ganglion better prognosis

Clinical picture

- Can be masked by other life threatening condition.
- Associated arterial injury,should looked for.
- Upper lesion C5-6:-shoulder abducted and externally rotated,forarm pronated,sensory loss at outer aspect of arm and forarm.
- Lower lesion wrist and finger flexor are lost intrinsic hand muscles are paralysed. Sensation is lost in the ulnar forearm and hand
- Whole limb paralysed

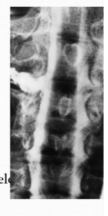


managment

- Follow the ATLS protocol.
- Repair of the nerve in open wound and this to be done by expert team..
- Surgery better to be performed within 6 monthes.
- Nerve transfer,nerve graft.
- Wait 2-3 years for obtain response.
- Tendon transfer for late reconstruction.
- Shoulder arthrodesis.

Features of root avulsion

1-crushing or burning pain of the limb.
2-paralysis of scapular muscle or diaphragm.
3-Horner syndrom.
4-vascular injury.
5-fracture cervical spine.
6-spinal cord dysfunction.
Negative histamine test.
- CT mylogram or MRI show pseudo meningo cel
- Nerve coduction study.



Radial nerve injury:

RADIAL NERVE



- Clinical features:- low lesion.
- post elbow fracture or deep wound or post surgery on proximal radius.
- Loss of MPJ extension,preserve of wrist extension due to ECRL
- High lesion
- Loss of both wrist and finger extension.



Treatment

- *Open injuries* should be explored and the nerve repaired or grafted as soon as possible.
- *Closed injuries* are usually first or second degree lesions, and function eventually returns.
- if no return to function then tendon transfer PT,PL,FCR

Ulnar nerve injury

ULNAR NERVE

- Clinical features *Low lesions* are often caused by cuts on shattered glass. numbness of the ulnar one and a half fingers.
- claw hand deformity.
- Hypothenar and interosseous wasting.
- Finger abduction is weak.
- *High lesions* occur with elbow fractures or dislocations.
- The hand is not markedly deformed(the *'high ulnar paradox'*)

Treatment

- Exploration and repair.with ulner nerve tranpostion
- Tendon tansfer.

tested By forment test .

CUBITAL TUNNEL SYNDROME

Causes
- Bone abnormalities.
- Ganglion.
- Hypertrophied synovium.
- Archades of struther.
- 2 head of FCU.
- Cubitus valgus deformity

Compression of ulnar nerve at the level of elbow

Clinical features

- numbness and tingling in the little and the ulnar half of the ring finger; symptoms may be intermittent and related to specific elbow postures (e.g. they may appear only while the patient is lying down with the elbows flexed.
- Claw hand in long standing problem

Treatment

- Conservative,braces,NSAID.
- If no response ulner nerve release and transpotion.



Median nerve injury :

MEDIAN NERVE

- Clinical features *Low lesions* may be caused by cuts in front of the wrist or by carpal dislocations.
- The patient is unable to abduct the thumb, and sensation is lost over the radial three and a half digits.
- Wasted thener muscle.
- *High lesions* are generally due to forearm fractures or elbow dislocation, (the 'pointing sign')

Treatment

- Clean cut to repair and suture .
- Tendon transfer if no recovery seen.

Femoral nerve injury:

FEMORAL NERVE

- Clinical features
- Quadriceps action is lacking and the patient is unable to extend the knee actively. There is numbness of the anterior thigh and medial aspect of the leg. The knee reflex is depressed. Severe neurogenic pain is common.

Treatment

- A thigh haematoma may need to be evacuated.
- Suture the nerve .
- Nerve graft.
- Tendon tansfer.

Sciatic nerve injury:

SCIATIC NERVE

- Gunshot injury.
- Deep lacerated wound.
- Post erior hip dislocation.
- Intraneural haematoma in patient taking anticoagulant.
- After total hip arthroplasty.

Clinical features

- the hamstrings and all muscles below the knee are paralysed; the ankle jerk is absent. Sensation is lost below the knee, except on the medial side of the leg which is supplied by the saphenous.
- The patient walks with a drop foot and a high-stepping gait

Treatment

- Nerve repair or graft recovery need about 1 year to develop.
- AFO. Splint.
- Care to avoid trophic ulcer
- Tendon transfer .
- In case of insensate painful limb,amputation

CARPAL TUNNEL SYNDROME

- Pain and paraesthesia occur in the distribution of the median nerve in the hand.
- night pain and burning ,tingling sensation.
- More in female.40-50years.
- pregnancy, rheumatoid disease, chronic renal failure or gout.
- (*Phalen's test*). (*Tinel's sign*).
- wasting of the thenar muscles.
- EMG and NCV.

لو تكلمنا نسيبها المريض للجراحه

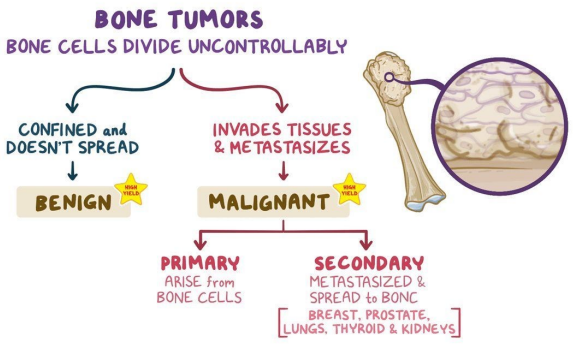
Treatment.
- Conservative,brace NSAID.
- Steroid injection.
- Carpal tunnel release.



MSS tumors:

Bone tumor is about 2% of all cancer cases

Most common affect young age



CLASSIFICATION OF BONE TUMORS

- **Origin:** -
  - **Primary**
  - **secondary:** 95%, breast, lung, prostate, kidney and thyroid
- **cell type:**
  - **Bone→**
    - Osteoma, osteosarcoma
  - **Cartilage→**
    - Chondroma, Chondrosarcoma
  - **Marrow→**
    - Hemangioma, angiosarcoma
  - **Fibrous tissue→**
    - Fibroma, fibrosarcoma
- **Tumor type:**

Benign: Osteoma, osteochondroma

Malignant:: Osteosarcoma, chondrosarcoma

Clinical picture:

May be Asymptomatic and discove accidentally

Syptoms :

pain (at night , wakes pt from sleep) due to hemorrhage or neuromascular adjacent state or cancer release substance that cause pain

Swelling , local tendrness , warmth

Pathological fracture

General syptoms: fever , malaise, wt loss

Mass

Dignosis:

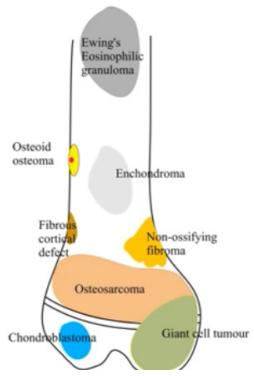
History (age , pain , neurological syptoms if the nerve is compressed by the tumor)

X-ray

QUESTIONS TO ASK WHEN STUDYING AN X-RAY
Is the lesion solitary or are there multiple lesions?
What type of bone is involved?
Where is the lesion in the bone?
Are the margins of the lesion well- or ill-defined?
Are there flecks of calcification in the lesion?
Is the cortex eroded or destroyed?
Is there any periosteal new-bone formation?
Does the tumour extend into the soft tissues?

1st order

- X-rays algorithms:
  - Where is it?
  - How big?
  - What does it contain?
  - What is it doing to bone?
  - What is bone doing to it?
  - Are there any others?

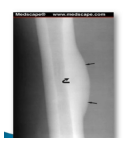


- **CT and MRI**
  - Asses the extent of the tumor
  - Relation to surrounding structures
- **Radionuclide scanning:**
  - Helpful in revealing site of a small tumor
  - Skip lesions
  - Silent secondary deposits

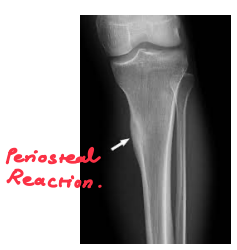
Look for periosteal reaction

If it is :soft , clear , regular —> may be post fracture of following any other dz or benign cancer not pointing to malignant

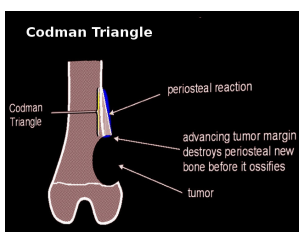
If Malignant: irregular edges , shade



- Midshaft periosteal reaction with smooth + thick edges: this is a benign osteoma.



In osteosarcoma of distal femur the periosteum is lifted off



- **Labs**
  - Calcium: Greater than normal levels may indicate metastasis.
  - Serum phosphorus: Greater than normal levels may indicate bone metastasis.
  - PTH: Lower than normal levels may indicate bone metastasis.
  - ALP isoenzyme: Higher than normal ALP levels may indicate Paget's disease, osteoblastic bone cancers, osteomalacia and rickets.
  - LDH: High values indicate poor prognosis

DDX.



Biopsy. Gold- Standrad.

* Biopsy allows us to reach a diagnosis.

* Biopsy allows us to plan for treatment.

Methods of biopsy:

- Open biopsy: surgical procedure done under GA.
- Zonal biopsy: open biopsy from transition zone.
- Excisional biopsy: excision of the entire tumor.
- Large-bore needle biopsy: aspirating cells.
- insicional : excision part of tumor

Biopsy complication

- Be aware of biopsy complications:

1. Hemorrhage
2. Wound break down
3. Infection
4. Pathological fractures

A last word of warning: When dealing with tumours that could be malignant, there is a strong temptation to perform the biopsy as soon as possible; as this may alter the CT and MRI appearances, it is important to delay the procedure until all the imaging studies have been completed.

Hemorrhage كلمة وغيرها يغير شكل الـ tumor بال MRI و CT يشابه صيلع الـ Biopsy بنطلع آخر حاجة

Staging:

- *Stage I* All low-grade sarcomas.
- *Stage II* Histologically high-grade lesions.
- *Stage III* Sarcomas which have metastasized.

Enneking Staging System for Benign Tumors

Latent
- Well-demarcated borders
- Grows slowly and stops
- Heals spontaneously [osteoid osteoma]
- Negligible recurrence after intracapsular resection

Active as aneurysmal Bone cyst
- Well defined borders but may show cortical thinning [ABC]
- Growth limited by natural barriers [compartment]
- Negligible recurrence after marginal resection

Aggressive
- Indistinct borders
- Growth not limited by natural barriers [GCT]
- 5% may have metastases
- High recurrence after intracapsular or marginal resection
- Wide resection preferred

ما طلع س مكانه

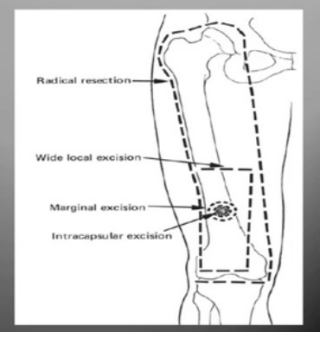
Stage	Grade	Site	Metastases
IA	Low	Intracompartmental	No
IB	Low	Extracompartmental	No
IIA	High	Intracompartmental	No
IIB	High	Extracompartmental	No
IIIA	Low	Intra- or extracompartmental	Yes
IIIB	High	Intra- or extracompartmental	Yes

Malignant

Table 9.2 Staging of benign bone tumours as described by Enneking

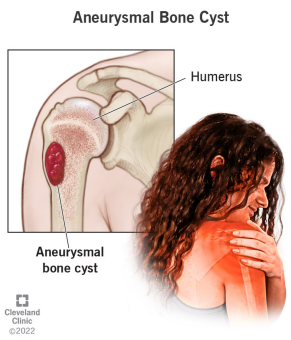
Method of treatment

- Tumour excison.
- Amputation.
- Chemotherapy.
- Radiotherapy.
- Limb salvage procedure.



Aneurysmal bone cyst:

Affect long bone and spine
Eccentric (near the coretx farawayfrom center)
expansile, pesudo-trabeculation
Blowout
Cause unknown but may Anastomosing ,caverns of blood
DDX : gaint cell tumor or taelangiectatic osteosarcoma
Treatment: cuerettage and graft (may reccurant) so we go f
Instillation of irritant solution as (phenol)



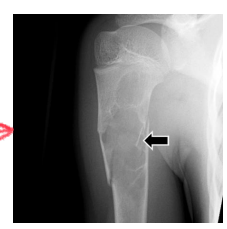


Simple bone cyst:

Fibrovascular lining with giant cells
Fluid within similar to serum
Treatment: methylprednisolone , cuerettage and graft , bone marrow

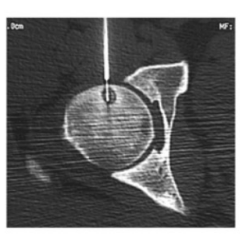


- Prox humerus or femur; os calcis (beware pseudocyst)
- Start close to growth plate and later 'move' away
- Cortex thinned – pathological fracture
- 'Fallen fragment' sign



Osteoid osteoma:

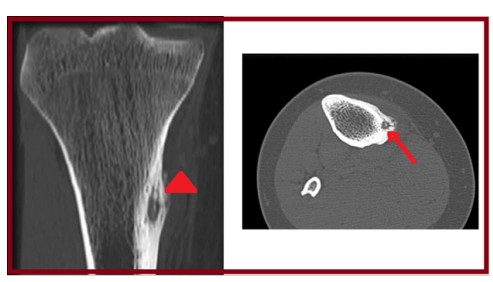
Affect diaphysis of femur or tibia , post elements of spine
Night pain and it's a good pain relieve on NSIDs
Fibrovascular naevus with high osteoblast and osteoclast population
A few low grade inflammatory cells



Osteoid osteoma

- Treatment
  - Treat pain with NSIDs and wait
  - RFA (radiofrequency ablation).
  - Surgical en block resection.

عكس بعد سنتين ترجع طالعا



Enchondroma :

Centrally placed lucencies within the medulla
Scalloping and moderately sclerotic margins
Stippled calcification
Typicall affect the finges
By histology: hyaline cartilage matrix presents
Pathological fractures occur
Treatment: curettage and phenolisation and bone graft

May a part of syndrome
Oliers or mafucci

10% malignant transformation
* Olier's Disease
→ Only enchondromas (multiple)

100% malignant transformation
* Maffucci's syndrome
→ enchondromatosis with overlying hemangioMa
↳ CNS malignancy



Osteochondroma :

Metaphyseal , sessile or pedunculated
Endochondral ossification leading to growth untill maturity → لو زاد عوضا بعد البلوغ صور اعمروفن توقف بفلك وتتبر malignant transformation
Fracture or deformaity may occur.
Effect on gliding structures

Osteochondroma



- Malignant change < 0.1% (solitary lesions)
- Excision must include cartilage cap
- Hereditary form is auto dominant.
- Deformity, short stature, ulnar club hand

Osteosarcoma:

Malignant
May be primary or secondary or juxtacortical (surface)

- Benign and transform to malignant
- After radiotherapy

من الاطفال osteosarcoma

Primary osteosarcoma



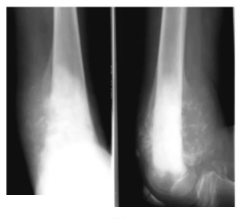
- Direct formation of bone from sarcomatous stroma
- OSA are not homogenous
  - Taelangiectatic
  - Classic (high grade intramedullary)
  - Low grade medullary

Classic osteosarcoma



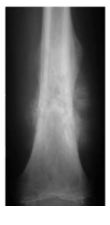
- Lytic with reactive bone
  - Codman's triangle
  - Sunburst striations
  - Onion-skin periosteum
- Skip lesions
- Most patients present at stage 2B

Classic osteosarcoma



- Around the knee
  - (distal femur > proximal tibia)
- Surpassed only by leukaemia and lymphoma in kids
- Peak inc 10–25 years

Osteosarcoma



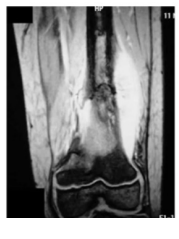
- Treatment
  - adjuvant chemoR_x
    - Shrink tumour
    - Clear reactive zone
    - Kill micromets
- Wide excision

Classic osteosarcoma



- Incidental after trauma
- Vague local symptoms
- Knee pain in adolescents : if not typical anterior type – xray!

Osteosarcoma



- Treatment
  - Resection arthrodesis
  - Allograft reconstruction
  - Prosthetic reconstruction
  - Rotationplasty (*van Ness*)
  - 5 YS: 60–70%

Ewings sacroma:

2nd most common after osteosarcoma
Round cell tumor
Affect round or flat bones
Metastasis common with systematic syptoms
Histologicalla need specialist input

Treatment:
Chemotherapy and wide excision
5 year survival : 60%

