1- Introduction to orthopedics

Objectives:

- To explain what Orthopedic is and what conditions will be discussed during this course.
- Explain what we mean by red flags.
- List the different causes of orthopedic disease.
- Describe some of clinical examination tests.
- Introduce titles of Clinical Skills which will be taught during this course.

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References: 435 team, Doctors' notes, 436 slides, Toronto notes, 433 team

Introduction

★ Orthopedic specialty:

Branch of medicine which manages trauma and disease of **Musculoskeletal system**.

- It includes: bones, muscles, tendons, ligaments, joints, peripheral nerves, vertebral column, spinal cord and its nerves. not only bones

Subspecialties: General, pediatric, sports and reconstructive (commonly ACL "anterior cruciate ligament" injury), trauma, arthroplasty, spinal surgery, foot and ankle surgery, oncology, hand surgery, upper limb (new) elbow & shoulder.

Red Flags = Warning Symptom or Sign. One or two will come in OSCE

- Should always be looked for and remembered.
- Presence of a red flag means the necessity for urgent or different action/intervention.

★ Examples of red flags:

1. **Open fractures:** Fractures communicate with the external environment
   More serious and very high possibility of infection and complications.
2. **Complicated fractures:** Fracture with a neurovascular damage E.g. leg fracture with foot drop
   Fracture with injury to the major blood vessel E.g. bleeding or DVT, nerve or nearby structures
3. **Compartment Syndrome:** you have to diagnose it early
   Increase in intra-compartment pressure which endangers the blood circulation of the limb and may affect nerve supply.
4. **Cauda Equina Syndrome**:
   Compression of the nerve roots of the Cauda Equina at the spinal canal which affects motor and nerve supply to lower limbs and bladder (incontinence) (also saddle or peri-anal area sensory).
5. **Infection:** Bone, joint and soft tissue.
   Osteomyelitis: Infection of the **bone**.
   Septic Arthritis: Infection of the **joint**.
   Cellulitis: Spreading Infection of the **soft tissue**. May cause septicemia or irreversible damage. Could cause necrotizing fasciitis.

+ Multiple Trauma or Pelvic Injury: (complicated fracture)

More than one fracture or injury sustained at the same time. Consider massive blood loss and associated injuries.

+ Acute joint Dislocations: (complicated fracture)

Requires urgent reduction or may cause serious complications. Must treated by 24h bcs blood supply is compromised.

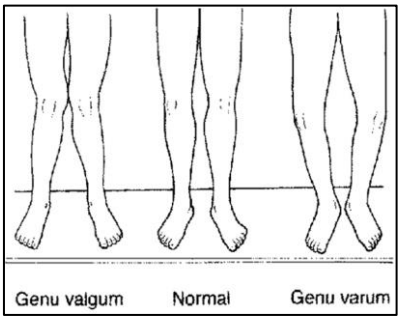
*Dislocation: Complete disruption of the joint.

*Subluxation: Partial dislocation.

Alignment terminology

- In OSCE during inspection you should comment on: Atrophy, alignment and deformities

We describe the alignment as:



- **Normal** → leg is straight.
- **Varus** → (bow-legged) (knees are pushed **away** from each other; "RUM in English means alcohol bottle" So imagine a bottle between the knees)
- **VaLgus** (knees are stick to each other; val**Gum**).
  L: "the distal part" lateral from the central line.

Cubitus varus	Cubitus valgus
	
Distal piece of humerus is going towards the ulna, medially (you can kind of see the olecranon)	Distal piece of humerus is going away from the ulna (away from olecranon)

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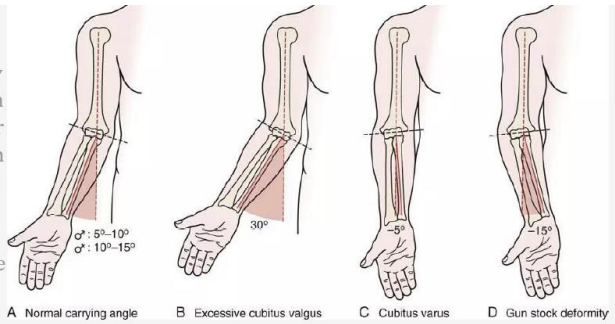
In the anatomical position the forearms are normally angled slightly outward relative to the line of the arm a carrying angle of 5–15 degrees of valgus. 'Varus' or 'valgus' deformity is determined by angular deviation towards the body or away beyond those limits or, in unilateral abnormalities, by comparison with the normal side. Gunstock deformity = cubitus varus (look at the angle between the longitudinal axis of the arm and the forearm)



Deformities

★Congenital: Common congenital Anomaly:

Talipes Equino-Varus (TEV). AKA clubfoot (very common in KSA)

★Acquired:

- Trauma "most common"
  - It includes: Fractures → Break in the continuity of bone, dislocations, soft tissues injuries (ligaments, tendons), nerve injuries and epiphyseal injury.
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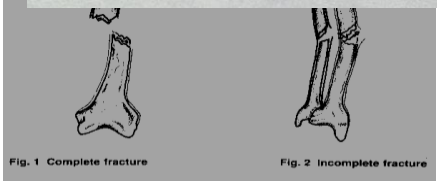
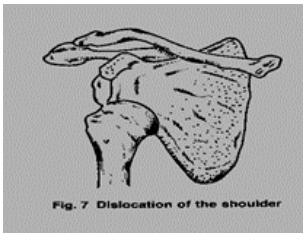


- Developmental:
  - Developmental Dislocation of Hip, Developmental Foot deformity, Slipped Capital Femoral Epiphysis and Spinal Deformities.
- Inflammation: Rheumatological, autoimmune.
- Infection: Osteomyelitis.
- Neuromuscular: Poliomyelitis. Duchenne muscular dystrophy, cerebral palsy
- Degenerative: Primary or secondary (osteoarthritis)
- Metabolic: Rickets, osteoporosis.
- Tumor: osteosarcoma, myosarcoma, chondrosarcoma

Traumatic Injuries

★ Fractures:

1- Complete: complete separation.
2- Incomplete: incomplete separation.

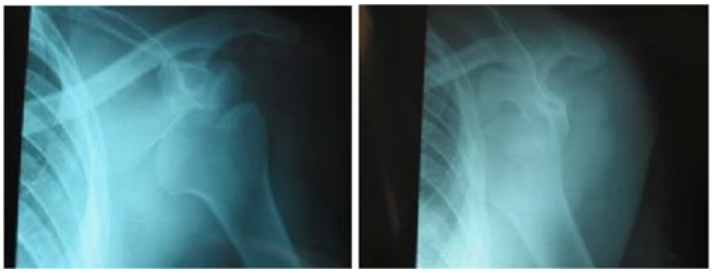


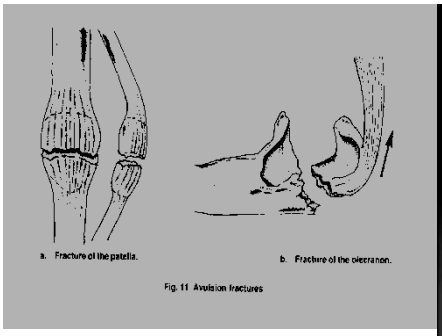
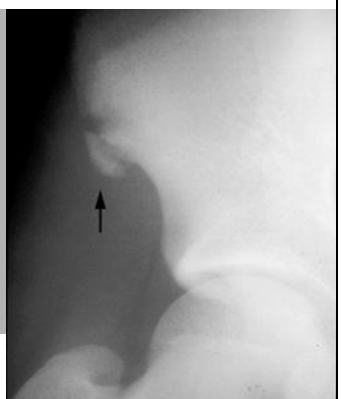
★ Dislocations: Complete separation of the articular surface.

Distal to proximal fragment: Anterior, Posterior, Inferior, Superior.

★ Fracture Dislocation: Dislocation with fracture of the bone.

Always X-Ray Joint Above and Below.



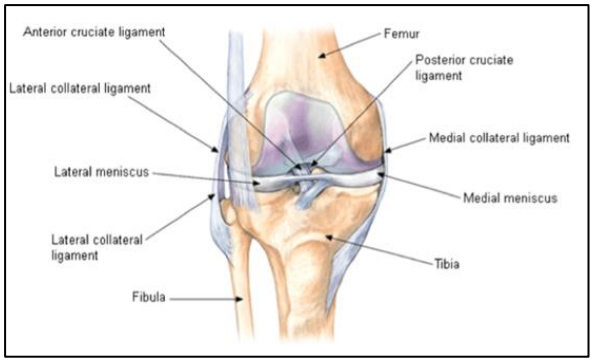
★ Avulsion Fracture	★ Intra-articular Fractures
Force due to resisted muscle action. Examples: fracture of anterior superior iliac spine due to resisted action of sartorius muscle.	If displaced ; should always be treated by Open Reduction and Internal Fixation (ORIF). Failure to reduce and fix such fracture results in loss of function, deformity and early degenerative changes.
  **"Avulsion[1]" → Transverse pattern**	

[1] An avulsion fracture is when a tendon or ligament pulls a piece of fractured bone away

★ Soft tissue injury:

- Most common soft tissue injury: **knee joint**.

- Most common knee joint injury: **Anterior Cruciate Ligament (ACL) Anterior Cruciate.** "Common in sport injuries"



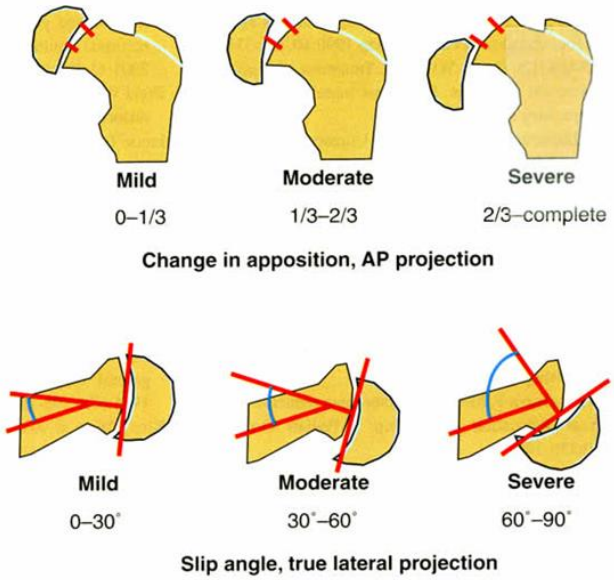
→ Anterior Cruciate Ligament MRI.

Developmental deformities:

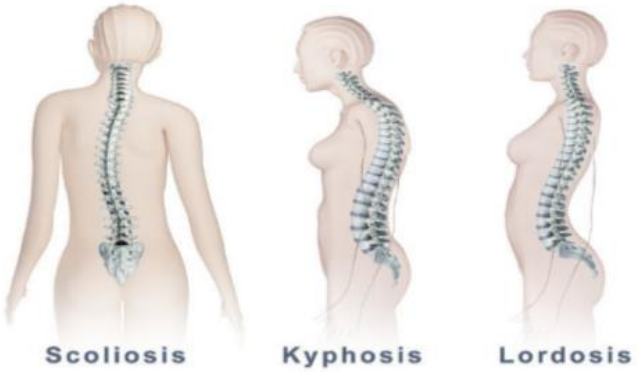
Developmental Dislocation (Dysplasia) of Hip (DDH):
Underdeveloped Epiphysis (seen on the left side of the x-ray)

Developmental Foot Deformity: Hallux Valgus

Slipped Capital Femoral Epiphysis (SCFE):



Spinal Deformities:
These deformities may be congenital or acquired:
Hyper lordosis, Kyphosis, Scoliosis



Degenerative disorders:

- Occur at any joint.
- Can be primary or secondary (more common).
- Can lead to pain and/or deformity and/or loss of function.

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4 signs of OA on x-ray: imp
Osteophytes, Sclerosis, Decrease in joint space, Cystic changes</td>
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Usually Arthritis involves the medial side.</td>
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<tr>
<td>Osteoarthritis of Hip</td>
<td>Osteoarthritis of Knee</td>
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Metabolic:

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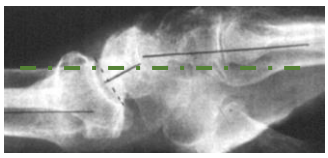
<td>Rickets: (Bow legs)
  </td>
<td>Osteoporosis: Pathological Fracture Of hip | Colles fracture
 


الطبيعي إنها تكون كلها على ليفل واحد</td>
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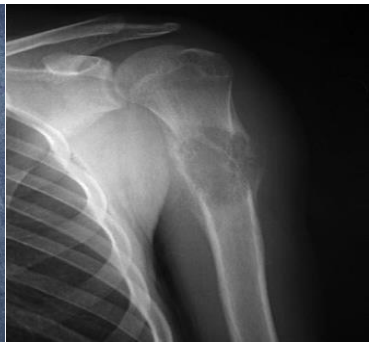
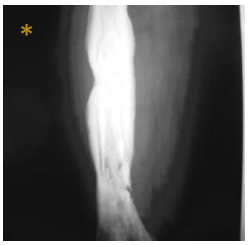
Bone Tumors:

Infections:

Chronic Osteomyelitis → Discharging sinus, Sequestrum*



Neuromuscular disorder:

Poliomyelitis: very rare nowadays due to vaccination "Pure motor involvement"

★ Nerve Injury:

Axillary nerve injury	Spinal cord injury
 Wasting of Deltoid muscle	- Often results from fracture dislocation of spine. - When injury is at cervical spine it may result in **Tetraplegia**. - Injury at dorsal spine may result in **Paraplegia**.

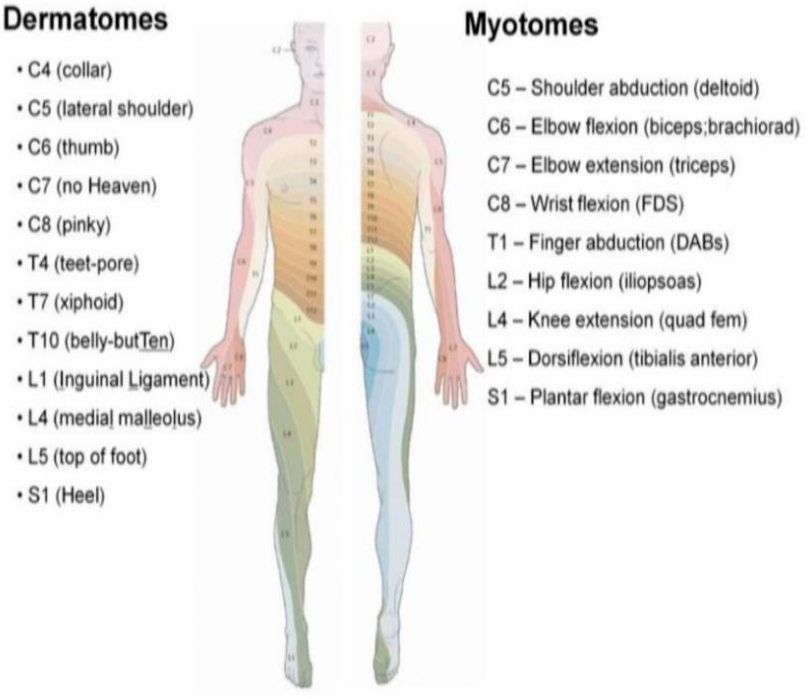
★ Neurological Evaluation: Sensory & Motor

You have to know

We have two important medical terminologies we have to know the **difference:**

Central nerve examination: examine the myotomes and dermatomes [we use it in spine condition]

Peripheral nerve examination: examine the ulnar, redial, median and so on [on fracture condition]



★ Physiotherapy for Orthopedic Patients:

Physiotherapy is an important part of orthopedic and trauma management.

- It is used for: pain relief, prevention of stiffness, muscle strengthening, mobilization of stiff joint or spine, training non-weight bearing or partial weight bearing.

Physiotherapy modalities include: heat, cold, exercise, ultrasound, traction, electrical stimulation.

Clinical Skill:

★ Cast application

★ Knee Aspiration