Orthopedics

432 Team

COMPREHENSIVE SUMMARY

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Color Code:

Slides	Doctor's Notes	Team Notes	Important	
431 team work	Arabic Words	Books' notes	Other Sources	

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(1) Introduction to Orthopedics

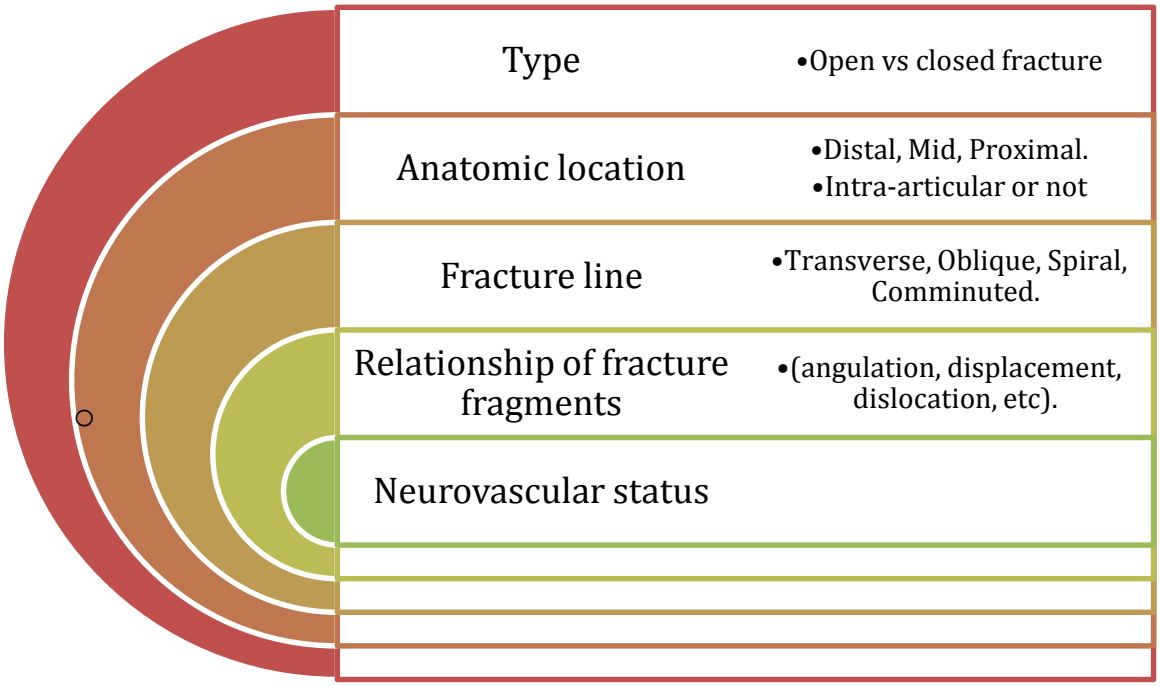
- **RED FLAGS:** Open Fractures, Complicated Fractures, Compartment Syndrome, Acute joint Dislocations, Multiple Trauma or Pelvic Injury, Cauda Equina Syndrome and Infection of Bone, Joint and Soft Tissue: Osteomyelitis, Septic Arthritis and Cellulitis.
- **Valgus:** when the limb go lateral and the joint go medial.
- **Varus:** when the limb go medial the joint lateral.
- **Orthopedic Diseases:** Congenital and Acquired.
- To describe a **dislocation**, you start by Distal to Proximal fragment: Anterior, Posterior, Inferior, or Superior.
- **Acute dislocation** may be complicated by neurovascular injury.
- **Acute dislocations** require urgent reduction
- **Intra-articular Fractures:** If displaced; should always be treated by ORIF= (Open Reduction and Internal Fixation). Failure to reduce and fix such fracture results in loss of function, deformity and early degenerative changes.
- **Lachman's test:** To diagnose injury of the anterior cruciate ligament (ACL).
- When the mother complains of difficulty in changing the baby's diaper, think about **Developmental Dislocation of Hip (DDH).**
- **Slipped Capital Femoral Epiphysis (SCFE)** develops during periods of accelerated growth, shortly after the onset of puberty.
- **Hyperlordosis** is an excessive inwards curvature of the lumbar (lower) spine. It's very common among females in our society.
- **Kyphosis** is an exaggerated curvature of the upper (thoracic) spine that creates a hunchback appearance.
- **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.

(2) Diagnostic Imaging & Investigations

1. ABCS approach

A	- Assess adequacy of x-ray which includes proper number of views and penetration. - Assess alignment of X-rays.
B	Examine bones throughout their entire length for fracture lines and/or distortions.
C	Examine cartilages (joint spaces) for widening.
S	Assess soft tissue for swelling/effusions

2. 2. LANGUAGE OF FRACTURES:



(3) Compartment Syndrome & Acute Joints Dislocation

Compartment syndrome

- Develops when there is excessive, sustained increase of local tissue pressure in a closed compartment so that the process of exchange becomes affected. Normally the pressure of the compartment should be lower than the diastolic pressure by at least 30 mmgh.
- **Risk factors (causes):** Edema – Trauma - Burns – Injection – Bleeding - Prolonged vascular occlusion - Tight bandage - Post-surgery.

Diagnosis:

- **Early:** Most important sign is PAIN. It increases while stretching and the Presence of Risk Factors.
- **Late:** 4 Ps: Paralysis, Paresthesia, Pallor and Pulslessness.
- Time window for CS is 6 Hours.

Management:

- **Initial (undeveloped CS):** Maintain normal BP - Remove any constricting bandage - Keep limb at heart level - Regular close monitoring (15-30 minute intervals) - Avoid nerve blocks, sedation and strong analgesia to obtain patients feedback.
- **Fully developed CS:** Maintain normal BP - Remove any constricting bandage - Keep limb at heart level - Diuresis to avoid kidney tubular injury if late - Urgent surgical decompression (Fasciotomy).

Acute Joint Dislocation

- **Joint stability:** bony stability and dynamic stability.
- It takes higher energy to dislocate a joint with bony stability than a joint with mainly soft tissue stability.
- **Connective tissue disorders** may lead to increased joint instability due to abnormal soft tissue stabilizers.
- Dislocation of a major joint should lead to considering other injuries.
- **Risk group:** Major trauma victims - Athletes and sport enthusiasts - Connective tissue disorder patients.
- **Diagnosis:** Hx and PEx – X-ray urgent (no delay) (special views).

Management principles:

Exclude other injuries - Pain control - Urgent reduction - Check stability - Check NV after reduction – X-ray post reduction - Protect the joint – Rehabilitation - Look for late complications.

Complications:

- **Early:** NV injury – CS – Fractures - Osteochondral lesion/fracture - Heterotopic calcification.
- **Late:** Stiffness - Chronic instability - AVN/ avascular necrosis - Arthrosis.

(4) Principles of Fractures

Bones Types:

1) Lamellar Bones.
2) Cancellous Bones.
3) Woven Bones.

Bones Composition:

- **Cells** (osteocytes, osteoblasts, osteoclasts).
- **Extracellular Matrix** (Organic (35%) Inorganic (65%)).

Fracture:

Can be described in different ways: Extent – Location – Morphology - Mechanism - Associated soft tissue injuries.

Fracture Healing:

1) Indirect bone healing:
   - A- Hematoma formation (Inflammation phase) (1-2 weeks)
   - B- Soft Callus (2-3 weeks)
   - C- Hard Callus (3-12 weeks) D- Remodeling (Years)
2) Direct bone healing.

Healing Factors:

Complexity, Soft tissue damage, Close vs. open, Periosteal stripping, Malnutrition, Smoking.

Principles of Evaluation:

- **History** (What? How? (Mechanism of injury) When? Where?).
- **Physical Exam** (inspection, palpate, range of motion cannot be assessed, vascular exam, peripheral nerve, check the compartment tightness), R/O open fracture, compartment syndrome and N/V injuries.
- **Investigations** (Basic blood works, X-rays of interest, advanced radiological exams if needed).

Treatment Pathway:

- **Reduction** (re-align).
- **Immobilization** (Fractures hurt, immobilization relieves pain).
- **Definitive treatment** (indicated when reduction cannot be achieved or held at initial stage).
- **Rehabilitation** (to restore the limb's function).

(5) Degenerative Joint Disorders

- Articular **Cartilage** has poor repairing properties, mostly repaired with fibrocartilage which is less effective than hyaline cartilage.
- **Synovium** is the target of autoimmune reactions.
- There are two **types** of Osteoarthritis primary (idiopathic), secondary Metabolic, inflammatory (RA), endocrine, trauma, etc.
- **Causes** of Osteoarthritis (OA) are increased mechanical stress **or** weakening of the articular cartilage.

Prevalence:

- OA is the **commonest** of all joint diseases.
- More common in **female.**
- Osteoarthritis is much more common in some joints (hip, **knee**, spine and the fingers).

The cardinal (major) features of osteoarthritis:

1) Progressive loss of articular cartilage thickness.
2) Subarticular cyst formation and sclerosis.
3) Osteophyte formation.
4) Synovial irritation *(synovitis)*.
5) Capsular fibrosis.

Clinical features:

Intermittent course, with periods of remission sometimes lasting for months.

Symptoms:

- Pain: **Localized** or rarely referred aggravated by exertion and relieved by rest. The most common cause of that is Bone pressure.
- Stiffness
- Loss of function.

Signs:

Swelling, deformity (Varus mal-alignment and fixed flexion in OA and valgus and hyperextension in RA), tenderness, limited movement, crepitus and instability.

Risk factors:

Old age, obesity and trauma.

X-rays findings of OA:

- **A**symmetrical narrowing of the joint space. **S**ymmetric narrowing in inflammatory OA.
- Subarticular cyst formation and sclerosis
- Osteophyte formation at the margin
- Evidence of previous disorders that may have increased OA risk.

- **Late features:** Mal-alignment, Joint subluxation, Bone loss, Loose bodies.

Complications:

- Capsular herniation
- Rotator cuff dysfunction
- Spinal stenosis
- Loose bodies
- Spondylolisthesis at L4/5

Treatment:

Depends on Joint (or joints) involved, stage of the disorder, severity of the symptoms, age of the patient and functional needs.

- **Early Stage of Treatment:**
  - Maintain movement and muscle strength (Physiotherapy).
  - Protect the joint from 'overload (**Weight-reduction,** Shock-absorbing shoes Walking stick).
  - Modify daily activities (avoiding activities like climbing stairs and squatting)
  - Medications (paracetamol or NSAIDs).

- **Intermediate stage of the disease:**
  Indications of surgery: Pain (most common), Sub-laxation, and severe bone erosion.

  ⇒ Joint Debridement (Arthroscopy).

  ⇒ Corrective Osteotomy done in Young, active, mild OA.

- **Late stage of the disease:**

  ⇒ Arthroplasty (Joint Replacement). Two types (total and partial).

  ⇒ Arthrodesis (Fusion) in Small joints like: hand, foot and spine.

(6) Open Fracture

Open fractures:

- A fracture that at some point communicated with the environment.
- The bone could be visible within the opening wound at time of presentation or not. That's why any wound close to a fracture is potentially an open fracture until proven otherwise!!!
- If a small wound continuously oozing blood + you see fat droplet within the blood, it is an open fracture for sure.
- If poly trauma apply ATLS
- If isolated take full Hx (time since injury, past surgical/medical history, allergy, drugs, smoking, when was the last meal)
- Asses the affected limp for: (soft tissue , bone , neurovascular status)
- Remember to check neurovascular status on arrival, post reduction, and after splinting, before OR, and after OR. Document everything.
- Open fracture grade:
  - ✓ **Grade 1**: less than or equal to 1 cm, < 6 h since injury, clean wound, non- segmental nor severely comminuted.
  - ✓ **Grade 2:** same as grade 1 except > 1 cm
  - ✓ **Grade 3:** anything that does not apply on 1 or 2:
    - **3A:** any size, > 6 h, no need for soft tissue coverage, extensive contamination of soft tissue.
    - **3B**: any open fracture needs soft tissue coverage.
    - **3C**: any open fracture needs vascular repair

To know whether it is 3B or 3C check for pulse.

  - ✓ Grade 1 give 1st generation cephalosporin (gram +ve) Ex: cefazolin
  - ✓ Grade 2 cover both gram –ve and +ve by adding Gentamicin
  - ✓ Grade 3 add penicillin to cover for anaerobes such as clostridium
  - ✓ In real life we try to cover for both gram –ve and +ve in grade 1.
- **In OR:** irrigate with normal saline, debride necrotic tissue.
- Remove bone fragments without soft tissue attachment except those with articular surface.
- Do not close wound on first look. Recheck again after 48-72 hours.
- Avoid internal fixator, we use external fixator.

Vascular injury:

- Hard sign >>> do realignment>>>improved>>> close observation.
- Hard sign >>> do realignment >>> persistent >>> vascular intervention.
- Orthopedic surgeon goes first to do quick fixation then vascular surgeon to do repair.

Nerve injury:

- Close fracture that does not needs surgery for fixation but with nerve injury → observe.
- Intact before reduction, absent after reduction: usually observe Close fracture requires open reduction and internal fixation but there is nerve injury → limited exploration.
- Open fracture with nerve injury → explore, tag nerve ends for later repair.

Pelvic fracture:

- Fall on one leg causing vertical sheers pelvic fracture. Extremely unstable. Lateral compression, e.g. car accident.
- Anterior force causing open book. More survival with open book then lateral compression and least is the.

Tetanus vaccination (depends on the wound):

- **Clean wound**: if booster less than 10 years do nothing, if more than 10 years or patient does not know or unconscious give 0.5 ml Td.
- **Other wounds:** if booster less than 5 year do nothing, more than 5 years give 0.5 ml Td. If not known or patient unconscious give 0.5 ml Td + TIG 250U (immunoglobulin).

(7) Cauda Equina Syndrome & Acute Spinal Injuries

- **Red Flags for BACK PAIN: B**owel or bladder dysfunction, **A**nesthesia (saddle), **C**onstitutional symptoms / malignancy, **K**hronic disease, **P**aresthesias, **A**ge >50 yr, **I**V drug use, **N**euromotor deficits.
- In order to see both C1&C2 and their articulation; Open mouth (odontoid) x- ray is required.
- Stable injury: One column only (Wedge fracture in anterior column). Treated conservatively.
- Unstable injury: Two or more columns. Treated surgically (intervention).
- Sympathetic tone loss if fracture above T6.
- Central cord syndrome: Characterized by disproportionally Motor deficit worse in UE >LE, sacral sparing.
- Anterior cord syndrome: Characterized by loss of corticospinal and spinothalamic tract with preserved posterior column. Which mean loss sense of pain, temperature and motor LE>UE and preserved deep touch, proprioception and vibration.
- Brown-Sequard syndrome: Ipsilateral deficit LCS tract & DC and contralateral LST tract.
- Conus-medullaris syndrome: Seen in T12-L1 injuries. Mixture of UMN & LMN.
- Cauda Equina Syndrome: LMN sign, Bilateral sensory loss, Sciatica (low back pain radiating to thighs and legs) and Sexual dysfunction (late presentation). MRI is mandatory and treated by Emergency decompression.
- Wedge fracture (flexion/compression) managed conservatively.
- Burst (compression), Chance (flexion/distraction) managed surgically.

(8) Common Paediatric Fractures

- Children have different physiology and anatomy that's why they have different fractures.

Physeal Classification: **Salter-Harris**

Indications for surgery:

- Head injury.
- Multiple injuries.
- Open fractures.
- Displaced intra articular fractures (Salter-Harris III-IV).
- Adolescence.
- Failure of conservative means (irreducible or unstable fractures).
- Severe soft-tissue injury or fractures with vascular injury.
- Neurological disorder.
- Malunion and delayed union.
- Compartment syndrome.

Methods of Fixation:

- Casting
- K-wires
- Intramedullary wires, elastic nails.
- Screws
- Plates
- IMN Intramedullary nail
- Ex-fix
- Combination

Common Pediatric Fractures:

- **Upper limb:**
  - Clavicle: Type I: Middle third, Type II: Lateral third, Type III: Medial third.
  - Supracondylar Fracture: Flexion Type and Extension Type. Pucker sign.
  - Distal Radius: Physeal Injuries and Metaphyseal Injuries.
- **Lower Limbs:**
  - Femur fractures: In children younger than walking age, 80% of these injuries are caused by child abuse.

(9) Bone & joint infection

Acute Osteomyelitis	• The causal organism is usually *Staphylococcus aureus (found in over 70% of cases).* • Sickle-cell disease are prone to infection by *Salmonella typhi.* • Bone infarction (Sequestrum) = Dead bone. • Subperiosteal (Involucrum) = New bone. • C-reactive protein: 4-6hrs (the most sensitive monitor). • ESR: 24-36hrs (takes time to rise). • MRI is the modality of choice. • Bone scan (very sensitive but not specific. • X-ray is not diagnostic. • Definitive diagnosis depends on seeing organisms at direct smear, or culturing organisms. • Empirical IV antibiotic treatment to be started immediately after sending samples for culture.
Chronic Osteomyelitis	• Sinus tract formation → may occasionally develop squamous cell carcinoma • Best test to identify the organism → Operative sampling of deep specimens from multiple foci. • *CT* and *MRI* are invaluable. • Empirical therapy is not indicated. IV antibiotics → must be based on deep cultures.
Septic arthritis	• Symptoms: like acute osteomyelitis. • Signs: hot swollen joint which is painful to any motion, inability to bear weight • Joint aspiration: WBC >50,000 (>90%PMNL), damaged WBC and **No crystals** • Rx: Admission for Emergency arthrotomy and washout, broad spectrum IV antibiotics and splintage **it's an emergency.**
Granulamatous bone infection=TB	• TB Follicles (tubercle): Lmyphocyte – monocytes, endothelial cells, Langhans giant cells, Coalesce, Caseation. • Musculoskeletal TB is Secondary to other primary TB lesions (Pulmonary, Renal, LN). • Route of spread: Hematogenous. • MSK targets: Spine (50%), Thoracic (50%). • Neurological compromise (motor>sensory). • Present with Constitutional symptoms: Fever, Weight loss, Night sweats, Anorexia. • T.B of The Spine: (Pott's disease): Affects the anterior part of the vertebral endplates Causing erosion and destruction and finally anterior wedging of the vertebrae. • Indications of surgery: (Spinal instability requiring stabilization, Abscess drainage if resistant to conservative treatment).

(10) Common Pediatric Lower Limb Disorder

1- **Leg ache:** is a benign Growing Pain, No functional disability
   - **Diagnosis** by exclusion of other Causes of the pain (Tumor – Trauma – Infection).
   - Pain at long bones of L.L, can be without activity & at night.
   - **Management:** Symptomatic (Analgesia, rest, massage), Reassurance.

2- **Limp:** Abnormal gait due to pain, weakness or deformity.
   - **Antalgic gait** (unilateral) → (Trauma – Tumor – Infection).
   - **Painless gait** (bilateral) → (Syndromic – Congenital).
   - **Weakness** → (general or nerve or muscle), **Deformity** → (bone or joint).
   - Above pelvis → (scoliosis) / below pelvis → Hips, knees, ankles, & feet.
   - **Management:** treat the cause.

3- **In-toeing & out-toeing**
   - **Physical Examination:** (Foot progression angle, hips rotational profile, Foot Thigh Axis, relation between the forefoot and the hindfoot).

- **In-toeing:** Causes & management:

1. Cerebral palsy and (DDH)
2. Femoral Anteversion → sit cross legged
3. Tibial Torsion→ spontaneous improvement
4. Forefoot Adduction anti-version shoes, or proper shoes reversal
5. Adducted Big Toe → spontaneous improvement

"Allow spontaneous correction (observational management) until 8 years of age"

- **Out-toeing:**
   - Causes: SCFE and Neuromuscular disorders, external tibial tortion,
   - Usually does not improve spontaneously
   - Operative correction: After the age 8y Foot propagation angle >30°

Version: Describes normal variations of limb rotation. It may be exaggerated.
Torsion: Describes abnormal limb rotation Internal or external

4- **Limb Length Inequality:**
   - True (what you Measure) and apparent (what you observe)
   - **Etiology:** Congenital (DDH), Developmental (Blount's), Traumatic,

Infection, Metabolic and Tumor.

- **Adverse effects:** Gait disturbance, Equinous deformity, Back pain, Scoliosis.
- **Evaluation:** Clinical: Measuring tape & Giliazi test. Imaging: Centigram.
- **Management:** For shorter limb: Shoe raise, Bone lengthening.
- For longer limb: Epiphysiodesis, Bone shortening.

5- Genu Varum and Genu Valgum:

- Bow legs (genu varus), Knock knees (genu valgus).
- **Etiology:** Physiologic (bilateral) / Pathologic (unilateral).
- **Management:** Physiological → Observation, Pathological → must treat underlying cause, as rickets. Epiphysiodesis, Corrective osteotomies.

6- TIBIA VARA (BLOUNT DISEASE):

- Damage of proximal medial tibial growth plate of unknown cause in Overweight & Dark skinned.
- **Types:** Infantile → < 3y, Juvenile → 3 -10 y, Adolescent → > 10y.
- Radiological classification →M.D.A (metaphyseal diaphyseal angle).
- MRI is mandatory in severe cases & Recurrence.
- **Treatment:** Mostly surgical.

7- Clubfoot:

- **Etiology**: Postural→ fully correctable.
- Idiopathic (CTEV) →partially correctable.
- Secondary (Spina Bifida) → rigid deformity.
- **Differentiate by exclusion:**
  - Neurological: (Spina Bifida).
  - Abnormalities Arthrogryposis, Myelodysplasia.
  - Congenital anomalies: "Proximal femoral focal deficiency" tibial hemimelia.
  - Syndromatic: Larsen's syndrome, Amniotic band.

- **Examination:**
  - **Hind foot:** Equinus (Ankle joint)=FPF, Varus (Subtalar joint),
  - **Mid & fore foot:** Midfoot Cavus, Forefoot Adduction.

- **Management:** Manipulation and serial casts:
  - Ponseti technique: Validity up to 12 months.
  - Dennis Brown splints: maintain correction until 3-4y old
  - Follow up till 9y old.

- **Indications of surgery:** after 12 months Complementary to conservative treatment - Failure of conservative – Recurrence.

- **Types of surgery**
  - Soft tissue
  - Bony
  - Salvage

8- Lower Limb Deformities in CP child

- A non-progressive brain insult that occurred during the peri-natal period. Cause by skeletal muscles imbalance that affects joint's movements.

- **Physiological classification:**
  - Spastic (most common), Athetosis, Ataxia, Rigidity and Mixed.

- **Topographic classification:**
  - Monoplegia >one limb affected
  - Diplegia> all limbs are affected but the lower limbs are more
  - Paraplegia>only lower limbs
  - Hemiplegia >one side of the body (arm &leg) affected
  - Bilateral hemiplegia > both sides are affected but uppers more than the lowers
  - Triplegia >three limbs affected
  - Quadriplegia or tetraplegia>all four limbs (+/- trunk, tongue and windpipe) affected.

- **Examination:**
  - **Hip:** Flexion, Adduction, Internal rotation.
  - **Knee:** Flexion.
  - **Ankle:** Equinus, Varus or valgus.
  - **Gait:** Intoeing, Scissoring.
  -

- **Management:** Multidisciplinary approach.

- **Options of Surgery:** Neurectomy, Tenotomy, Tenoplasty, Muscle lengthening, Tendon Transfer, Bony surgery Osteotomy/Fusion.

(11) Common Spine Disorders

Degenerative spinal disorder (Spondylosis)	A) Degenerative disc disease. B) Facet osteoarthrosis. **Presentation:** 1- Mechanical pain: due to joint degeneration or instability. A. "Axial pain" in the neck or back. B. Activity related-not present at rest. C. Associated with movement: - Sitting, bending forward (flexion). - Standing, bending backward (extension). 2- Neurologic symptoms: due to neurologic impingement: A. Spinal cord –Presents as myelopathy, spinal cord injury. - Myelopathy: chronic. ▪ Loss of motor power and balance. ▪ Loss of dexterity ▪ UMN deficit ▪ Slowly progressive - Spinal cord injury: acute ▪ Spinal stenosis B. Cauda equine: - Radiculopathy: (LMN deficit.)
Spinal cord or root entrapment	- Conservative treatment is first line of treatment in **Spinal** stenosis. - Conservative treatment is first line of treatment for mild sciatica without motor deficit (**Disc herniation).** - Surgical treatment is Indicated for: ▪ Cauda-equina syndrome. ▪ Motor deficit ▪ Failure of 2 months of conservative treatment.
Osteoporotic Vertebral Fractures	○ Treat the underlying cause. ○ Osteoporosis and osteoarthritis (they happen in old people) but they are not the same. Osteoporosis is metabolic bone disease, and osteoarthritis is a degenerative disease.
Spinal Deformities	○ Scoliosis: Deformity of the spine in the Coronal plane ○ Kyphosis: Deformity of the spine in the Sagittal plane. ○ Spondylolisthesis: Translation of one vertebra over another. ○ Spondylolisthesis: Defect in pars interarticularis causing a forward slip of one vertebra on another usually at L5-S1, less commonly at L4-5.

(12) Common Adult Fractures

Upper extremity fractures

- **Clavicle fracture:**
  - Commonly in the middle third of clavicle.
  - Management mostly is conservative.
- **Humerus fracture:**
  - **A- Proximal humerus fracture:**
    - Commonly in the surgical neck.
    - Can be associated with axillary nerve injury.
    - In x-ray, we do here 3 views (AP, lateral and axillary view).
    - Management: if fracture is displaced, surgery is indicated.
  - **B- Humerus shaft fracture:**
    - Associated with radial nerve injury.
    - Treatment usually is non-surgical.
- **Both bones forearm fractures:**
  - **I- Both bone fracture.**
  - **II- Monteggia fracture** (i.e proximal/middle third of ulna fracture+dislocation of radius proximally).
  - **III- Galeazzi fracture** (distal radius fracture+ disruption of DRUJ).
    - Always this type of fracture is treated with ORIF.
- **Distal radius fracture:**
  - **I- Extra-articular** (like colle's and smith fractures).
  - **II- Intra-articular*** (like Barton's fracture).
    - Intra-articular fractures usually treated with ORIF.

Lower extremity fractures

- **Hip fracture: (older)**
  - Lethal.
  - A- Intra-capsular: (supcapital and transcervical).
  - B- Extra-capsular: (basicervical and intertrochantric).
  - Management differs according to the presence of displacement.

  Femoral neck fracture (young): take to OR for ORIF within 6 hours
- **Femur shaft fracture:**
  - Management starts with ATLS then early surgical fixation.
  - Might be associated with fat embolism and ARDS.
- **Tibia shaft fracture:**
  - Carries the highest risk of compartment syndrome.
  - Most common complication is non-union.
- **Ankle fracture:**
  - Lateral malleolus: Weber's classification (A,B,C)
  - Weber's C is always managed by surgery.

(13) Common Paediatric Hip Disorders

1- Developmental Dysplasia of the Hip (DDH):

- The head of femur is not articulating the acetabulum.
- The acetabulum is shallow.
- DDH is not due to an injury during delivery.

Causes: Hormonal (relaxin and oxytocin), Familial, Genetics (more common in females and twin), Mechanical: Pre-natal (Breach, oligohydrominus, primigravida), Post-natal (Swaddling, strapping).

Risk factors: Parents who are relatives, Positive family history: 10X, 1st child, Breach presentation: 5-10 X, Oligohydrominus, Twins: 40%, A baby girl: 4-6 X, Torticollis: CDH in 10-20% of cases, Foot deformities and Knee deformities.

On Examination:

- External rotation
- Lateralized contour
- Shortening
- Asymmetrical skin folds
- Limited abduction
- Special test (depending on the age):
  - ⇒ Galiazzi sign
  - ⇒ Ortolani: Pull and **abduct**, Barlow: Pull and **adduct** test only till 4-6 m of age
  - ⇒ Hamstring Stretch test
  - ⇒ Trendelenburg sign: older comprehending child
  - ⇒ Limping:
    - ➢ Unilateral one sided limping
    - ➢ Bilateral waddling gait (Trendelenburg gait)

Investigations:

- 3 weeks - 3 months: U/S
- > 3months: X-ray
- After 6 months: reliable

Treatment:

- **Birth – 6m:** In OPD: reduce + maintain with Pavlik harness or hip spica (H.S).
- **6-12 m:** GA + Closed reduction + maintain with hip spica + Open reduction if not return.

- **12-18m:** GA + Open reduction + maintain with H.S 6w, then B.S cast for months.
- **18 – 24 m:** GA + Open reduction + Acetabuloplasty + maintain with hip spica 6w, then B.S cast 6wks.
- **2-8 years:** GA + Open reduction + Acetabuloplasty + femoral shortening + H.S 6w, B.S 4-6wks.
- **Above 8 years:** GA +Open reduction + Acetabuloplasty (advanced) + femoral shortening + (H.S).

2- Slipped capital femoral epiphysis (SCFE):

At level of growth plate – Physis - (separating the epiphysis from the metaphysis)

Types:

1- Radiological:

- Acute < 3wks.
- Chronic > 3wks, can see start of callus formation.
- Acute on chronic.

2- Clinical:

- Unstable: cannot weight bear on that limb.
- Stable: can put weight (walk).

Typically:

- 8-12 years old
- In males
- In obese
- In black
- 20 - 25 % chance that the other hip will be affected, within 18m post the 1st hip affection.

On Examination:

- Hip in ER (external rotation).
- With hip flexion the limb goes in spontaneous ext. rotation.
- Limited internal rotation & Abduction.
- Usually painful ROM.

Investigation:

- X-ray of pelvis: Positive "Klein Line" Or just wide physis.

Treatment:

- **Aim: prevent further slippage & fuse the physis.**
- Pin threads pass the physis, & stops 5mm before the articular surface to prevent "Chondrolysis".

3- Perhes Disease:

- At the level of head of femur.
- Decreases vascularity of head of femur (avascular necrosis).

Cause: **unknown**

Theories of its cause:

- Minor trauma (hyperactive child).
- A.V malformation.
- Virus infection.

Typically:

- 4-8 years younger than SCFE.
- More in males.
- More in obese.
- Bilateral in 10 – 12% of patients.

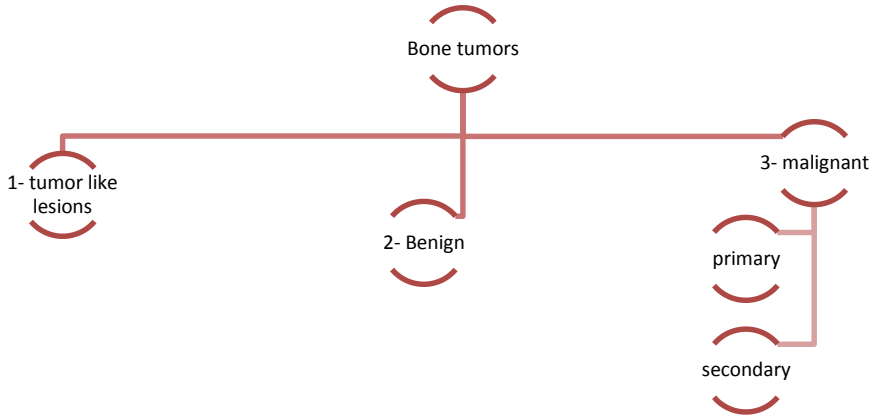
On Examination:

- Decreased Abduction.
- Decreased IR (internal rotation).
- Usually painful range of motion –decreased-
- Limping (painful).
- Thigh muscle wasting (disuse).

Treatment:

- Control pain.
- Maintain ROM.
- Hip containment.

(14) Bone Tumors



How to describe bone tumors?

By describing the Site, centric, border, matrix, periosteal reaction, Geographic appearance and Soft tissue extension.

Benign VS malignant:

Description	Benign	Malignant
Border	Well-defined	ill-defined
Periosteal reaction (PR)	Smooth PR	Characteristic PR
Matrix	Lytic or sclerotic	Lytic & sclerotic
Soft tissue extension	NO	Usually
Geographic appearance	Uniform shape	Doesn't have specific shape
Symptoms	Usually swelling proceed the pain	Usually the pain proceed the swelling

Tumor like lesions

1- Simple bone cyst (unicameral cyst):

- The most common tumor like lesions.
- Usually in children age group up to 20 years old Male > Female.
- **Sites:** Common in the end of long bones (e.g. proximal humerus).
- **Presentation:** Usually its presentation is incidental, but patient may present with pathological fracture that cause pain.
- **Radiological feature:** x-ray is the main investigation in benign tumors.
    1. Metaphysic lytic lesion.
    2. Sclerotic margin, well define.

2- **Aneurysmal bone cyst:**
- Aggressive and balloon-like.
- Fusiform cyst and Arteriovenous formation.
- **Site (common site):** Upper humerus, Upper femur, Spine, Proximal tibia and Scapula.
- **Presentation:** The usual presentation is swelling.
- **Radiological feature:** X-ray shows different content inside aneurysmal cyst unlike simple cysts.

Benign tumors

1- **Fibrous Cortical Defect (Non Ossifying Fibroma):**
- Benign lesion since birth.
- Ec-centric lesion.
- **Site:** Around knee: (lower femur, upper tibia) and Lower tibia.
- **Presentation:** Asymptomatic discovered incidentally.
- **Radiological Feature:**
  - Metaphyseal lytic lesion
  - Well defined, sclerotic margin.

2- **Osteoid Osteoma:**
- Usually affects young patients 10-35 and more in males.
- May arise in the cortex of long bones, or occasionally in the cancellous bone of the spine and less commonly talus.
- **Presentation:** Usually well localized pain that is worse at night and prevents patients from sleep (**Main** presentation is pain).
- **Character of pain:**
  1. Pain at the site of tumor.
  2. Aggravated by activity.
  3. Relived by aspirin & NSAID.
- **Radiological features:**
  - Metaphyseal or diaphyseal lesion.
  - Lytic lesion (Nidus) inside patch of sclerotsis.

3- **Endochondroma:**
- 15-50 age group.
- Tumor grows within the bone and expands it (ballooning).
- It composed of translucent hyaline cartilage and content inside is chondroid.
- **Sites:** Mainly small bone e.g. phalangese in hand & foot.
- **Presentation:**
  - Usually found incidentally.
  - Swelling.

- Pathological fracture which may cause pain.
- Affect one side e.g. one hand.

- **Radiological features:**
  - Metaphyseal or diphyseal lytic lesion.
  - Well defined.
  - Sclerotic margin.
  - Multicentric.

4- Osteo chondroma:

- Usually in 10-20 age group and Male > Female.
- Painful in children due to growth plate compression and pressure effects on adjacent nerve or vascular structures.
- **Sites:** The commonest are (around knee) distal femur + proximal tibia
- **Presentation:**
  - Swelling: it can reach huge size
- **Symptom of complication :**
  1- Pressure symptom (Pseudo-aneurysm, parasethesia, rendering the movement).
  2- Fracture especially with pedunculated type.
- **Radiological feature:**
  - Metaphyseal lesion.
  - Mushroom-like stalk of the bony tumor.

5- Giant cell tumor:

- From bone marrow.
- Occurs most commonly in young adults, 20-40 age groups.
- Benign aggressive tumor.
- It's only the benign bone tumors that can metastases to the lung. So it's important to get chest x-ray.
- **Sites:** Most common distal epiphysis of radius
- **Presentation:**
  - Mostly patient present first with: pain, then swelling & later on pathological fracture.
  - Osteopenia.
- **Radiological feature:**
  - Epiphyseal lytic lesion.
  - No new bone formation b/c this new bone will be eaten by the osteoclast.
  - Radiograph shows lucent regions, lytic destruction of the bone with expansion of the cortex, without a sclerotic rim.

Malignant tumors

1- Ewing's sarcoma

- Origin: from the endothelial lining of the bone marrow canal.
- Most of the Ewing's sarcoma is miss-diagnosed firstly as acute osteomyelitis.
- Young age group 5-25
- Pulmonary metastasis can occur.
- **Sites:**
  - It is the only bone tumor which takes it origin from diaphysis → so; we will find a diaphyseal lesion.
  - The diaphyses of the femur are the most common sites.
- **Presentation:** Very characteristic:
  - Febrile patient.
  - High WBC's.
  - Local Pain & redness like the presentation of infection
  - Ulceration of skin.
  - Swelling.
- **Radiological feature:** X-ray: peal onion reaction.
  - You think it is AOM→YOU do aspiration for drainage of pus → there will be no pus & you will find tumor tissue →biopsy → Ewing's sarcoma.
  - So, it is a diaphyseal lytic lesion (not sclerotic).
- **Investigation:** Definite diagnosis made by MRI and biopsy.

2- Osteo sarcoma

- 10- 25 year old and Male > Female
- **Sites:**
  - Arises from primitive bone-forming cells.
  - Around the knee, Common in the lower femur, upper tibia, and upper humerus.
- **Presentation:** Patient present firstly with pain, then swelling, lastly pathological fracture and Overlying skin is warm due to high vascularity.
- **Radiological presentation:**
  - Very dense.
  - Irregular medullary and cortical destruction of the metaphysis.
  - Sun rise periosteal reaction (surrounded by low dense).
- Definite diagnosis made by biopsy.

3- Multiple myeloma:

- Arise from plasma cells in the bone marrow.
- Occur in old adults > 50 and predominantly Males.
- Bence Jones proteins test found in 24-hour urine collection.
- **Site:** Central bones (axial skeleton): skull, ribs, pelvic girdle & spine.
- **Presentation:**
  - Pt ill (decreased immunity).
  - Sclerotic (no more elasticity) so more prone to fractures.
  - In skull there will be pepper (lytic) &salt (sclerotic).
  - P.t came with bone ach (backache) + osteopenia.
- The only one definitive to diagnose it, is Bone marrow aspiration. "Biopsy".

4- Metastatic lesions:

- Tumor outside the bone. The most common tumors are: prostate, thyroid, breast, lung and kidney.
- More than 45 in age, F<M.
- Take biopsy to know where is the primary
- If there is fracture do curettage first then fixation.
- **Presentation:**
  - Patient present & primary tumor is known & the patient is treating from it.
  - May present with secondary metastasis. So, we have to search for the primary and try to treat it.
  - Usually metastasis occurs in the highly vascular bones e.g. vertebral body, ribs, pelvis, upper end of femur, and humerus.
- **Radiological feature:**
  - It may be solitary or multiple (common) or just osteoporosis (called carcinomatosis).
  - If the primary tumor is from the prostate →the lesion will be sclerotic.
  - If the primary tumor is from the breast → the lesion will be lytic.

(15) Metabolic Bone Disorders

Osteomalacia: A failure of bone mineralization which may lead to pain, weakness and fragility of the bone. The causes of adult osteomalacia are varied, but ultimately result in a vitamin D deficiency.

Rickets: This is a childhood form of osteomalacia. Its effects are due to failure of bone mineral to ossify from lack of vitamin D. Dietary deficiency has now become rare except in economically deprived countries, particularly where there is also deficient exposure to sunlight. In growing bones the failure of ossification leads to widening of the epiphyseal lines and generalized demineralization. The epiphyses are widened and have a "cupped" appearance, usually best seen on an AP radiograph of the wrist.

- **Clinical features:** Symptoms usually start about the age of 1. The child is small and fails to thrive, developing deformities such as bowing of the femora and tibiae, a large head and deformity of the chest with thickening of the costochondral junctions (rachitic rosary) and a transverse sulcus in the chest caused by the pull of the diaphragm (Harrison's sulcus).

- **Investigations:** Hypocalcaemia, Hypocalciuria, High alkaline phosphatase.

- **Treatment:** Treat the underlying disorders, Doses of vitamin D, Correcting residual deformities (If there is any deformity that didn't improve by Vit D).

Adult osteomalacia: The changes are mainly those of softening of the bones. The effects on the growing epiphyses do not apply in the adult so that deformities are not usually severe. The condition is probably more common than is usually thought, particularly in older people who may have dietary defi ciency and do not receive sufficient sunlight.

- **Clinical & radiological features:**
  1- Generalized bone pain with occasional exacerbations usually in the spine due to crush fractures.
  2- Anorexia, weight loss, muscle weakness, sometimes bony deformity.
  3- X-rays show diffuse osteoporosis, pathological vertebral wedging and pseudo - fractures, which are translucent zones with surrounding sclerosis, usually running at right angles to the margin of the bone (Looser's zones). They are well seen in the vertebral border of the scapula and the ischio -pubic ramus.

- **Investigations:** As in rickets, Serum calcium and phosphate may be lowered. Alkaline phosphatase is raised. Bone biopsy may be needed for diagnosis; excessive amounts of unmineralized osteoid can be demonstrated.

- **Treatment:** Vitamin D and calcium supplements is usually effective; elderly people may need very large doses. Underlying disorders of the gut, liver or kidney will need treatment as well.

Osteoporosis: Generalized osteoporosis, as a clinical disorder, is characterized by an abnormally low bone mass and defects in bone structure, a combination which renders the bone unusually fragile and at greater than normal risk of fracture.

- **Clinical features:** It usually affects women over 60 and to a lesser extent men of the same age. Occasionally, symptoms become marked at or soon after the menopause. The clinical features are bone pains, lassitude (weariness) and acute back pain due to pathological vertebral fractures (complication, Osteoporosis itself doesn't hurt). The gradual development of a kyphosis and loss of height are the main features. Hip fractures in the aged are almost certainly related to osteoporosis.

- **Investigations:** All patients should be screened biochemically and radiologically to attempt to exclude secondary osteoporosis. In typical senile or post - menopausal osteoporosis the X-rays show generalized loss of density of bones and thinning of the cortices from within. The bones may have a "ghostly" quality. Vertebrae may be wedged or the discs may protrude into the bodies ("ballooning" of the disc). Kyphosis is usual and stress fractures may occur. It is now possible to assess the degree of osteoporosis by measuring bone density using a dual-energy X-ray absorptiometric device, known as the DEXA scanner, and this is used as a screening technique to detect patients at risk, particularly post-menopausal women.

- **Treatment:**
  1- **Lifestyle:** weight-bearing exercises, cessation of smoking, reduce caffeine intake & Stop/avoid osteoporosis-inducing medications.
  2- **Drug Therapy:**
  - Elemental calcium & Vit D.
  - Bisphosphonates (Osteoclasts suppressors): Fosamax, Bonviva.
  - Dual action bone agent: Protelos (increases deposition of new bone by osteoblasts and reduces the resorption of bone by

osteoclasts). Has been pulled from the market by SFDA duo to the high risk of myocardial infarction.

- Teriparatide (FORTEO) injections: Recombinant of human parathyroid hormone. This medication has been found to cause an increased risk of osteosarcoma in laboratory rats.

3- **Management of fractures.**

Hyperparathyroidism: Three types are recognized:

1- **Primary hyperparathyroidism** due either to generalized hyperplasia of the parathyroid or to an adenoma.
2- **Secondary hyperparathyroidism** usually in response to renal disease or as a sequel to osteomalacia or malabsorption. The parathyroid hormone acts to restore serum calcium and phosphate levels by causing demineralization.
3- **Tertiary hyperparathyroidism** is the expression used to describe the situation where the constantly stimulated gland of secondary hyperparathyroidism develops an autonomous over secretion so that even if the underlying cause is eliminated, the gland may still oversecrete. In primary hyperparathyroidism the serum calcium in blood and urine is raised and phosphate lowered. In secondary hyperparathyroidism calcium may be normal or even low, and phosphate levels vary, depending on the renal pathology.

- **Radiological Changes:**
  - Generalized decrease in bone density.
  - Sub-periosteal bone resorption (scalloping of metacarpals and phalanges).
  - Brown tumors (too much bone reuptake causing areas of empty bone with bleeding, this blood will accumulate like paste forming what calls brown tumors).
  - Chondrocalcinosis (wrist, knee, shoulder).

- **Management of Hyperparathyroidism:**
  - Primary hyperparathyroidism due to neoplasm (adenoma or carcinoma) by excision.
  - Secondary hyperparathyroidism by correcting the cause of hypocalcaemia.
  - Tertiary hyperparathyroidism by excision of hyperactive (autonomous) nodule.
  - Extreme care should be applied after surgery to avoid hypocalcaemia due to hungry bones syndrome.

(16) Sport & Soft Tissue Injuries

Muscle injuries can be divided into:

- **Muscle strain:** The most common muscle injury suffered in sports **immediate pain** associated with diminished function.
  - Muscle tears also typically occur at or near to the **myotendinous junction**
  - **Treatment:**
    - ✓ **RICE:** Rest –Ice – Compression – Elevate.
    - ✓ NSAID
    - ✓ Physical therapy
- **Muscle Contusion:** **Quadriceps and Brachialis** muscles are common involved regions.
- **Muscle Laceration**
- **Delayed-onset soreness**

Complications of Muscle Injuries: Compartment syndrome - Myositis ossificans.

Tendon injuries:

- **Overuse tendinopathies:** **Osteotendinous junction** is the most common site. Hypovascularity of the tendon at the junction may predispose the tendon to hypoxic tendon degeneration and has been implicated in the etiology of tendinopathies.
- **Tendon rupture:**
  - ✓ **Quadriceps tendon: > 40 YO**
  - ✓ **Patellar tendon: <40 YO**
  - ✓ **Achilles tendon:** kicked in the heel during the injury. Positive Thompson test**.**
- Predisposing factors: **Steroid**, chronic disease, and tendinopathy.
- **X-ray:**
  - ✓ Patella-alta: Patellar tendon rupture.
  - ✓ Patella-infera (Baja): Quadriceps rupture.

Knee:

- **Meniscus tear:**

  Hx: With an acute meniscal tear, an effusion may develop slowly several hours after injury. This differs from an anterior cruciate ligament (ACL) injury, where swelling develops rapidly within the first few hours.

  Symptoms: locking.

  Physical examination:
  - ✓ Joint line tenderness.
  - ✓ Range of motion is typically normal, but longitudinal bucket-handle tears may block full extension of the knee joint.

* What is the type of menscial tear that causes locking? Bucket handle tear

Treatment: Generally non-surgical "conservative". Need surgery if ACL injury is associated, if there is mechanical block, or if conservative treatment is failed.

- **ACL Injury:**

Symptoms:

- ✓ Instability.
- ✓ Swelling (Hemarthrosis) is noted **immediately** after the injury.
- ✓ Pain.

Physical examination:

- ✓ A moderate to severe **effusion.**
- ✓ ROM: in acute injury the range of motion may limited.

Special tests:

- ✓ Lachman's test.
- ✓ Anterior Drawer test.
- ✓ Pivot shift test.

- **Injuries associated with ACL Disruption:**

Meniscal tears. The commonest meniscus to be injured in **acute ACL** tear is the **lateral meniscus**, **Chronic ACL** tear comes with **medial meniscus.**

- **Medial Collateral Ligament:**

Symptoms: Pain in the medial side of the knee at 1st 6 weeks leading to inability to fully flex the knee, Limited ROM.
Physical examination: Valgus stress test.

- **Lateral Collateral ligament:** Varus stress test.
- **Posterior Cruciate Ligament:** Dashboard injury.
- **Knee dislocation:**

Vascular examination is critical in an acutely dislocated knee. Pulse and ankle-brachial index (ABI) should be carefully assessed. An ABI of less than 0.90, and most certainly less than 0.80, should be considered abnormal then do angiogram.
Rx: emergent closed reduction and splinting or bracing should be performed immediately.

Ankle sprain:

- Is a common sports related injury.
- Lateral sprains accounting for 85% of all such injuries. Treated first by conservative, if failed we do surgery.

(17) Chronic Shoulder Disorder

Shoulder Anatomy

Bones:

- Humerus.
- Scapula.
- Glenoid.
- Acromion: Type1 (Flat) / Type2 (Curved) / Type3 (Hooked).
- Coracoid.
- Scapular body.
- Clavicle.
- Sternum.

Joints:

- **Glenohumeral joint:**

  - Most common dislocated joint
  - Lacks bony stability
  - Composed of:
    Fibrous capsule
    Ligaments
    Surrounding muscles
    Glenoid labrum, important for stability

- **Acromioclavicular (AC) joint.**
- **Sternoclavicular (SC) joint.**
- **Scapulothoracic joint.**

Muscles:

- **Rotator Cuff Muscles:** Depress humeral head against glenoid
  - Supraspinatus: Abduction
  - Infraspinatus: External rotation
  - Teres Minor: External rotation
  - Subscapularis: Internal rotation
- **Deltoid Muscle:** Largest and strongest Muscle of the shoulder

Subacromial Bursa:

- Between the acromion and the rotator cuff tendons.
- Protects the acromion and the rotator cuff from grinding against each other. It reduces the friction with movement.

Impingement Syndrome:

- Describes a condition in which the supraspinatus and bursa are pinched as they pass between the head of humerus and the lateral aspect of the acromion.
- **Risk factor:** age over 40 years, overhead activities, bursitis and supraspinatus tendinitis, AC arthritis, AC joint osteophytes, Posterior shoulder capsule stiffness and rotator cuff weakness.
- It is presented by pain with overhead activities and pain at night and also decreased range of motion with atrophy of rotator cuff muscles
- Neer's, Hawkins, and external rotation with resistance are tests for impingement.
- Impingement Syndrome is treated conservatively (Avoid painful and overhead activities, Physiotherapy, NSAIDs, and Steroid injection into the subacromial space, if failed we move to surgery by arthroscopy or open surgery "remove part of acromion"

Rotator cuff tear:

- Rotator cuff tear is caused by many things like: **Intrinsic** factors (Vascular, Degenerative). **Extrinsic** factors: (Impingement), Repetitive use or Traumatic. And its symptoms are similar to Impingement syndrome.
- Physical examination: Lift off test for subscapularis, Empty can test for supraspinatus, and external rotation while resisting for Infraspinatus.
- Gold Standard for impingement and Rotator Cuff tear is MRI.
- It is either partial or full thickness tear. Treated by conservative then surgery.
- We always start with SURGERY in Traumatic tear!

Adhesive Capsulitis:

- It is characterized by pain and restriction of all movements of the shoulder (global stiffness) First movement lost is Internal Rotation. In rotator cuff tear when you lift the patient hand it will elevate but here not.
- Risk Factors For adhesive Capsulitis are DM, Thyroid, trauma, or high cholesterol.
- Usually self-limiting (typically begins gradually, worsens over time and then resolves but may take >2 years to resolve).
    - Resolves by its own, maybe treated by Physiotherapy, NSAID, Steroid injections, MUA, or Arthroscopic release.

AC Arthritis:

- Caused by Degenerative osteoarthritis, Rheumatoid Arthritis, Gouty Arthritis, Septic Arthritis, Atraumatic osteolysis in weight lifters, Post-traumatic osteolysis of lateral end of clavicle

- Presented by pain while moving specially shoulder adduction
- Treated Non-surgical and Surgical "Remove The joint"

Shoulder Dislocation:

- Mostly Anterior dislocation. Mechanism mostly indirect. Associated with pain
- **Clinical Presentation:**
  - ✓ Holds the injured limb with other hand close to the trunk
  - ✓ The shoulder is abducted and the elbow is kept flexed
  - ✓ There is loss of the normal contour of the shoulder
  - ✓ Loss of the contour of the shoulder may appear as a step
  - ✓ Anterior bulge of head of humerus may be visible or palpable
  - ✓ A gap can be palpated above the dislocated head of the Humerus
- Injury to axillary nerve may be associated in anterior dislocation
- It is an emergency, it should be reduced in less than 24 hours or there may be Avascular Necrosis of head of humerus.

Complications of anterior Shoulder Dislocation:

- **Early:**
  - ✓ Neuro vascular injury (rare).
  - ✓ Axillary nerve injury.
  - ✓ Associated Fracture of neck of humerus or greater or lesser tuberosities.
- **Late:**
  - ✓ Avascular necrosis of the head of the Humerus (high risk with delayed reduction).
  - ✓ Recurrent shoulder dislocations (most common).

(18) Peripheral Nerve Injuries

- **Compression Neuropathy:** chronic + sensation of light touch and pressure are lost first, pain and temperature are last. Risk factors: DM + Pregnancy + obesity + infection. Can cause night pain and numbness + clumsiness. the best test to do is Semmes-Weinstein monofilaments
- **Carpal Tunnel Syndrome:** risk factors are like obesity, DM and pregnancy. Durkan test = Most sensitive
- **Pronator Syndrome:** Median nerve compression at the arm or forearm
- **Ulnar Tunnel Syndrome:** Compression neuropathy of ulnar nerve in the Guyon canal, MRI is good
- **Neurapraxia:** stretch or trauma (focal) The nerve is intact but mechanical pressure has caused demyelination of axons in a limited segment
- **Axonotmesis:** there is interruption of the axons in a segment of nerve. It is seen typically after closed fractures and dislocations. There is loss of conduction but the nerve is in continuity and the neural tubes are intact.
- **Neurotmesis:** Disruption of all layers of the nerve, Wallerian degeneration distal to injury (Distal to the lesion, and for a few millimeters proximal to it, axons disintegrate and are resorbed by phagocytes) .
- **Acute Carpal Tunnel Syndrome:** is after trauma or Hemorrhage needs emergency decompression.

(19) Common Foot & Ankle Disorder

1- Flat Foot:

- Reduced longitudinal arches of the foot. Most cases are developmental, usually is painless.
- **Management:** Usually NO action is needed. Foot exercises is prescribed; but its value is not confirmed. Rigid flat foot may require surgical management.

2- Hallux Valgus:

- Lateral deviation of big toe usually at the metatarsophalangeal joint. Associated with a bunion. Common at middle age and elderly, mainly females. Painless.
- **Management:** Correct and suitable shoe wear. Avoidance of tight shoes. Protection to the bunions. Surgery is reserved for symptomatic and disturbing cases.
  Following surgery; patient has to continue proper shoe wear.

3- Plantar Fasciitis:

- Common at middle age and elderly. Insidious in onset; unilateral or bilateral. Vague pain at heel region. Localized tenderness to insertion of plantar fascia into calcaneum.
- Plain lateral X-ray of heel frequently shows calcaneal spur.
- **Management:** NO easy or simple management is available. Mainly conservative.

- Commonly associated with flat feet.
- No visible heel swelling, no skin changes and no increase in local temperature.
- Inflammatory process is at site of pain; i.e. at plantar fascia insertion into calcaneum.
- Heel pain like stabbing pain when patient puts foot to the ground first thing in the morning; and gets less after some walking.

4- Ankle Sprains:

- Most common injuries. Usually occurs during sports activities. There is pain, swelling and local bruising X-rays do not show fracture.
- The injury is partial or complete ligament rupture.
- Most commonly injured ligament is the Anterior Talo-Fibular Ligament. Ankle anterior drawer test is used to detect its rupture.
- **Management:**
  - RICE: Rest, Ice, compressors, Elevation.
  - Used to apply Back-slab splints for few days.
  - Rest should only be for few days.
  - PRICES: recent view = Protection, relative Rest, Ice, Compression, Elevation and support.

5- Osteochondral Defects of talus (OCD):

- Very localized areas of joint damage; due to lack of blood supply. Often post traumatic, but occasionally No cause can be found. Usually postero-medial part of dome of talus. Localized pain on weight bearing and even at rest may present.
- **Management:** it depends!
  - Arthroscopic debridement of the lesion and drilling of its crater (base).
  - Rarely Fixation of a large defect which has significant bony part, by absorbable screws.

6- Diabetic Foot:

- It can result in numbness, tingling and reduced sensation of the feet. Decreased circulation associated with neuropathy can result in small cuts on feet being overlooked and becoming infected. Infection in diabetic foot may result in Gangrene.
- Wound debridement, antibiotics and repeated dressing should be done.
- Amputations may become necessary when there is Gangrene

7- Charcot Foot:

- People who have significant nerve damage to the foot. The bones of the foot become weak and the joints inflamed, swollen and lax.
- Walking on the foot leads to disintegration and collapse of the joints and **Deformity.**
- **Management:**
  - Non-surgical: Immobilization - Custom Shoes and Bracing - Activity modification.
  - Surgical: May be indicated in certain cases.