1-Introduction to the Orthopedics

Objectives:

1. To explain what Orthopedic is and what conditions will be discussed during this course
2. Explain what we mean by Red Flags
3. List the different causes of orthopedic disease.
4. Describe some of clinical examination tests
5. Introduce titles of Clinical Skills which will be taught during this course.

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References: 436 Doctor slides and notes + 435Team + Toronto notes+ 433 team

[Color index : Important | Notes | Extra] Editing file link

introduction

- Branch of surgery concerned with conditions involving the **musculoskeletal system**. Orthopedic surgeons use both surgical and nonsurgical means to treat musculoskeletal trauma, spine diseases, sports injuries, degenerative diseases, infections, tumors, and congenital disorders.
- 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

- 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.
- 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, 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:**
   Osteomyelitis: Infection of the **bone**.
   Septic Arthritis: Infection of the **joint**.
   Cellulitis: Spreading Infection of the **soft tissue**. May cause septicemia or irreversible damage.

-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.

Dislocation: complete disruption of the joint

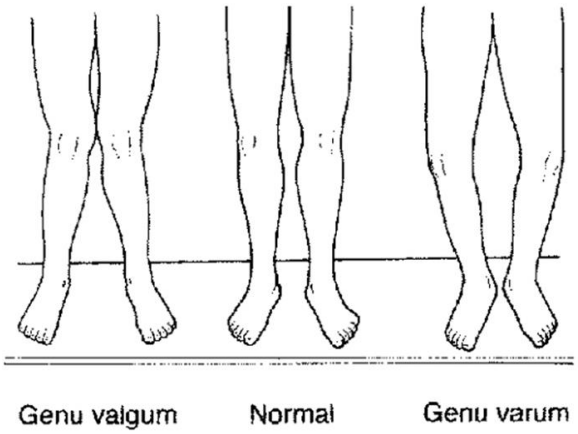
Subluxation: partial dislocation

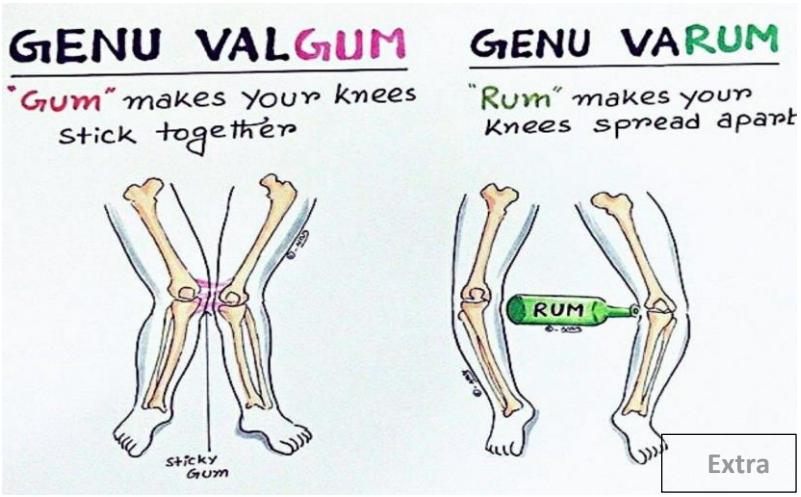
Alignment terminology

We describe the alignment as:

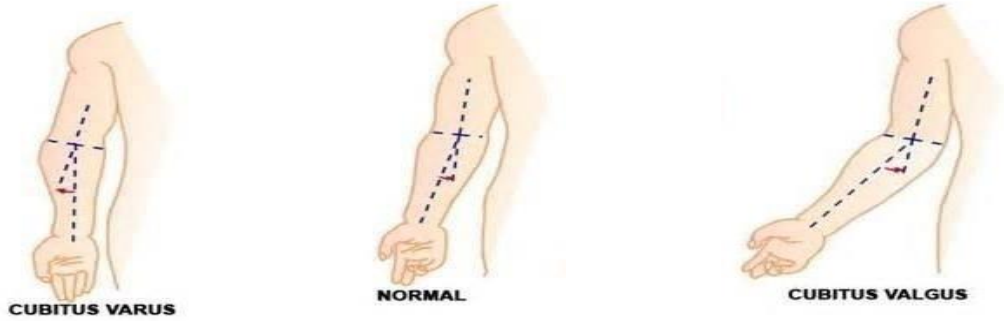
- Normal leg is straight
- Varus (bow-legged) **(knee is pushed away from each other; "RUM in English means alcohol bottle" so imagine a bottle b the knees)**
- Valgus **(legs are stick to each other; valgum "GUM"** يعني علكة و العلكة تخلي الأشياء ملتصقة**)**

(varus is same as varum / valgum is same as valgus)



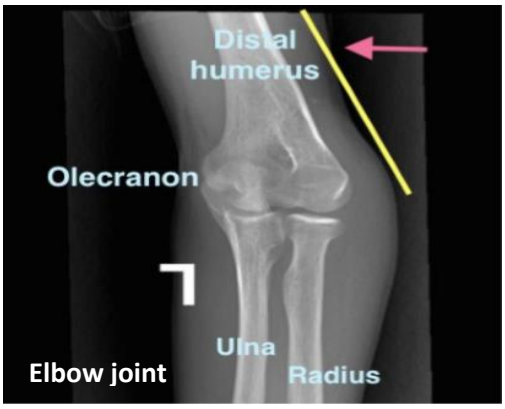


- Cubitus varus and cubitus valgus:



cubitus varus **(humerus towards ulna)**

cubitus valgus **(humerus going away from ulna)**



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)

hallux varus

hallux valgus

Deformities

- **Congenital:** (will be discussed in future lectures in details)
  Common congenital Anomaly: Talipes Equino-Varus (TEV), known as clubfoot (very common in KSA)
- **Acquired:** (will be discussed in future lectures in details)

★ Trauma "most common"
- It includes: fractures dislocations soft tissues injuries (ligaments, tendons), nerve injuries and epiphyseal injury.

★ Developmental:
- Developmental Dislocation of Hip, Developmental Foot deformity, Slipped Capital Femoral Epiphysis, Spinal Deformities.

★ Inflammation:
- rheumatological dx, autoimmune

★ Infection
- Osteomyelitis.

★ Neuromuscular:
- Poliomyelitis. duchenne muscular dystrophy, cerebral palsy

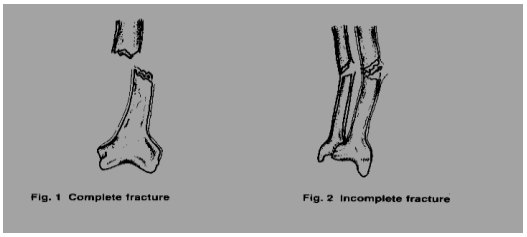
★ Degenerative:
- Primary or secondary (osteoarthritis)

★ Metabolic:
-Rickets, osteoporosis.

★ Tumor:
-osteosarcoma, myosarcoma, chondrosarcoma

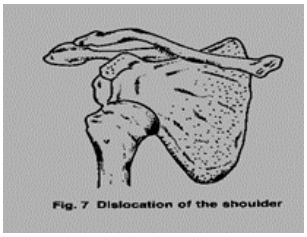
Traumatic Injuries

- **Fractures:** Break in the continuity of bone.
  Types:
  1-complete: complete separation.
  2-incomplete: incomplete separation.



- **Dislocations:** Complete separation of the articular surface.
  Types:
  1. Complete

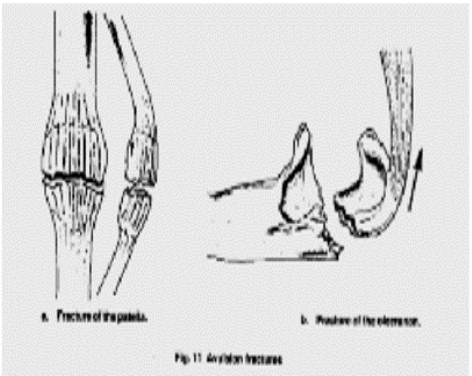
  2. Partial (subluxation): some contact

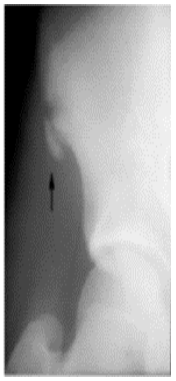


Extra

- **Fracture Dislocation:** Dislocation with fracture of the bone
  Types:

- **Avulsion Fracture:** Force due to resisted Muscle Action
  [An avulsion fracture is when a tendon or ligament pulls a piece of fractured bone away **Examples: fracture of anterior superior iliac spine due to resisted action of sartorius muscle. - fracture of anterior inferior iliac spine due to resisted action of rectus femoris muscle.]**





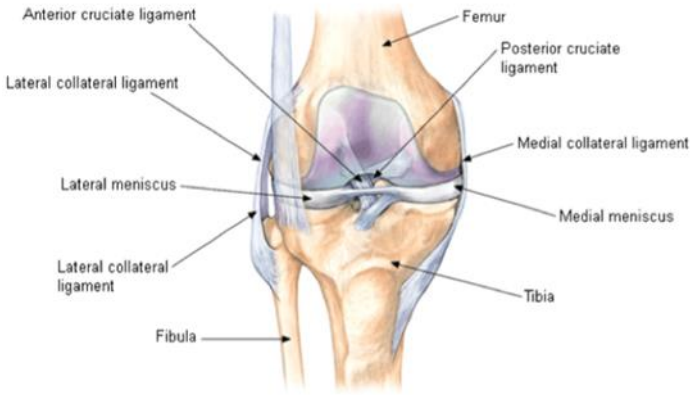
- **Intra-articular Fractures:**
  If displaced (needs to be fixed); should always be treated by Open Reduction and Internal Fixation (ORIF) basically realign cartilage + fixation failure to reduce and fix such fracture results in loss of function, deformity and early degenerative changes.

Extra

- **Soft tissue injury**

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

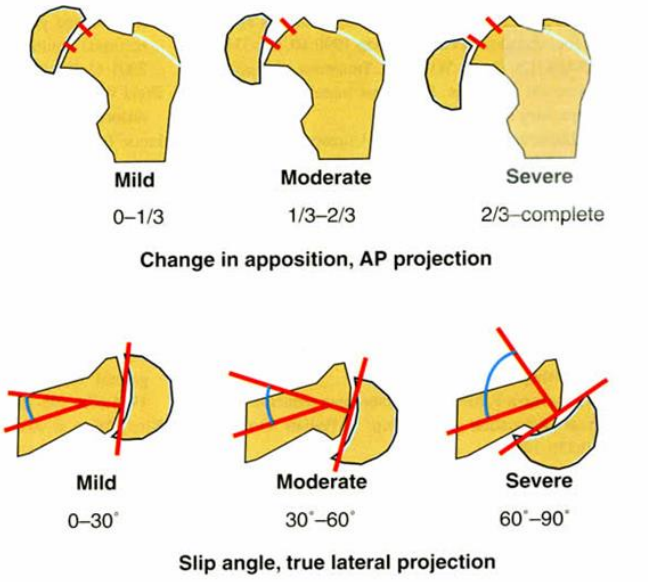
- Most common knee joint injury: **Anterior Cruciate Ligament (ACL) Anterior Cruciate**



Developmental Deformities

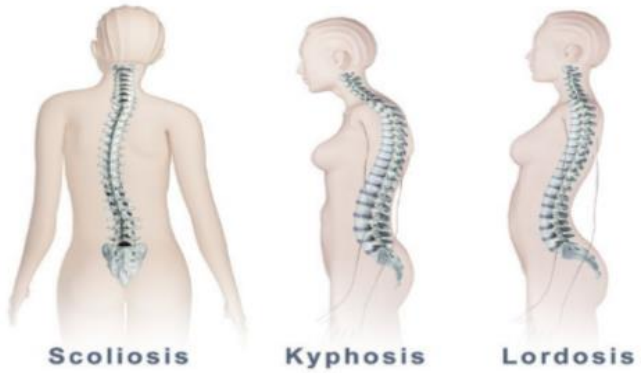
Developmental Dislocation (Dysplasia) of Hip (DDH): Underdeveloped Epiphysis (seen on the left side of the x-ray)	**Developmental Foot Deformity:** Hallux Valgus (hallux is the Latin name of the joint we wrote it in the beginning) causes symptoms on the medial edge of the foot, the sole, and the small toes.
	

Slipped Capital Femoral Epiphysis (SCFE): SCFE (Slipped Epiphysis)



Spinal Deformities:
<u>These deformities may be congenital or acquired</u>

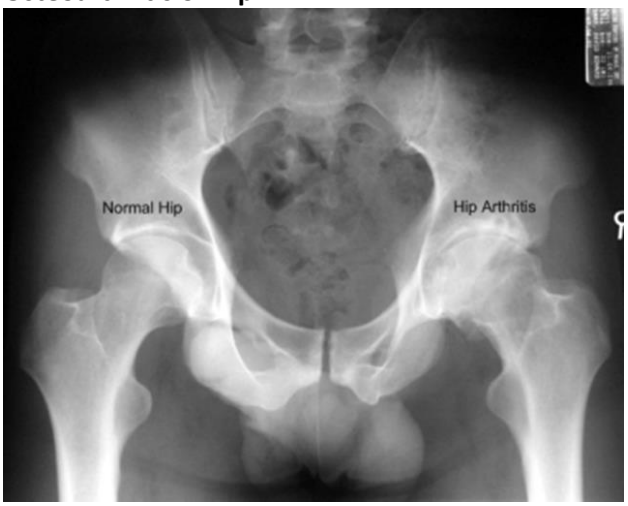
Hyper lordosis
Kyphosis
Scoliosis



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.

Osteoarthritis of Hip



4 signs of OA on x-ray: osteophytes- sclerosis- decrease in joint space – cystic changes

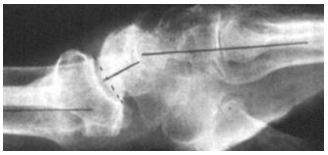
Osteoarthritis of Knee

Metabolic

Rickets:

Osteoporosis:

Pathological Fracture Of hip | Colles fracture



Bone Tumors

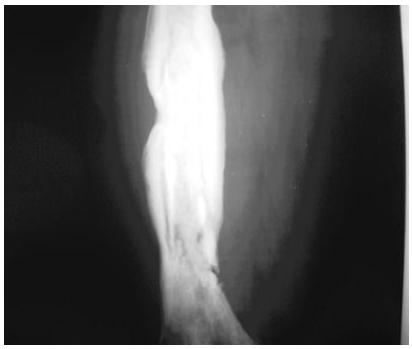
Can be a soft tissue or bony tumor

Lytic lesion on humerus.

Infections

Chronic Osteomyelitis

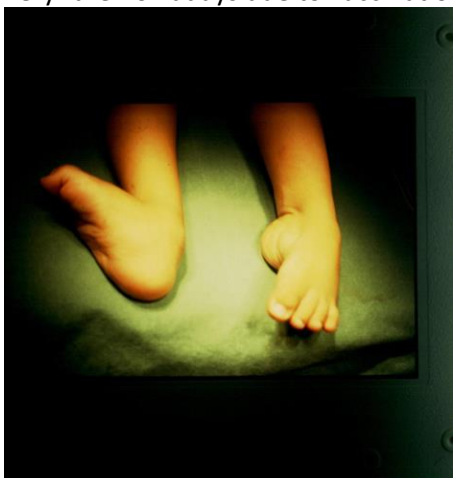
Discharging sinus



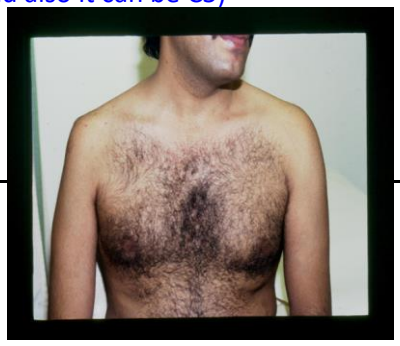
Sequestrum

Neuromuscular

Poliomyelitis:
very rare nowadays due to vaccination “Pure motor involvement”



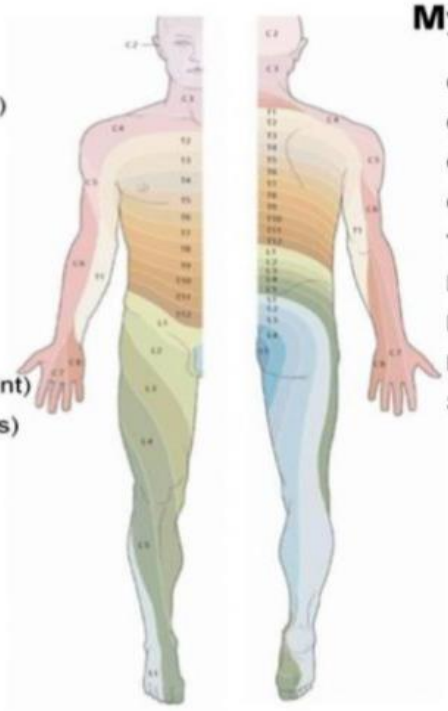
Nerve Injury

Axillary Nerve Injury	Spinal Cord Injury
Wasting of right deltoid muscle due to Axillary nerve injury (and also it can be C5) 	Often results from fracture dislocation of the spine. When injury is at <u>cervical spine</u> it may result in tetraplegia. Injury at <u>dorsal spine</u> may result in paraplegia.

- **Neurological Evaluation: Sensory & Motor**

Dermatomes

- C4 (collar)
- C5 (lateral shoulder)
- C6 (thumb)
- C7 (no Heaven)
- C8 (pinky)
- T4 (teet-pore)
- T7 (xiphoid)
- T10 (belly-butTen)
- L1 (Inguinal Ligament)
- L4 (medial malleolus)
- L5 (top of foot)
- S1 (Heel)



Myotomes

C5 – Shoulder abduction (deltoid)
C6 – Elbow flexion (biceps;brachiorad)
C7 – Elbow extension (triceps)
C8 – Wrist flexion (FDS)
T1 – Finger abduction (DABs)
L2 – Hip flexion (iliopsoas)
L4 – Knee extension (quad fem)
L5 – Dorsiflexion (tibialis anterior)
S1 – Plantar flexion (gastrocnemius)

we have two important medical terminology 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:**

Not every orthopedic case is treated surgically. In fact, most are treated conservatively. Conservative treatment includes: pain killers, rest, activity modification, special brace or splinting.

- Physiotherapy is an important part of recovery, It is used for: pain relief, prevention of stiffness by improving the range of motion muscle strengthening and preventing wasting and muscle atrophy mobilization of stiff joint or spine, training non-weight bearing or partial weight bearing or full weight bearing.
- Physiotherapy modalities include: heat, cold, exercise, ultrasound, traction, electrical stimulation.