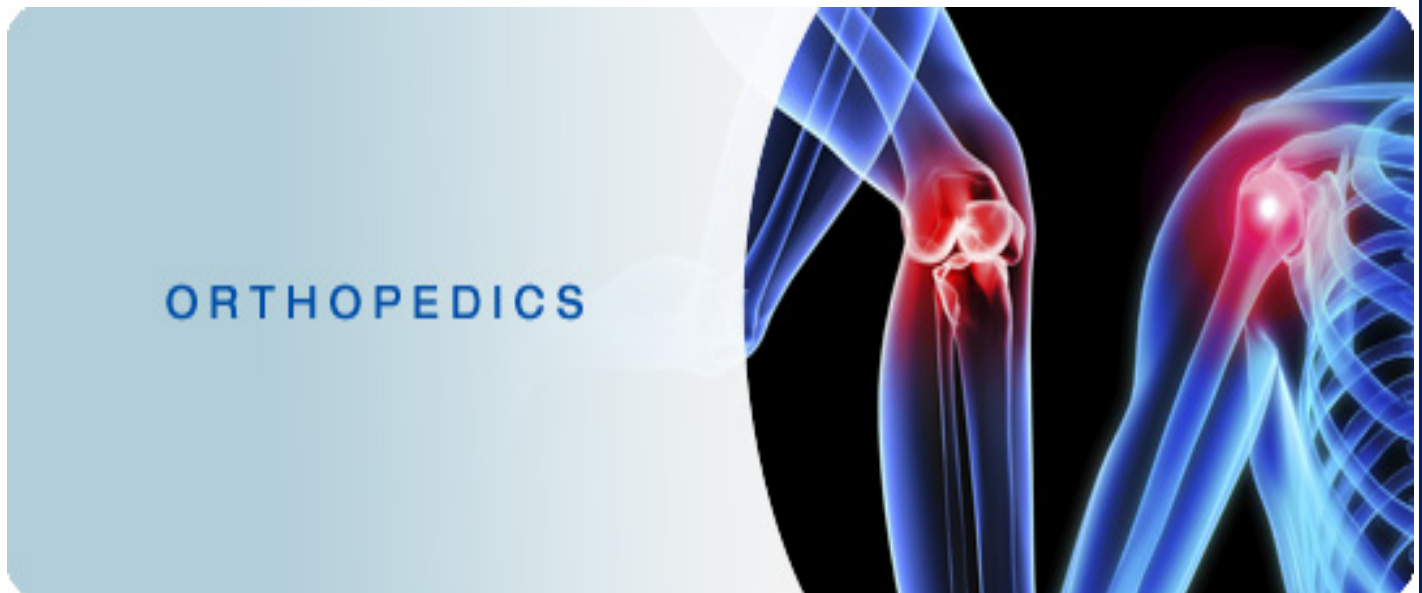


*Isn't it funny how someone can say "I believe in Allah " but still follow the Satan who by the way also, " believes " in Allah...*

## 430 ORTHOPEDICS TEAM



### Lecture: Introduction to orthopedics.

#### Team Members:

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Nour Al-Enezi.

**Wejdan Al-Swayyid.**

Arwa Abudawood.

Leena Al-Shaman.

Areej Al-Qunaitir.

#### Team Leader:

**Ayedah Al-Ruhaimi.**

-The slides were provided by the doctor.

-Important notes in **Red**. –Medical dictionary in **blue**.

-Copied slides in **Black**.

-Doctor's notes in **green**.

ORTHO = Straight, Upright, Correct.

Païos = Child.

First used by Nicolas Andry a French doctor (1841) in a book titled Orthopedia : the art to correct and prevent deformities in children.

### Orthopedic Surgery = Not only Bone Surgery

- Orthopedic specialty is the branch of medicine which manage trauma and disease of Musculoskeletal system.
- It includes: bones, muscles, tendons, ligaments, joints, peripheral nerves, vertebral column and spinal cord and its nerves.

### Orthopedic Specialty: Also Known as: Trauma and Orthopedic Surgery

Sub-Specialties in orthopedic include: Pediatric Orthopedic, Sport and Reconstructive Orthopedic, Orthopedic Trauma, Arthroplasty (It is a surgery to relieve pain and restore range of motion by realigning or reconstructing a joint, it has a rule in prosthetic joints), Spinal Surgery, Oncology orthopedic and Foot and Ankle surgery.

**Red Flags:** (It means be careful this case has something strange & need an immediate treatment).

- Red Flags = Warning Symptom or Sign
- Red flags should always be looked for and remembered
- Presence of a red flag means the necessity for urgent or different action/intervention

E.g. Patient has back pain but recently he can't pass urine this is red flag. We have to give him attention different from other patients with only back pain.

### Examples of Red Flags: very imp

- **Open Fractures:** more serious and very high possibility of infection and complications because bone naturally is well saved in sterile environment but in open fracture there will be communication with outside (bacteria) to inside (bone) means this fracture is susceptible to severe possible communication and have to be treated immediately and in a special way other than closed fractures.
- **Complicated Fractures:** fracture with injury to major blood vessel, nerve or nearby structure. E.g. Patient who came with fracture but when we check the pulse there is no pulse. This means that he has either: compression on the artery or there is a damage to the artery. So, we have to take him to the OR immediately within 2-3 hours not like other fractures which we used to treat them within 24 hours.

**Case:** Child who came with supracondylar fracture of the elbow due to falling on his arm, his arm was swollen & we can't feel the radial pulse.

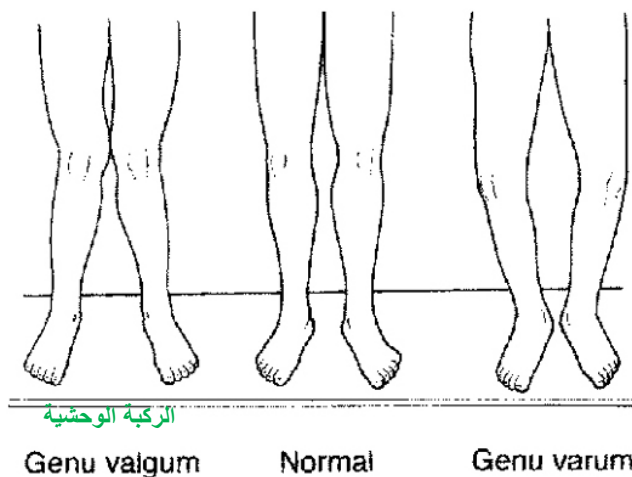
- **Compartment Syndrome:** increase in intra-compartment pressure which endangers the blood circulation of the limb and may affect nerve supply.  
Muscles, nerves and blood vessels they all covered by fascia which has the ability to expand when there is a pressure but to very little extend. So, when there is a swelling in the lower limb usually below the knee (very rarely in upper limb), the fascia will expand a little bit but pressure still there and it will increase slowly until the blood can't go in or out & this will lead to more swollen. With time the muscles around will become infarcted due to the absence of the blood supply & this may lead to lose the limb (necrosis). That's why when we have a fracture with too much swelling and too much pain & in advanced cases no pulse, pallor this mean this case require a treatment priority over the other cases.
- **Cauda Equina Syndrome:** compression of the nerve roots of the Cauda Equina at the spinal canal which affect motor and nerve supply to lower limbs and bladder (also saddle or peri-anal area).  
-When there is a back pain + difficulty in passing urine or numbness or reduced sensation (altered or absence) at sacral or peri-anal area this mean a very serious condition & we have to do urgent surgery.
- **Infection of Bone, Joint and Soft Tissue:** All the infections especially the acute once are considered as Red Flag.
  - Osteomyelitis: Infection of the bone (from inside & outside). Osteo: bone myle: bone marrow.
  - Septic Arthritis: Infection of the joint. If you don't treat it very quickly, it will destroy the structure of the bone. The cartilage & the articular surface will destroyed & the ligaments may tear & the capsule may punctured.
  - Cellulitis: spreading (not localized) Infection of the soft tissue, skin May cause septicemia or irreversible damage.
- **Multiple Trauma or Pelvic Injury:** more than one fracture or injury sustained at the same time consider massive blood loss and associated injuries.  
**Why pelvic bone fracture is important?** Because it's a big bone and bleeds a lot (could lead to blood loss about 45 units of blood inside). That's why we press the pelvic from outside (Pelvic tamponade) to stop the bleeding.

-Patient with multiple fractures or pelvic fracture has the priority of treatment over the one who have single fracture.

- **Acute joint Dislocations:** requires urgent reduction or may cause serious complications.

Dislocation means that the two ends of the joint are no longer in contact. This requires immediate treatment & if we don't reduce it, the joint will deprive from blood supply (because the joint out of its place here) & this can lead to necrosis or infarction.

### Alignment terminology:



**Valgus:** when the limb and the joint goes away from the midline.

**Varus:** when the limb and the joint goes toward the midline.

In the upper limb the elbow is called Cubitus. So, the same as the lower limb we call it either cubitus valgus or varus.

In examination you have to describe the alignment before you describe the swelling or small wound for example.

### Congenital or Acquired:

-Acquired conditions include :

- Trauma
- Developmental: E.g. baby born normal but after that while he is growing, he start to develop the abnormality e.g. genu valgum or develop limping.
- Inflammation
- Infection.

**What is the different between inflammation and infection?** Infection caused by organisms but in inflammation not necessary there is organisms e.g. rheumatic disease (autoimmune or body rejection).

- Neuromuscular: e.g. cerebral palsy (1-2% of Saudi child have it) and muscular atrophy.
- Degenerative: Because of loss of content of hydration.
- Metabolic: The bone normally active, every day millions of bone cells destroyed by osteoclast and millions of cells built back by osteoblast.

- Tumor.( either: Benign or malignant & it's either primary or secondary or metastatic".

### Congenital Anomaly: Talepoequinovarus TEV



Tale: foot , equino: horse ,  
varus: goes toward midline

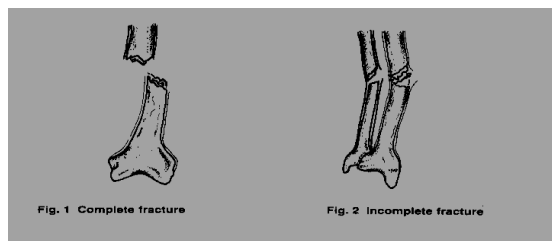
### Traumatic Injuries:

- Fractures: Break in the continuity of bone.

It could be:

- 1- Complete displaced or not displaced (adult fracture).
- 2- Incomplete.

**Greenstick:** fracture in children.



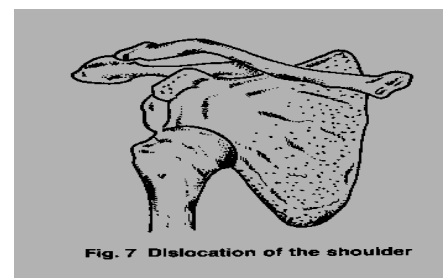
- Dislocations
- Soft tissues injuries: ligaments, tendons
- Nerve injuries
- Epiphyseal injuries

**Dislocations:** Complete separation of the articular Surface .

**How to describe dislocation?**

**Distal to proximal fragment:**

Anterior, Posterior, Inferior, Superior



**This picture is inferior dislocation.**



Dislocation with fracture of the bone:

We always have to get 2 views (e.g. Anterior Posterior and Lateral)

Always X-Ray Joint Above and Below

### Fracture Dislocation Dorsal Spine:



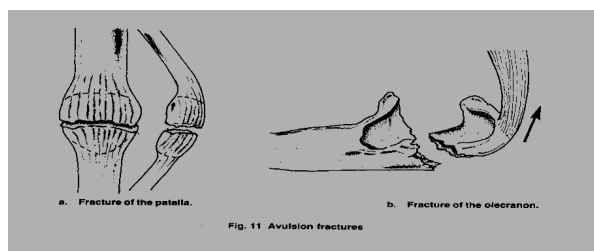
-Fracture dislocation **of the cervical spine** can cause **tetraplegia (quadriplegia)**.

-Fracture dislocation of the **dorsal spine** (below the cervical) can cause **paraplegia**.

### Avulsion Fracture:

Force due to Resisted Muscle Action: -

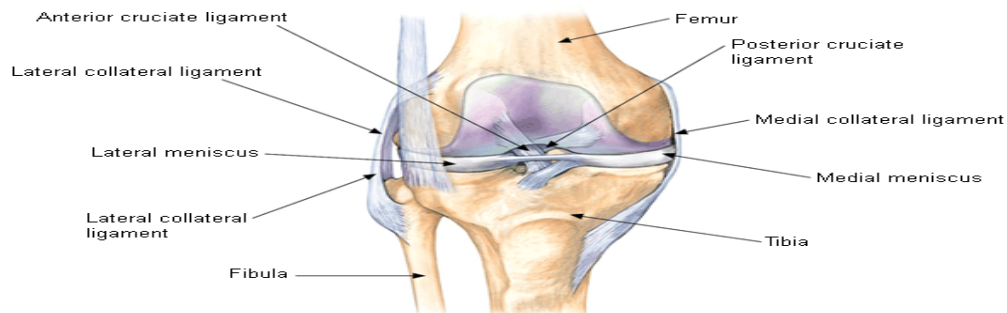
“Avulsion” Transverse pattern.



Usually tendons are attached to the bones .So, when someone has resistant action and tendon stronger than the bone it will cause avulsion of the bone from its normal place (e.g. football player throw the rock by mistake instead of throwing the ball). Treated by returning it to its normal place & fixing it

## Soft tissue injuries of the knee:

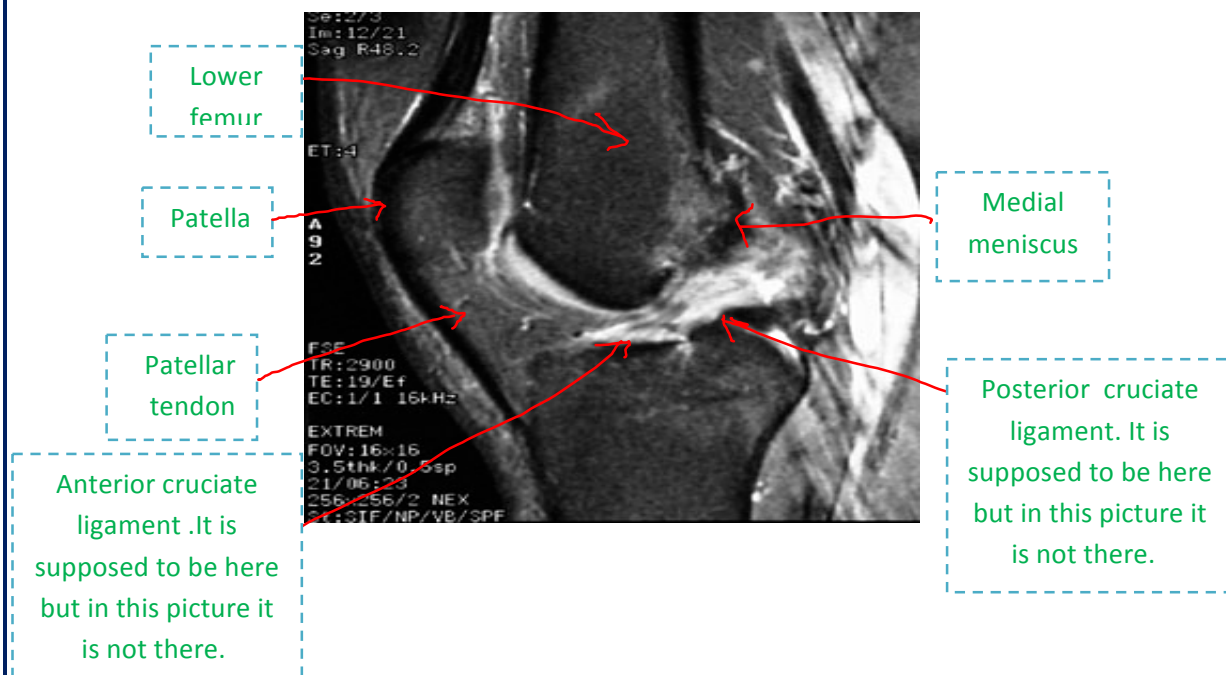
Some of the soft tissues are extra articular and the others are intra articular. They are separated by the capsule.



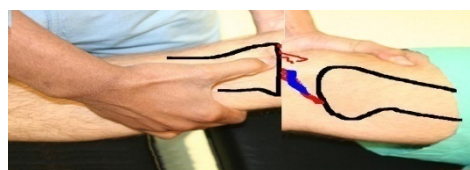
- We use Hyaluronic Acid as Joint Injection because it's similar to the synovial fluid. It helps in the lubrication & early moderation of osteoarthritis.

## Anterior Cruciate Ligament injury: MRI

(Doctor said this MRI could come in exam or other one similarly)



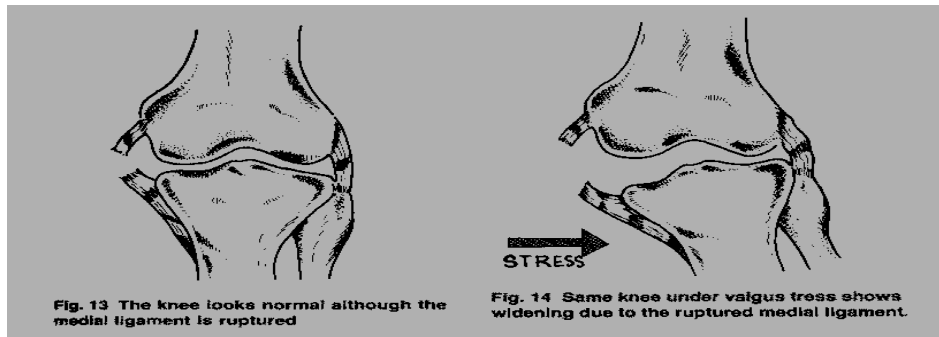
**Lachman's test:** to determine if there is tearing of anterior cruciate ligament or not (you will be asked about it in OSCE in knee examination).



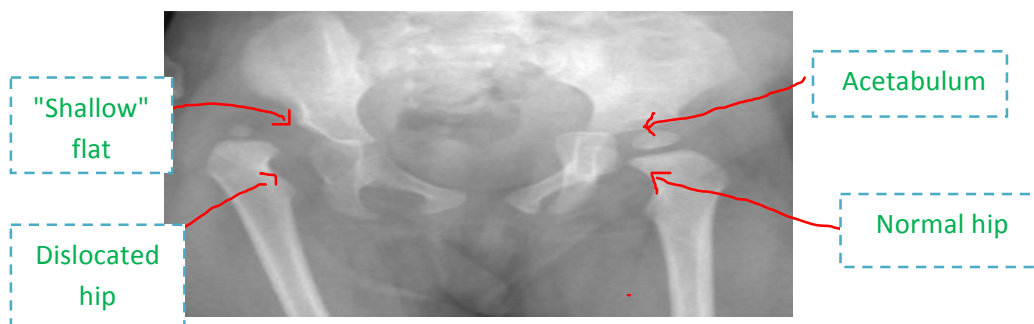


## Medial Collateral Ligament (MCL): Extra articular

We do stress test for the knee to determine if there is injury of the collateral ligaments or not. It appears normal in x-ray.



## (Developmental Dislocation of Hip) DDH:



-The mother complains of difficulty in changing the baby diaper. At the beginning we do US because it's easier but if the baby age become few months, we do x-ray.

## Orthosis : Pavlick Harness



## Foot deformity: Hallux Valgus (big toe goes away from midline) (acquired)

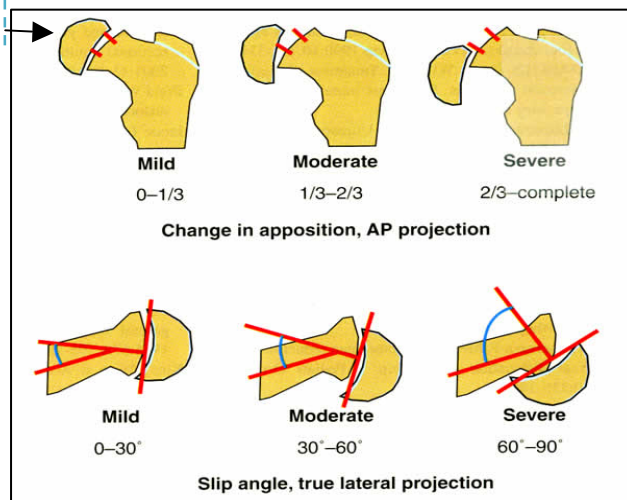


Forefoot become wide then when patient wearing tight shoes it becomes more deviation.



## SCFE (Slipped Capital Femoral Epiphysis):

Epiphysis

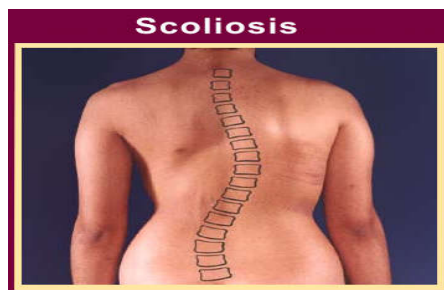


This is a rare condition but it's important to know how to diagnose it.

The children when they reach the puberty age, they feel hip pain (sometimes they feel it in the knee also) which cause restriction of hip movement. So, what happen is that the ligaments which attach the epiphysis with the main shaft become affected by the hormones & become lax. Along with the effect of weight this will move the epiphysis from its place.

This condition will lead to an early joint replacement.

## Scoliosis:



-It is the lateral deviation of the spin from the mid line.

- Most of the time it's painless and developmental (but it could be congenital).

-Mostly affect female more than male.

**Degenerative Disorders:** the most common cause is losing of hydration.

- Occur at any joint
- Can be primary (due to aging) or secondary (other problems e.g. infection).
- Increased wear and tear
- Can lead to pain and/or deformity and/or loss of function
- Increase with advancing age
- Management depends on type and age

### Osteoarthritis of Hip:



The changes which can happen in osteoarthritic hip:

-Decrease in the joint space because the cartilage becomes thinner.

- There maybe sclerosis of the hip.

-There will be an osteophyte.

### OA Knee:



There are:

- Decrease medial joint space.
- Osteophytes formation.
- Sclerosis.

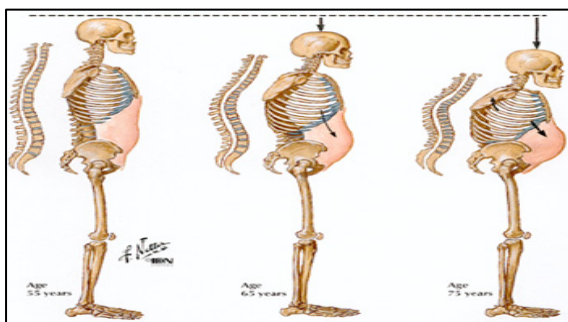
### Metabolic Disorders (Rickets):



-It's due to vitamin D, calcium deficiency or insufficient exposure to the Sunlight (nutritional & sun exposure).

-Sometimes the cause is the kidney disease & it's called renal rickets.

### Spinal Osteoporosis:

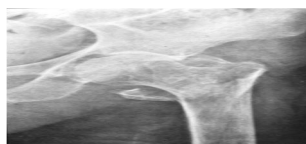


-Mainly affect female more than male due to the decrease of the level of estrogen after the menopause.

-It's painless & can cause the fractures.

-Osteoporotic fractures are painful & can affect the patient's life & he may die from it (especially hip fracture).

**Osteoporosis: Fractured NOF** (Neck of the Femur) the most dangerous complication especially in old people)



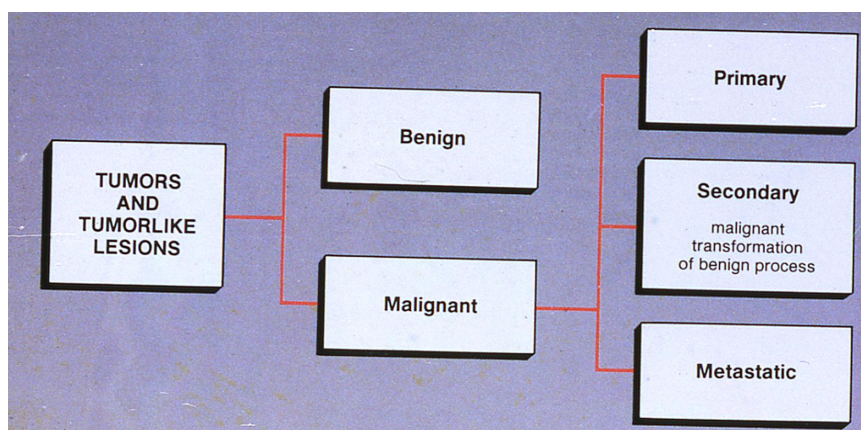
Hemi-Arthroplasty Lt Hip



Osteoporosis: Colles fracture



## Bone Tumors:

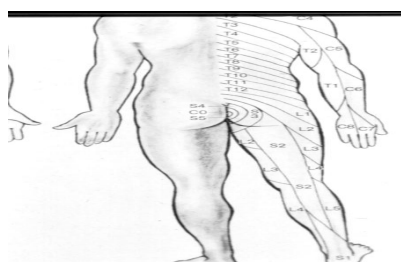
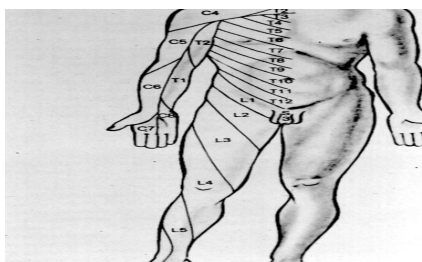


In the x-ray there are:

- Bone destruction.
- Pathological fracture.
- Ill defined lesion.

Most likely it's malignant tumor.

## Neurological Evaluation: Sensory



## Muscle wasting:



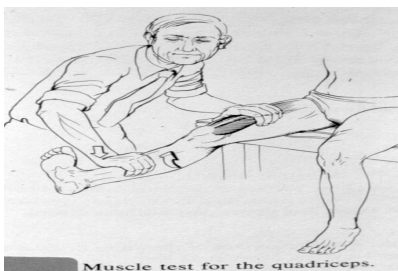
There are differences between the R & L side:

- Difference in the shoulder's shape (the left one has normal contour while the right one is slipped).
- There is atrophy of the muscle at the right side due to nerve damage.

## Muscle Power Testing: Iliopsoas



## Muscle Power Testing : Quadriceps



Muscle Power testing:

- 0 = no power.
- 1= simple contracting.
- 2= slight contraction within the gravity.
- 3= muscle power against gravity
- 4= against gravity with resistance
- 5= against gravity with normal resistance

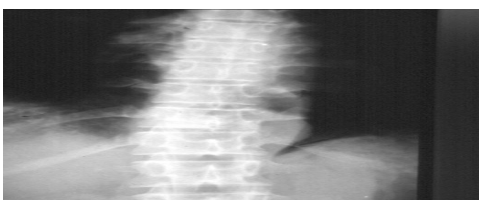
## Neuromuscular disorder: Polio



## Chronic Osteomyelitis : discharging sinus



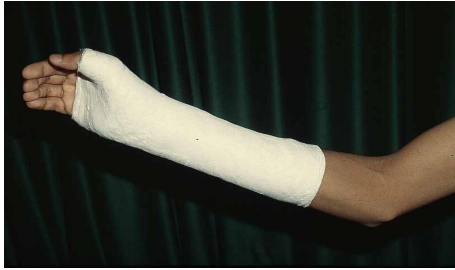
## Spinal Infection: Tuberculosis



## Chronic Osteomyelitis : Sequestrum



## Clinical Skill: Cast application



## External Fixator : Ilizarov

