بِسْمِ اللَّهِ الرَّحْمَٰنِ الرَّحِيمِ

فكرة مُكررة

سؤال مُكرر

اجابة مُعدلة

2022:

1- osteoarthrosis in the knee , x-ray will show all the following , except :

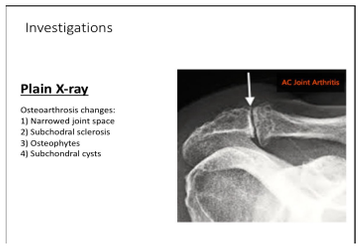
a-cyst formation

b-osteophyte

c- periarticular osteopenia

d- subchondral sclerosis

e- narrow space joint



Answer c

2- All are considered a risk factors for osteoarthritis except:

osteoporosis.

Risk factors for OA

1-Older age, Obese Female *2-Genetic inheritance* *3-Race & ethnicity*
4-Previous joint injury *5-Metabolic syndrome*
6-Local mechanical factors
* Mal-alignment, muscle weakness, internal derangements.
* Excessive joint loading. * Joint overuse. * Joint instability.

Etiology

Non-modifiable risk factors	Modifiable risk factors
*Age (> 55 years) *Familial history *History of joint injury or trauma *Anatomic factors causing asymmetrical joint stress.	* Obesity * Excessive joint *loading or Overuse

3- One of the following is a symptom of an advanced carpal tunnel syndrome:

a. Total numbness (anesthesia)

b. Objects falling from the hand

c. History of diabetes

d. Sleep disturbances due to pain

e. Paresthesia

A-Carpal tunnel syndrome (CTS). Important

Most common compressive neuropathy in the upper extremity =Idiopathic form
Risk factors
Obesity, Pregnancy, DM, hypothyroidism, Rhd A. Chronic Renal Failure, ?
Advanced age and Vibratory exposure during occupational activity.

Diagnosis
- Paresthesia and pain (often at night) in the volar aspect of radial 3 1/2 digits (thumb, index, long and radial half of the ring).
- **Provocative test**
  1- Carpal tunnel compression test (Durkan test). 60 seconds
  2- Tinel and Phalen's tests.
- **Sensory testing**
  Large sensory fibers (light touch, vibration) are affected before small fibers (pain and temperature).
  Semmes-Weinstein monofilament testing is sensitive for diagnosing early CTS. (large fibers).
- Weakness, loss of fine motor control, and abnormal 2-point discrimination are later findings.
- Thenar eminence atrophies but the sensation of the thenar eminence is spared because the palmar cutaneous branch enters the hand external to the carpal tunnel.

Differential diagnoses of CTS.
1-Cervical radiculopathy, 2-Brachial plexopathy, 3-Thoracic outlet syndrome, 4-Pronator syndrome, 5-Peripheral neuropathy.

Treatment
- **Non-operative treatment.**
  1- Activity modification, Night splints, and NSAIDs.
  2- Single corticosteroid injection yields transient relief in approximately 80% after six weeks, but only 20% are symptom-free by 1year.
- **Operative treatment options**
  1- Open, Mini-open
  2- Endoscopic release of the transverse carpal ligament.

Answer B

4- One of the following fracture patterns is expected to be the best in healing ?

a- transverse → Direct Trauma / High energy

b- segmental

c- oblique → indirect Trauma / Low energy high surface area

d- comminuted → Direct Trauma / high energy

86
43

Answer c

5- question about best & early treatment of clubfoot :

something about bracing to decrease progression .

→ indication

Treatment

1-Started at birth by Ponseti serial casting (4-6 casts) changed weekly, (90% success), the cornerstone for the correction is the head of the talus.
The first deformity to be corrected is the cavus by supination of the foot.
2-Tendo Achilles lengthening (90%) at the end of correction, if not done the foot may end in rocker bottom deformity

6-Elderly with peptic ulcer have not respond to analgesia for knee pain :

a- increase dose of analgesia

b- knee arthroplasty

Treatment
- Early
  - (1) relieve pain; (2) increase movement; (3) reduce load.
  - Pain relief is achieved by analgesics and nonsteroidal anti-inflammatory drugs (NSAIDs).
  - Load reduction can be achieved by using a walking stick, wearing soft-soled shoes,
- Late
  - Joint replacement,the procedure of choice for OA in patients with severe symptoms, marked loss of function and significant restriction of daily activities.

Answer B

7- false about children skeleton in comparison to adults :

a- better growth

b- better healing

c-specific fracture

d- comminuted fracture more

1-Properties of children's bones

1- **Growth plate (GP):**
In infants, GP is stronger than a bone this will lead to
= Increased fractures in the metaphyseal area.
= Provides perfect remodeling power.
= Injury of growth plate causes deformity.
= A fracture near the GP might lead to overgrowth.

Physeal anatomy
- ***The proliferative zone*:** The most metabolically active zone.
- ***The hypertrophic zone***

= The weakest because it lacks both collagen and calcified tissue.
= Most physeal separations occur through this layer.

2- Bones in children:
A- Increased collagen/bone ratio → easy fractures
B- Increased cancellous bone →
- Reduces tensile strength
- Reduces the tendency of fracture to propagate →less comminuted #
- Bone fails on both tension and compression ("buckle" fracture)
- Less brittle, therefore may bend but not fracture.

C- Increase Plasticity→ Greenstick fractures

Why do children's bones bend before they break?
*Less osteoid density than the adult.
*More porous than adult bone (Haversian canals occupy a much greater part of the bone.

8-Tillaux fracture:

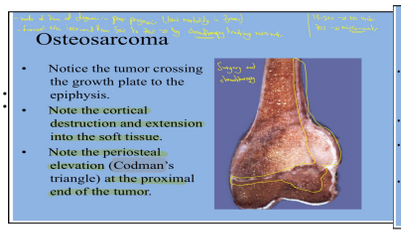
4-Tillaux fracture
A fracture involving the anterolateral distal tibial epiphysis.
Mechanism: closure of medial physis earlier than the lateral attachment of anterior inferior tibiofibular (AITF) ligament.
Open reduction and screw fixation.

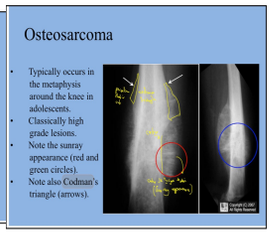
Answer D

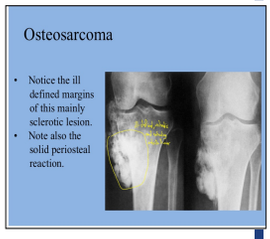
fracture of the anterolateral distal tibia epiphysis ... (Transitional fracture , SH type III)

9- Codman triangle on x-ray, indicate of :

osteosarcoma







10- Mostly seen in a child above 3 years with bilateral DDH ?

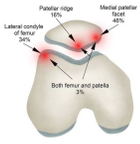
wide perineum

C. In toddlers, (+after walking)

* Wide perineum in bilateral DDH
* Lumbar lordosis in bilateral DDH
* Trendelenburg's sign and gait.
* Limping in unilateral DDH
* LLD in unilateral DDH

11- Question about dislocated patella .. with hemarthrosis and floating fragments .. the origin of these fragments ?

Medial patellar facet.



8. Complications of Perthes disease.
a. Femoral head deformity.
* Premature physeal arrest patterns * Osteochondritis dissecans,
* Labral injury, and * Late osteoarthritis.
b. The most important *prognostic factor*
1- Shape of the femoral head and its congruency at skeletal maturity
2- patient age at onset of disease.
c. Degenerative changes in the hip joint in the fifth or sixth decade of life.

Differential diagnoses

Unilateral Perthes disease	Bilateral Perthes disease
= Transient synovitis	= Hypothyroidism
= Infection	= Multiple epiphyseal dysplasias
= Lymphoma, and leukemia.	= Spondyloepiphyseal dysplasia
= Juvenile chronic arthritis	= Gaucher's disease.
= Rheumatic fever.	
= Sickle cell disease.	

12-Scenario about : Fragmentation and focal resorption of the femoral epiphysis, and minor subluxation ,....diagnosis

a- perthes

b-DDH

Feature	Perthes	DDH
Main pathology	AVN of femoral head	Hip instability/ dislocation
Typical age	4–10 years	Neonates/infants
X-ray	Fragmentation + sclerosis	Dislocation + shallow acetabulum
Epiphyseal resorption	Present	Absent
Limp	Common	Later if untreated

1. Definition: non-inflammatory idiopathic AVN of the femoral head in a growing child, caused by temporary cessation of the blood flow to the femoral head resulting in venous occlusion and necrosis of the femoral head.

2. Epidemiology
a. The disease more commonly affects boys than girls (5:1).
b. The hips are involved **bilaterally in 10%** to 12% of cases.

3. Patho-anatomy
1. Etiology: The exact cause of LCPD is not known
a. Disruption of the vascularity of the capital femoral epiphysis.
b. Hydrostatic pressure theory.
Reactive synovitis → capsular distension → compression on retinacular vessels
c. Thrombophilia(protein C and S def.)
d. Microtrauma or passive smoking (affects fibrinolysis)

2. Risk factors (Susceptible child)
* Boys (80%). * Poor Social class.
* Short stature with delayed bone age (usually by two years). (90%)
* The child is often thin, and very active. * Smaller than his age group.

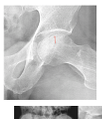
4. Pathology
The capital epiphysis and physis are abnormal histologically, with disorganized cartilaginous areas of hypercellularity and fibrillation.

5. Evaluation
1. Clinical presentation
a. Age 4-9 years.
b. Commonly have a limp and pain in the groin, hip, commonly thigh, or knee (referred pain).

2. Physical examination
a. Abnormal gait (antalgic). b. Decreased abduction and internal rotation.
c. Late Limb-length inequality, is mild due to femoral head collapse.

3. Diagnostic tests
a. Plain Radiographs.
Standard AP and frog-leg lateral views of the pelvis are critical in making the initial diagnosis and assessing the subsequent clinical course. (best)

Radiographic Feature (according to the stage)
• Widening of the joint space and minor subluxation
• Sclerosis
• Caffey's sign (Salter), a subchondral # (Crescent sign) on lateral X-ray. (an anterolateral aspect of the femoral capital epiphysis).
• Fragmentation and focal resorption of the epiphysis.
• Loss of epiphyseal height.



• Widening of the femoral neck & head (coxa magna).
• Lateral uncovering of the femoral head.
• Metaphyseal cyst formation.
• Sagging rope sign in adults.

Radiographic stages (Waldenstrom)
a-Necrosis. (Ischemia stage).
b-Fragmentation stage (Revascularization)
c-Re ossification stage (healing)
d-Final stage (Remodeling).
N.B: In general, necrotic and fragmentation stages last approximately six months each, the re-ossification stage 18 months, and the remodeling stage 3 years.

Late Stage
– Coxa magna – High-riding trochanter
–Flattened femoral head –Irregular articular surface

Other imaging studies:
Bone scans, MRIs, and arthrography are not routinely necessary.

6. Classification
1. The Herring (lateral pillar) classification (most accurate)
Based on the height of the lateral pillar of the capital epiphysis on the AP view of the pelvis.
a. Group A: Normal height
b. Group B: More than 50% of the lateral pillar height is maintained.
c. Group C: Less than 50% of the lateral pillar height is maintained.

13-False about slipped femoral capital epiphysis:

A. more in Females

B. 70% gradual in onset

C. Lateral view is important in diagnosis

D. Affected Limb is externally rotated

3-Epidemiology
a. *Most common* disorder of the hip in adolescents.
b.*> Male* (12–14 years)
c. *Unilateral* (80%),
d. *Obese* hypogonadal male (adiposo genital syndrome), or excessively thin and tall.

External rotation in the foot.

Answer A

14- The classic presentation of patient with subtrochanteric facture:

a-adduction and extension of proximal

b- abduction and extension of proximal

c- predominantly internal rotation of proximal

d- adduction and flexion

e- abduction and flexion

- Position the patient come with:
  a. Proximal segment Leg position – abducted gluteus medius and minimus , flexed by iliopsoas
  b. distal segment will be: adducted
  c. Shortening limb

↳ By adductor muscle + Hamstring muscle + quadriceps muscle

Sub-trochanteric fracture:
- Within 5 cm of the lesser trochanter
- Low energy fall in elderly or high energy trauma in young (as in motor vehicle accident- MVA)
- The patient come with rotated limb (The upper fragment is flexed and appears deceptively short; the shaft is adducted and is displaced proximally) ,NO range of motion and decreased vascularity
- Needs surgery
  - Open reduction and internal fixation is the treatment of choice
- Malunion is fairly common

swer E

- **Risk factors** [2]
  - **Osteoporosis** (especially postmenopausal women and older individuals)
  - Muscle weakness
  - Difficulty walking and impaired coordination
  - Estrogen deficiency
  - Low body weight
  - Poor nutrition (vitamin D deficiency or calcium deficiency)
  - Smoking, alcohol use

15 -question about intertrochanteric fracture :

female (risk of osteoporosis) → is Risk factor

16- 30 years old man with tibial fracture ?

(السؤال ناقص)

Open reduction and internal fixation

17- question of a 70 year old woman fall on wet floor?

Fracture of femur shaft

Epidemiology

- **Age**: bimodal distribution, based on exposure to causative force
  - High-energy trauma associated: common in younger population (< 25 years)
  - Low-energy trauma associated: common in older population (> 65 years)
- **Sex**: ♂ > ♀

Epidemiological data refers to the US, unless otherwise specified.

18- The structure that determine the stability in ankle fracture is:

a. syndesmosis

b. articular surface

c. Anterior talofibular ligament

d. calcaneofibular ligament

e. Posterior talofibular ligament

The syndesmosis is a fibrous joint connecting the tibia and fibula bones in the lower leg. It plays a crucial role in stabilizing the ankle joint. Ankle fractures often involve disruption of the syndesmosis, which can lead to instability if not properly managed. Therefore, the integrity of the syndesmosis is essential for determining stability in ankle fractures.

Answer A

19- A 15-year old female patient is being assessed for scoliosis that was noticed 2 years ago, her curve measure 65 degrees. How would you counsel her with regards to this deformity?

a. Neurological exam is not mandatory in idiopathic scoliosis → Must

b. Pain is rare with this type of deformity → 1/3 of Patient with Pain

c. She doesn't need treatment as it is unlikely that this curve will progress

d. A type 5 riser sign indicates that this patient is skeletally mature

e. main goal of surgery if to be done is cosmetic

SPECIAL IMAGING

- CT and MRI may be necessary to define a vertebral abnormality or cord compression.

1. Grade 1 → when the ilium (bone) is calcified at a level of **25%**; it corresponds to prepuberty or early puberty.
2. Grade 2 → when the ilium (bone) is calcified at a level of **50%**; it corresponds to the stage before or during growth spurt.
3. Grade 3 → when the ilium (bone) is calcified at a level of **75%**; it corresponds to the slowing of growth.
4. Grade 4 → when the ilium (bone) is calcified at a level of **100%**; it corresponds to an almost cessation of growth.
5. Grade 5 → when the ilium (bone) is calcified at a level of **100**% and the iliac apophysis is fused to iliac crest; it corresponds to the end of growth.

Reasons to treat:

- Cosmetic mainly.
- Progression (>50 degree) as a rate of 0.5-1 /year.
- Cardiac and respiratory complications.
- Disc herniation.

Answer D

20- A Basketball player developed immediate swelling of the medial knee after a rebound fall, what is the structure most likely to be injured is

A.Mcl

B.Acl

C. Meniscus

- **ACL**
  - Anterior cruciate ligament injury is when the anterior cruciate ligament (ACL) is either stretched, partially torn, or completely torn.Injuries are most commonly complete tears.
  - ACL direction ,described from proximal to distal, → anteriorly ,distally ,medially. Starts from lateral femoral epicondyle to tibial spine.
  - Hamstrings is more important in stabilizing ACL deficient knee
  - Quadriceps is more important in stabilizing PCl deficient knee
  - ACL tear aspiration → blood (acutely)
    - Meniscal tear aspiration → synovial fluid
  - Signs and symptoms
    - Symptoms include pain, a popping sound during injury "طقة", instability of the knee, and joint swelling. Swelling generally appears within a couple of hours.
    - An individual may feel or hear a "pop" in their knee during a twisting movement or rapid deceleration, followed by an inability to continue participation in the sport and early swelling from hemarthrosis. This combination is said to indicate a 90% probability of rupture of the anterior

- Risk factors
  - ACL injury is most commonly a non-contact injury that occurs when an individual stops suddenly or plants his or her foot hard into the ground. ACL injury also has been linked to heavy or stiff-legged landing; the knee rotating while landing, especially when the knee is in an unnatural position.
  - Significantly, many ACL injuries occur in athletes landing flat on their heels. This movement directs the forces directly up the tibia into the knee, while the straight-knee position places the anterior femoral condyle on the back-slanted portion of the tibia. The resultant forward slide of the tibia relative to the femur is restrained primarily by the now-vulnerable ACL.
  - ACL injuries also can be caused by direct contact or trauma, such as in a motor vehicle collision or from a tackle in football. A severe form of ACL injury caused by direct contact is called the "**unhappy triad**," also known as the "terrible triad," or "O'Donaghue's triad."
  - The "**unhappy triad**" involves injury of the anterior cruciate ligament, the medial collateral ligament, and the medial meniscus.
  - Women in sports such as association football, basketball, and tennis are significantly more prone to ACL injuries than men.The discrepancy has been attributed to gender differences in anatomy, general muscular strength, reaction time of muscle contraction and coordination, and training techniques.+hormonal effect
    - More neuromuscular instability
    - Increased ligamentous laxity

er B

2021:

1- Mortality with hip fracture in the elderly is highest with which co- morbidity:

a.BMI of 35.

b.Renal failure.

c.Diabetes.

d.High blood pressure.

e.Smoking.

Renal failure is associated with a higher mortality rate in elderly patients with hip fracture due to several factors:

1. Impaired healing: Renal failure can lead to impaired wound healing and delayed recovery following hip fracture surgery, increasing the risk of complications such as infection and nonunion.
2. Increased susceptibility to infections: Renal failure compromises the immune system, making elderly patients more susceptible to infections, including postoperative infections following hip fracture surgery.
3. Fluid and electrolyte imbalance: Renal failure can disrupt fluid and electrolyte balance, leading to complications such as electrolyte abnormalities, dehydration, and heart failure, which can exacerbate the effects of hip fracture.
4. Cardiovascular complications: Renal failure is often associated with cardiovascular comorbidities such as hypertension and heart disease, which can increase the risk of cardiovascular complications following hip fracture surgery, including myocardial infarction and arrhythmias.
5. Overall frailty and comorbidity burden: Patients with renal failure often have multiple comorbidities and are more likely to be frail, which can further increase the risk of mortality following hip fracture.

Certainly! Here's an explanation of the other choices:

a. BMI of 35: Obesity (BMI ≥ 30) is associated with an increased risk of complications following hip fracture surgery, including wound infection, delayed wound healing, and venous thromboembolism. However, while obesity can contribute to increased morbidity, it is not typically associated with the highest mortality rate compared to other comorbidities such as renal failure.

c. Diabetes: Diabetes is a common comorbidity in elderly patients and is associated with an increased risk of complications following hip fracture surgery, including delayed wound healing, infection, and impaired bone healing. However, while diabetes can contribute to increased morbidity and mortality, it is not typically associated with the highest mortality rate compared to conditions such as renal failure.

d. High blood pressure: Hypertension (high blood pressure) is a common comorbidity in elderly patients and may increase the risk of cardiovascular complications following hip fracture surgery, such as myocardial infarction and stroke. However, while hypertension can contribute to increased morbidity and mortality, it is not typically associated with the highest mortality rate compared to conditions such as renal failure.

e. Smoking: Smoking is a well-known risk factor for poor surgical outcomes and increased complications following hip fracture surgery, including delayed wound healing, infection, and impaired bone healing. However, while smoking can contribute to increased morbidity and mortality, it is not typically associated with the highest mortality rate compared to conditions such as renal failure.

In summary, while all of these comorbidities can contribute to increased morbidity and mortality in elderly patients with hip fracture, renal failure is typically associated with the highest mortality rate due to its impact on overall health, immune function, and surgical outcomes.

Answer B

2- In unconscious patient the spinal injury is assessed by one of the following:

a. spinal tenderness

b. absence of response to painful stimulus

c. Absence of deep reflexes

d. inspection of the back of patient

e. moving upper and lower limbs of the patient

Answer C

3- One of the following fracture patterns is expected to take the longest time to heal:

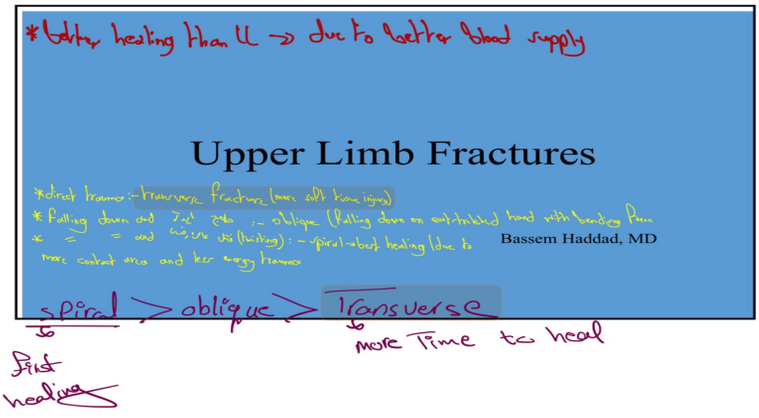
a. Buckle.

b. Oblique.

c. Spiral.

d. Greenstick.

e. Transverse.



Answer E

4- Measurement of the curve severity of an adolescent idiopathic scoliosis by:

a. Perkin's angle.

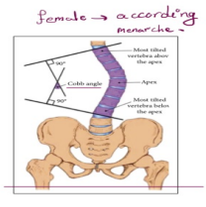
b. Vertebral Scapular angle.

c. Cobb's angle.

Imaging:

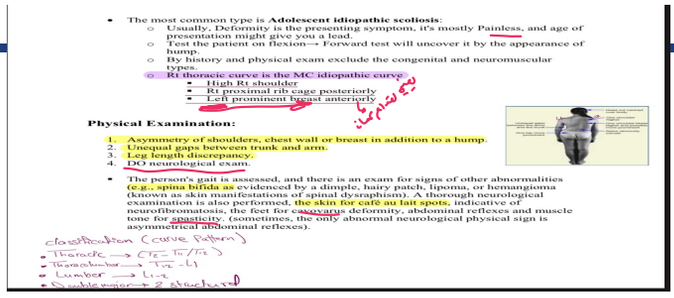
Cobb's angle

- Full-length PA and lateral x-rays of the spine and iliac crests must be taken with the patient erect.
- The degree of curvature is measured by drawing lines on the x-ray at the upper border of the uppermost vertebrae of the curve and the lower border of the lowermost vertebra of the curve; The angle between intersecting lines drawn perpendicular to the top of the top vertebrae and the bottom of the bottom vertebrae is the Cobb angle "the angle of curvature"
  - Mild → 10 - 30°
  - Moderate → 30 - 45°
  - Severe → >45°
- If 50-90 → needs surgery to prevent progression
- <50 → conservative
- Right thoracic curves are the commonest, the great majority in girls in adolescent idiopathic scoliosis. → the apex to the Rt side → to the opposite side of heart
- Left thoracic curves are so unusual that if seen they should be further investigated by MRI to exclude spinal tumors.
- Primary thoracic curves are usually convex to the right, lumbar curves to the left.



d. Vertebral Sacral angle.

e. Vertebrocostal angle.



Answer C

5- The highest fracture remodeling capacity would be in a:

steps –

1- small age > older age

2- upper limbs > lower limbs

a. Humeral shaft fracture in a 10-year-old boy.

b. Intertrochanteric fracture in a 75-year-old man.

c. Surgical neck humerus fracture in a 65-year-old lady.

d. Tibial shaft fracture in a 40-year-old lady.

e. Distal radius fracture in a 4-year-old girl.

Answer E

6- Which best describes neglected complete dislocation in developmental hip dysplasia (DDH) in a 3-year-old child?

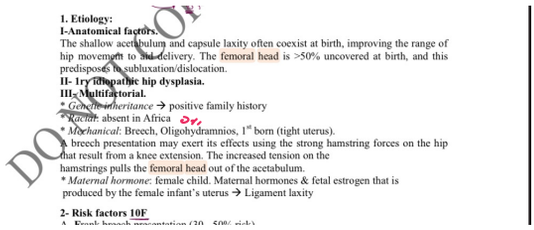
a. Normal ossification of capital epiphysis.

b. Round femoral head.

c. Neck shaft angle is less than 110 degrees.

d. Femoral head is pulled proximally & amp; laterally by hip adductors.

e. Anteversion of head and neck of femur



Feature Finding
Ossification Delayed, irregular
Femoral head shape Flattened, small
Neck-shaft angle Coxa valga (>140°)
Displacement direction Superior & posterior
Version Excessive anteversion
Acetabulum Shallow, dysplastic

Answer D

7- A 13-year-old girl had a knee x-ray after injuring her knee while playing volleyball. It showed a lesion in the distal femoral metaphysis. The presence of which of these radiological findings favors a benign entity over a malignant one:

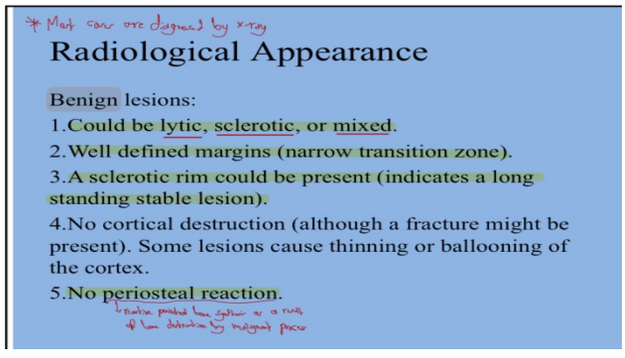
a. Wide transition zone.

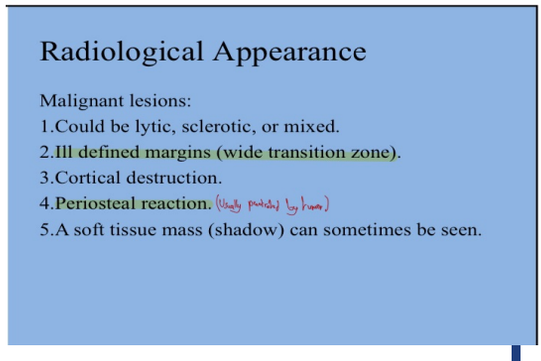
b. Well-defined margins.

c. Cortical destruction.

d. Lytic lesion.

e. Sunray appearance.





Answer B

8- A 65-year-old male patient had a direct fall on his right shoulder. Now he cannot abduct or do forward flexion. The most common tendon to be torn is:

a. Subscapularis

b. Long head of biceps

c. Deltoid

d. Supraspinatus

e. Infraspinatus

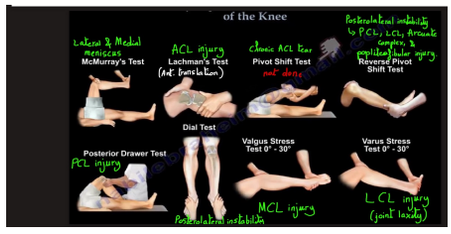
Scapulohumeral muscles

Muscle		Origin	Insertion	Innervation	Function
Rotator cuff	Supraspinatus muscle	• Supraspinous fossa of the scapula	• Greater tubercle of the humerus	• Suprascapular nerve	• Initiation of arm abduction (from 0°–15°) • Physical examination via Jobe test
	Infraspinatus muscle	• Infraspinous fossa of the scapula			• External rotation • Physical examination via infraspinatus test
	Teres minor muscle	• Axillary (lateral) border of the scapula		• Axillary nerve	• Adduction • External rotation
	Subscapularis muscle	• Subscapular fossa	• Lesser tubercle of the humerus	• Upper and lower subscapular nerves	• Adduction • Internal rotation • Physical examination via lift-off test or belly-press test
Deltoid muscle		• Clavicle • Acromion • Spine of the scapula	• Deltoid tuberosity of the humerus	• Axillary nerve	• Clavicular part: anteversion, internal rotation, adduction • Acromial part: abduction (from 15°–100°) • Spinal part: retroversion, external rotation, adduction
Teres major muscle		• Posterior surface of the inferior angle of the scapula	• Intertubercular sulcus of the humerus	• Lower subscapular nerve	• Adduction • Internal rotation

"**roTISS**erie:" **T**eres minor, **I**nfraspinatus, **S**upraspinatus, and **S**ubscapularis are the muscles of the **ro**tator cuff.

Answer D

9- Which of the following physical exam maneuvers would be most expected for a patient with a Segond's fx on his radiograph



a. Positive McMurray's test with leg internally rotated

b. Positive McMurray's test with leg externally rotated

c. positive Lachman test

d. Positive external rotation dial test with knee flexed at 30 degrees

- X -ray → for avulsion fracture of the tibial spine which is more in amateur players. And for Segond fracture (pathognomonic of ACL tear) which is an avulsion fracture of the knee that involves the lateral aspect of the tibial plateau and is very frequently (~75% of cases) associated with disruption of the anterior cruciate ligament (ACL) tear.

e. Positive external rotation dial test with knee flexed at 30 degrees and 90 degrees

Summary

Osgood-Schlatter disease (OSD) is a traction apophysitis that occurs where the patellar tendon attaches to the tibial tuberosity. It is an overuse injury typically seen in children aged 9–14 years of age who regularly engage in athletics. OSD is characterized by progressive anterior knee pain that is exacerbated by activity (typically jumping, kneeling, running, or squatting). On examination, there is usually focal swelling and tenderness over the tibial tuberosity. Diagnosis is clinical; imaging is reserved for ruling out differential diagnoses of OSD if there is diagnostic uncertainty. Treatment is usually conservative, involving NSAIDs, ice, and physical therapy. Surgery is reserved for refractory cases in patients with a closed growth plate.

FEEDBACK

Answer C

10- A 50-year-old female patient with right hallux valgus deformity, indication for operative treatment is:

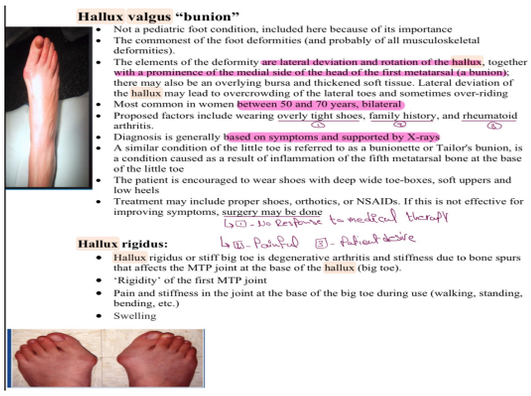
a. Associated rotational deformity.

b. Intermetatarsal angle of 20

c. Painful deformity.

d. Hallux valgus angle of 35

e. Associated curly 2nd toe.



Hallux valgus "bunion"

- Not a pediatric foot condition, included here because of its importance
- The commonest of the foot deformities (and probably of all musculoskeletal deformities).
- The elements of the deformity are lateral deviation and rotation of the hallux, together with a prominence of the medial side of the head of the first metatarsal (a bunion); there may also be an overlying bursa and thickened soft tissue. Lateral deviation of the hallux may lead to overcrowding of the lateral toes and sometimes over-riding
- Most common in women between 50 and 70 years, bilateral.
- Proposed factors include wearing overly tight shoes, family history, and rheumatoid arthritis.
- Diagnosis is generally based on symptoms and supported by X-rays
- A similar condition of the little toe is referred to as a bunionette or Tailor's bunion, is a condition caused as a result of inflammation of the fifth metatarsal bone at the base of the little toe
- The patient is encouraged to wear shoes with deep wide toe-boxes, soft uppers and low heels
- Treatment may include proper shoes, orthotics, or NSAIDs. If this is not effective for improving symptoms, surgery may be done

(a) - No response to medical therapy

Hallux rigidus: (a) - Painful (b) - Patient desire

- Hallux rigidus or stiff big toe is degenerative arthritis and stiffness due to bone spurs that affects the MTP joint at the base of the hallux (big toe).
- 'Rigidity' of the first MTP joint
- Pain and stiffness in the joint at the base of the big toe during use (walking, standing, bending, etc.)
- Swelling

The indication for operative treatment of hallux valgus deformity in a 50-year-old female patient is typically based on the severity of symptoms and functional impairment. Among the options provided, the most appropriate indication for operative treatment is:

c. Painful deformity.

While associated rotational deformity (option a), intermetatarsal angle of 20 (option b), hallux valgus angle of 35 (option d), and associated curly 2nd toe (option e) may all contribute to the overall severity of the deformity, the presence of significant pain and discomfort (painful deformity) is typically the primary indication for surgical intervention.

Operative treatment is often considered when conservative measures such as footwear modification, orthotics, and physical therapy have failed to alleviate symptoms, and the patient experiences persistent pain and functional limitations due to the hallux valgus deformity. Therefore, option c, painful deformity, is the most appropriate indication for operative treatment.

Answer C

11- A pointing index sign results from injury to the:

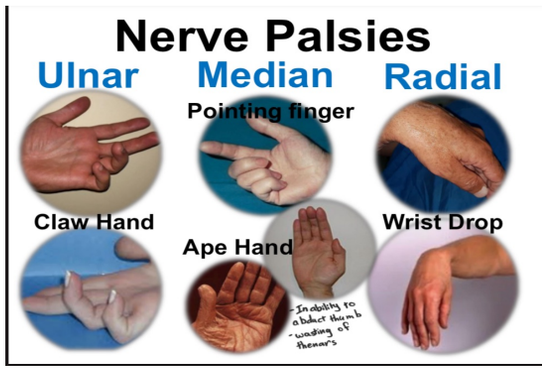
a. Posterior interosseous nerve

b. Median nerve

c. Radial nerve

d. Ulnar nerve

e. Musculocutaneous nerve



Answer B

12- 10-year-old male child presented with a painful rigid flat foot deformity; his pain started few months ago. He has no trauma to the foot, no constitutional symptoms. No underlying neurological abnormality. Most probably he has:

a. Degenerative mid-foot arthropathy

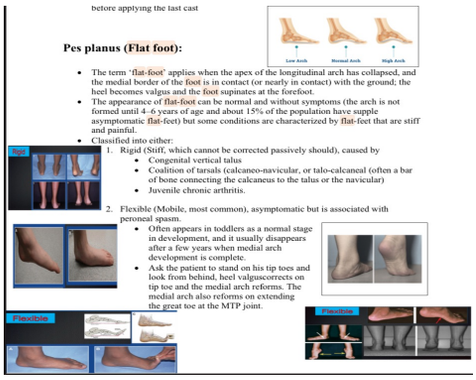
b. Skew foot

c. Calcaneonavicular coalition

d. Club foot

e. Peroneal spasticity

↳ in flexible Type



before apptyng the last cast

Pes planus (Flat foot):

- The term 'flat-foot' applies when the apex of the longitudinal arch has collapsed, and the medial border of the foot is in contact (or nearly in contact) with the ground; the heel becomes valgus and the foot supinates at the forefoot.
- The appearance of flat-foot can be normal and without symptoms (the arch is not formed until 4–6 years of age and about 15% of the population have supple asymptomatic flat-feet) but some conditions are characterized by flat-feet that are stiff and painful.
- Classified into either:

1. Rigid (Stiff, which cannot be corrected passively should), caused by
   - Congenital vertical talus
   - Coalition of tarsals (calcaneo-navicular, or talo-calcaneal (often a bar of bone connecting the calcaneus to the talus or the navicular)
   - Juvenile chronic arthritis.
2. Flexible (Mobile, most common), asymptomatic but is associated with peroneal spasm.
   - Often appears in toddlers as a normal stage in development, and it usually disappears after a few years when medial arch development is complete.
   - Ask the patient to stand on his tip toes and look from behind, heel valgus corrects on tip toe and the medial arch reforms. The medial arch also reforms on extending the great toe at the MTP joint.

Flexible

Flexible

- Clinical assessment:
  - In the common flexible flat feet, there are usually no symptoms, but the parents notice that the feet are flat or that the shoes wear badly.
  - The deformity becomes noticeable when the youngster stands. The first test is to ask him or her to go up on their toes: if the heels invert and the medial arches forms up, it is a flexible (or mobile) deformity. This can also be checked by performing the jack test (also called the great toe extension test (toe raise)): with the child seated, feet planted firmly on the floor, the examiner firmly dorsiflexes the great toe; the medial arch should re-appear while the heel adopts a more neutral position and the tibia rotates externally.
  - A tight Achilles tendon may induce a compensatory flat-foot deformity.
- X-rays are unnecessary for asymptomatic, flexible flat feet.
  - If painful or stiff flat feet → use x-ray
  - If tarsal coalitions → CT
- Treatment:
  - Physiologic "flexible" flat foot: reassurance "deformity' will probably correct itself out if young enough". (Medial arch support only if there was genuine medial foot pain, but this doesn't get rid of the flat foot deformity.) remember 15-25% of adults have flexible flat feet.
  - Rigid type might need surgery if symptomatic enough however we always start conservatively

Answer C

13- The rectus femoris is active at what phase of the gait cycle?

* Dr. Ziad

a. at pre swing

b. at late swing

c. at mid stance

d. Immediately following initial contact

e. at terminal stance

Answer A

14- one is not a feature of intertrochanteric fracture:

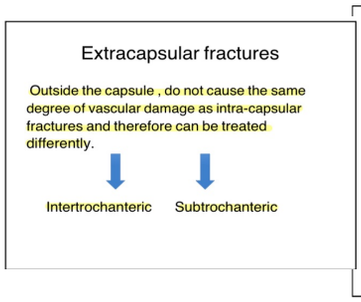
a. More vascular anastomosis ↳ intra-capsular

b. High risk of femoral head avascular necrosis

c. Better healing than femur neck fractures

d. More cancellous type of bone

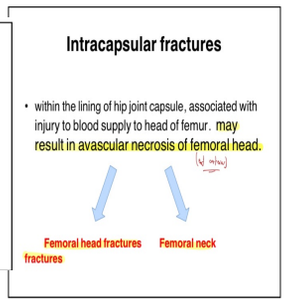
e. Less nonunion



Extracapsular fractures

Outside the capsule , do not cause the same degree of vascular damage as intra-capsular fractures and therefore can be treated differently.

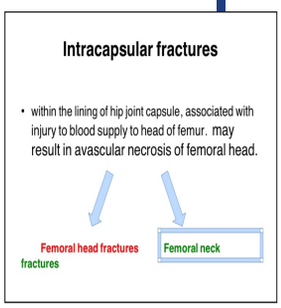
Intertrochanteric Subtrochanteric



Intracapsular fractures

- within the lining of hip joint capsule, associated with injury to blood supply to head of femur. may result in avascular necrosis of femoral head.

Femoral head fractures Femoral neck fractures



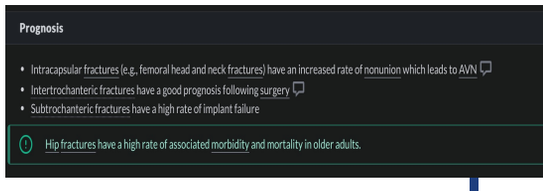
Intracapsular fractures

- within the lining of hip joint capsule, associated with injury to blood supply to head of femur. may result in avascular necrosis of femoral head.

Femoral head fractures Femoral neck fractures

Category	Characteristic	Significance
Extracapsular Intertrochanteric Subtrochanteric	Large amount of cancellous bone and good blood supply	Typically heals well, although subtrochanteric has higher rate of impact device failure
Intracapsular Femoral head Femoral neck	Little cancellous bone and relatively poor blood supply	Higher incidence of avascular necrosis, nonunion, malunion, and degenerative changes

Information from reference 30.



Prognosis

- Intracapsular fractures (e.g., femoral head and neck fractures) have an increased rate of nonunion which leads to AVN
- Intertrochanteric fractures have a good prognosis following surgery
- Subtrochanteric fractures have a high rate of implant failure

Hip fractures have a high rate of associated morbidity and mortality in older adults.

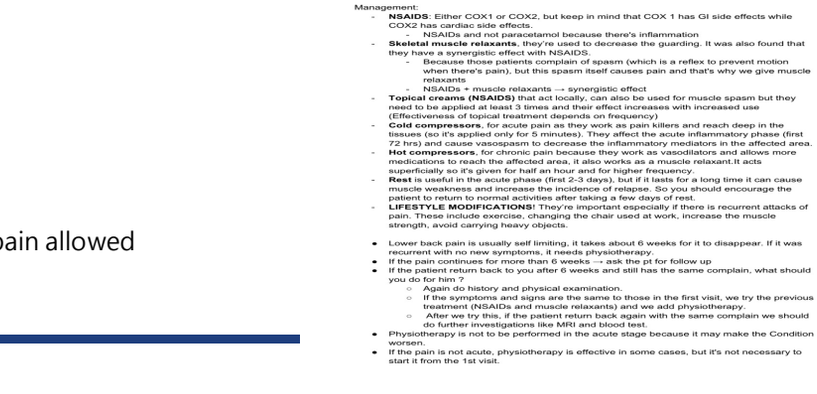
Answer B

15- A 25-year-old male patient presented with history of mechanical low back pain for 2 months. without radicular symptoms or red flags. on examination the pain becomes worse with flexion and extension although the patient can do full range of motion. the best course of management ?

a. Oral steroids

b. Lumbo-sacral spine x-ray

c. Analgesia, limited bed rest, and return to work as pain allowed



Management:

- **NSAIDS**: Either COX1 or COX2, but keep in mind that COX 1 has GI side effects while COX2 has cardiac side effects.
  - NSAIDs and not paracetamol because there's inflammation
- **Skeletal muscle relaxants**, they're used to decrease the guarding. It was also found that they have a synergistic effect with NSAIDS.
  - Because those patients complain of spasm (which is a reflex to prevent motion when there's pain), but this spasm itself causes pain and that's why we give muscle relaxants
  - NSAIDs + muscle relaxants → synergistic effect
- **Topical creams (NSAIDS)** that act locally, can also be used for muscle spasm but they need to be applied at least 3 times and their effect increases with increased use (Effactiveness of topical treatment depends on frequency)
- **Cold compressors**, for acute pain as they work as pain killers and reach deep in the tissues (so it's applied only for 5 minutes). They affect the acute inflammatory phase (first 72 hrs) and cause vasospasm to decrease the inflammatory mediators in the affected area.
- **Hot compressors**, for chronic pain because they work as vasodilators and allows more medications to reach the affected area, it also works as a muscle relaxant.It acts superficially so it's given for half an hour and for higher frequency.
- **Rest** is useful in the acute phase (first 2-3 days), but if it lasts for a long time it can cause muscle weakness and increase the incidence of relapse. So you should encourage the patient to return to normal activities after taking a few days of rest.
- **LIFESTYLE MODIFICATIONS!** They're important especially if there is recurrent attacks of pain. These include exercise, changing the chair used at work, increase the muscle strength, avoid carrying heavy objects.

- Lower back pain is usually self limiting, it takes about 6 weeks for it to disappear. If it was recurrent with no new symptoms, it needs physiotherapy.
- If the pain continues for more than 6 weeks → ask the pt for follow up
- If the patient return back to you after 6 weeks and still has the same complain, what should you do for him ?
  - Again do history and physical examination.
  - If the symptoms and signs are the same to those in the first visit, we try the previous treatment (NSAIDs and muscle relaxants) and we add physiotherapy.
  - After we try this, if the patient return back again with the same complain we should do further investigations like MRI and blood test.
- Physiotherapy is not to be performed in the acute stage because it may make the Condition worsen.
- If the pain is not acute, physiotherapy is effective in some cases, but it's not necessary to start it from the 1st visit.

d. Intra-muscular steroid injection

e. Lumber MRI

Answer C

16- One of the followings is not a risk factor for Quadriceps Tendon Rupture:

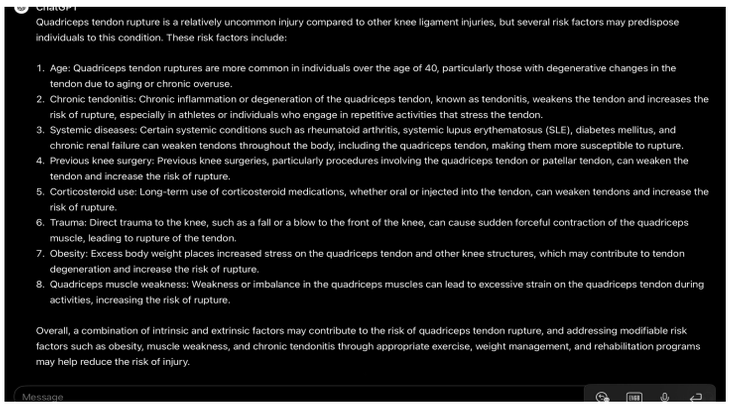
a. steroid use

b. connective tissue disorders

c. rheumatoid arthritis

d. diabetes

e. hypoparathyroidism



Answer E

17- One is not seen during examination of typical club foot deformity:

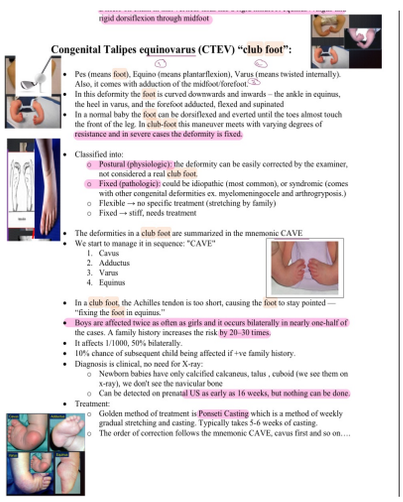
a. Equinus deformity

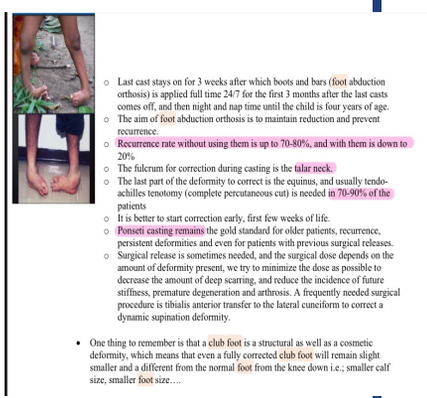
b. Deep medial foot crease

c. More forefoot supination in relation to the hindfoot

d. Forefoot adductionp

e. Hind foot varus





Answer B

18- A 48-year-old male had a direct trauma to his left lower limb resulting in isolated posterior knee dislocation, he had decreased sensation over the foot and absent distal pulses. Next step is:

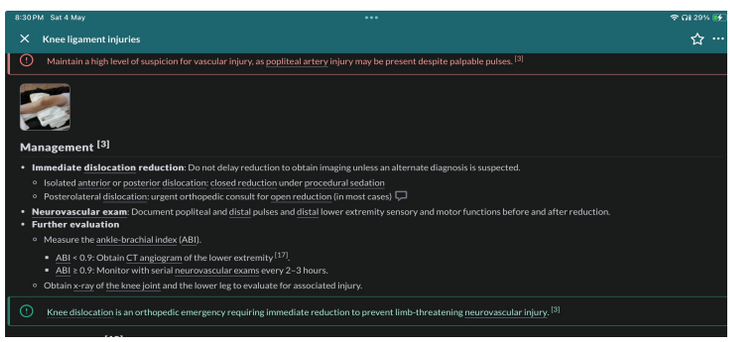
a. More Intravenous fluids.

b. Application of external fixator.

c. Urgent Arthroscopy.

d. Reduction.

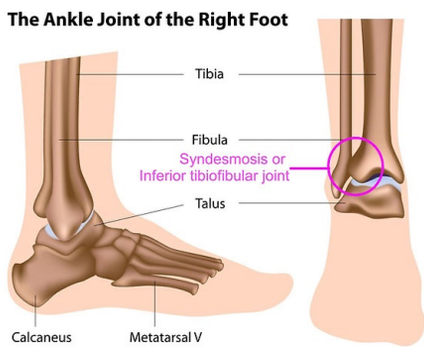
e. Angiogram in the Emergency room.



Answer D

19- The structure that determine the stability in ankle fracture is:

a. syndesmosis



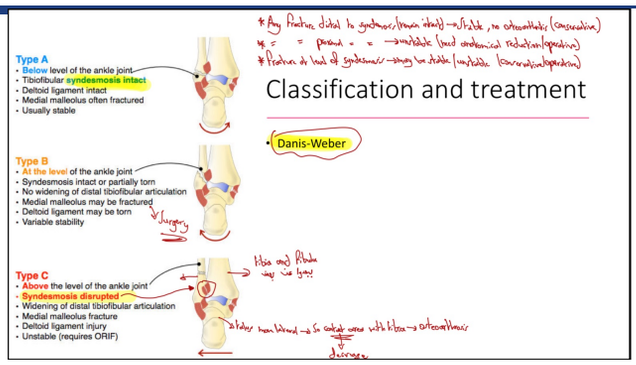
The syndesmosis is a fibrous joint located between the tibia and fibula bones, held together by strong ligaments. It plays a crucial role in stabilizing the ankle joint, especially in cases of ankle fractures. Disruption of the syndesmosis, such as with a high ankle (syndesmotic) fracture, can result in instability and impaired healing. Therefore, proper management and stabilization of the syndesmosis are essential for optimal outcomes in ankle fracture treatment.

b. articular surface

c. Anterior talofibular ligament

d. calcaneofibular ligament

e. Posterior talofibular ligament



Answer A

20- Denosumab Mechanism of action in the treatment of osteoporosis is:

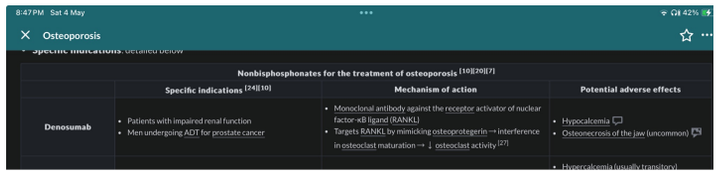
a. activates Wnt pathway by binding sclerostin

b. Agonist on estrogen receptors in bone

c. stimulates intestinal absorption Ca and PO4

d. Binds membrane receptors on osteoclasts to inhibit resorption

e. Monoclonal Ig2 against RANKL



Answer E

Exam Q

21- One of the following x-ray changes is pathognomonic for chronic osteomyelitis:

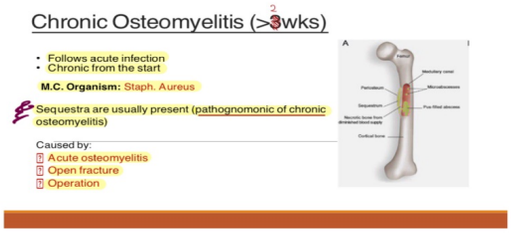
a. Involucrum

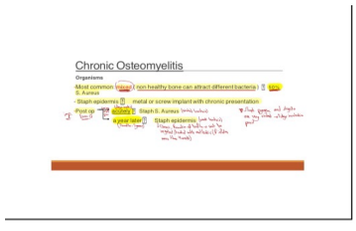
b. Rarefaction

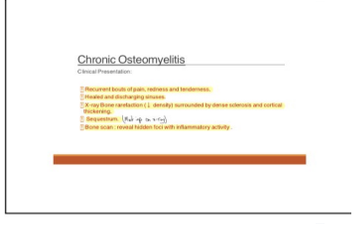
c. Bone destruction

d. Sequestrum

e. Sinus







Answer D

22- One of the following is a symptom of an advanced carpal tunnel syndrome:

a. Total numbness (anesthesia)

b. Objects falling from the hand

c. History of diabetes

d. Sleep disturbances due to pain

e. Paresthesia

Advanced carpal tunnel syndrome can lead to muscle weakness and atrophy in the hand, particularly in the muscles controlled by the median nerve, which is compressed in carpal tunnel syndrome. This weakness can result in difficulties with grip strength and coordination, leading to a sensation of objects slipping or falling from the hand. This symptom often indicates more severe nerve compression and muscle involvement in advanced stages of carpal tunnel syndrome.

1. Early Symptoms:
   - Numbness and tingling: Patients may experience numbness, tingling, or "pins and needles" sensation in the thumb, index, middle, and part of the ring fingers. This sensation may occur intermittently and often worsens at night or during activities that involve repetitive wrist movements.
   - Paresthesia: Patients may also describe abnormal sensations such as burning, prickling, or electric shock-like sensations in the affected fingers.
2. Moderate Symptoms:
   - Weakness and clumsiness: As the condition progresses, weakness and clumsiness in the affected hand may become more noticeable. Patients may have difficulty with fine motor tasks such as buttoning shirts or picking up small objects.
   - Pain and discomfort: Some patients may experience dull aching pain or discomfort in the hand, wrist, or forearm, especially after prolonged use or repetitive movements.
3. Late Symptoms (Advanced Carpal Tunnel Syndrome):
   - Muscle weakness and atrophy: In advanced stages, muscle weakness and atrophy (shrinking) may occur, particularly in the muscles controlled by the median nerve. This can lead to difficulties with grip strength, coordination, and dexterity.
   - Loss of sensation: Severe compression of the median nerve can result in loss of sensation (anesthesia) in the thumb, index, middle, and part of the ring fingers. Patients may have difficulty discerning temperature or touch sensation in these areas.
   - Inability to perform tasks: Patients may find it challenging to perform everyday tasks requiring manual dexterity, such as writing, typing, or gripping objects. Some may even report objects slipping or falling from their hand due to weakness and loss of coordination.

It's important to note that symptoms can vary from person to person, and not all individuals will experience the same progression or severity of symptoms. Early recognition and treatment of carpal tunnel syndrome can help alleviate symptoms and prevent progression to more advanced stages.

Answer B

23- One of the following is NOT an indication of MRI in patients with acute low back pain:

a. night pain, rest pain

b. post-menopausal osteopenia

c. history of malignancy

d. progressive neurological deficit

e. new onset urinary incontinence

Explanation:

a. Night pain, rest pain: Night pain, especially if it disrupts sleep, can be indicative of more serious underlying conditions such as infection, malignancy, or inflammatory disorders. Therefore, it may warrant further evaluation with MRI to assess for these conditions.

c. History of malignancy: Patients with a history of malignancy are at higher risk of developing metastatic spinal cord compression, which can present with back pain. MRI is indicated in these cases to evaluate for spinal cord compression and determine the extent of the malignancy.

d. Progressive neurological deficit: Progressive neurological deficits such as weakness, numbness, or difficulty with bowel or bladder control suggest compression of the spinal cord or nerve roots, which may require urgent intervention. MRI is essential for identifying the cause and extent of compression.

e. New onset urinary incontinence: New onset urinary incontinence, especially if associated with saddle anesthesia (loss of sensation in the perineum), can indicate cauda equina syndrome, a serious condition caused by compression of the nerves at the base of the spinal cord. MRI is necessary to evaluate for cauda equina syndrome and determine the underlying cause.

Post-menopausal osteopenia (option b) is not typically an indication for urgent MRI in patients with acute low back pain. While osteopenia increases the risk of vertebral fractures, which can cause back pain, it does not typically require urgent imaging unless associated with neurological deficits or other red flags. Instead, initial management would focus on conservative measures and possibly X-ray evaluation for suspected fractures.

1. Trauma: Acute low back pain following significant trauma, such as a motor vehicle accident or fall from height, may indicate spinal fracture or ligamentous injury. MRI can help evaluate for fractures, ligamentous injuries, and soft tissue damage.
2. Suspected infection: Acute low back pain associated with fever, chills, or signs of systemic infection may suggest spinal infection (osteomyelitis or discitis). MRI is the imaging modality of choice for diagnosing spinal infections and assessing the extent of involvement.
3. Suspected disc herniation: Acute low back pain with radicular symptoms (sciatica) such as leg pain, numbness, or weakness, particularly if accompanied by neurological deficits, may indicate a herniated disc compressing a spinal nerve root. MRI is highly sensitive for detecting disc herniations and assessing nerve root compression.
4. Suspected spinal stenosis: Acute low back pain with neurogenic claudication (pain or numbness that worsens with standing or walking and improves with sitting or bending forward) may suggest lumbar spinal stenosis. MRI can confirm the diagnosis by evaluating for spinal canal narrowing, ligamentous hypertrophy, and nerve root compression.
5. Failed conservative management: Acute low back pain that persists despite conservative management (rest, activity modification, analgesics) for several weeks may warrant further evaluation with MRI to identify the underlying cause, such as disc herniation, spinal stenosis, or other structural abnormalities.
6. Suspected malignancy: Acute low back pain in patients with a history of cancer or risk factors for malignancy (e.g., age over 50, unexplained weight loss) may raise concern for metastatic spinal cord compression. MRI is essential for detecting spinal metastases and determining the extent of involvement.

These indicators, in addition to the ones previously mentioned, help guide clinicians in determining when MRI is warranted in the evaluation of acute low back pain, particularly when red flags or concerning features are present.

Answer B

2020

24-The major determinant of the type of healing of a fracture (primary or secondary healing) is:

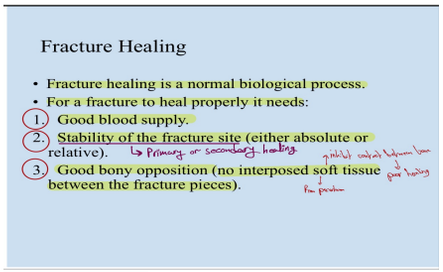
a. The age of the patient

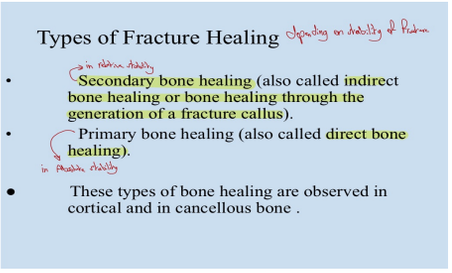
b. The extent of soft tissue injury

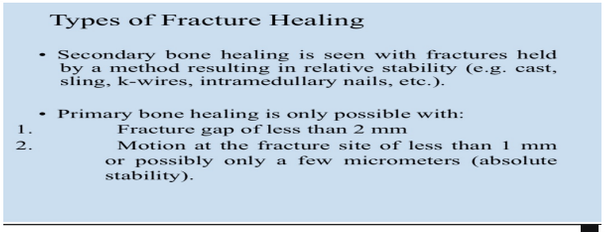
c. The site of the fracture

d. The degree of fracture displacement

e. The stability of fracture fixation







Answer E

25_Which one of the following pairs best matches?

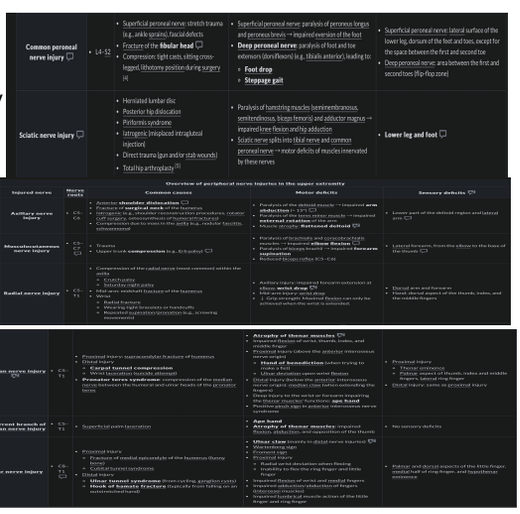
a. Distal radius fracture: anterior interosseous nerve injury

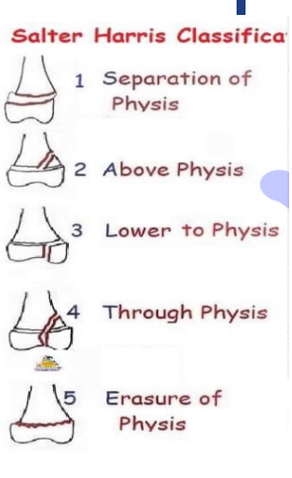
b. Midshaft humeral fracture: median nerve Injury

c. Salter Harris I fracture: significant growth arrest

d. Posterior hip dislocation: sciatic nerve injury

e. Ankle fracture-dislocation: Popliteal artery injury





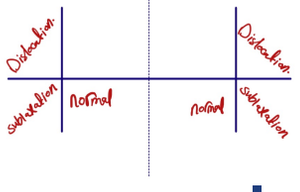
Answer D

26_ Which of the following x-ray findings is characteristic of a left sided developmental dysplasia of the hip (dislocation type) in a 7 months old female infant?

a. Acetabular index more than 30 degrees with the ossific nucleus located inI the upper outer quadrant

b. Acetabular index less than 30 degrees with the ossific nucleus located in the lower outer quadrant

c. Acetabular index more than 30 degrees with the ossific nucleus located in the lower outer quadrant

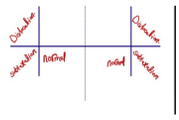


d. Acetabular index less than 30 degrees with the ossific nucleus located in the upper outer quadrant

e. Absent ossific nucleus of the femur head

>>> Radiographic finding in acetabular dysplasia

* Increased obliquity of the acetabulum (AIA >30°). * Loss of acetabular concavity. * Intact Shenton line.



Answer A

27- Which of the following features is found in a severe slipped capital femoral epiphysis in an adolescent male patient?

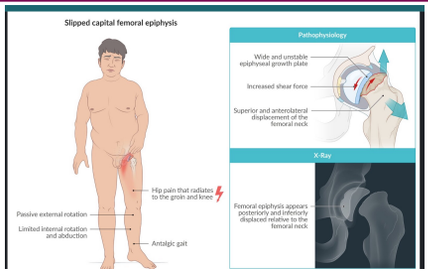
a. Weak ankle dorsiflexion

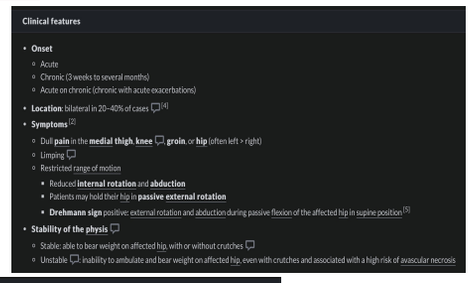
b. Absent dorsalis pedis pulse

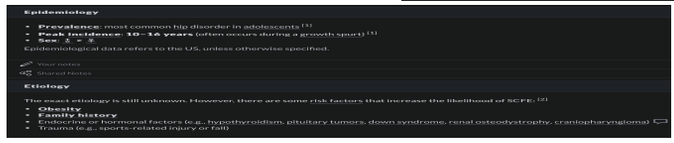
c. There is always a history of trauma

d. Normal AP and lateral x-ray of the pelvis

e. Obligatory external rotation on hip flexion







Answer E

28- A 65-year old carpenter presented with progressive bilateral knee pain that is not interfering with his activities of daily living, he has medial joint line tenderness and decreased joint space on x-ray, you will advise him: osteoarthritis

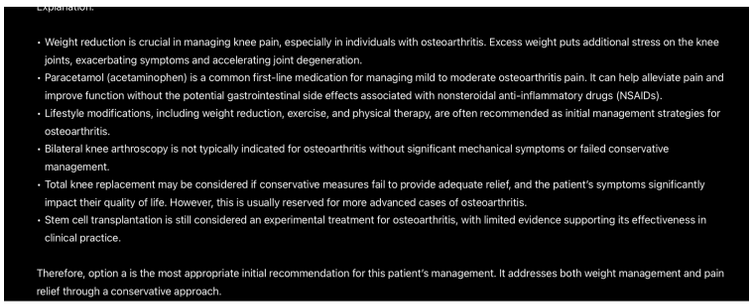
a. To decrease his weight and take paracetamol

b. To take hyaluronic acid supplements

c. To do bilateral knee arthroscopy

d. To go for total knee replacement

e. To have stem cells transplantation



Answer A

29- In acute osteomyelitis, the pain is caused by:

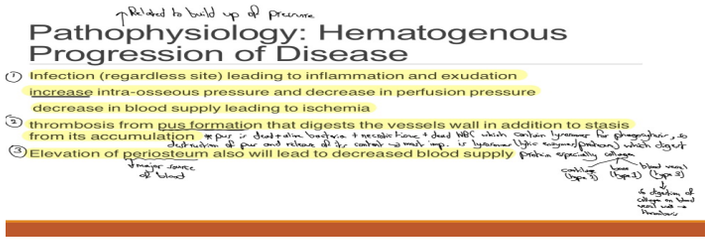
a. Increased intraosseous pressure

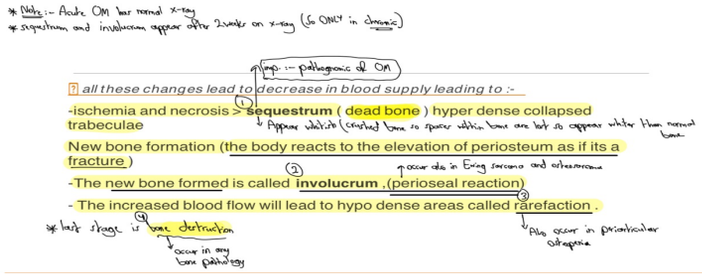
b. Abscess formation

c. Periosteal reaction

d. Avascular necrosis

e. Fracture



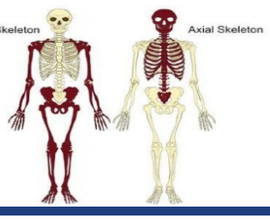


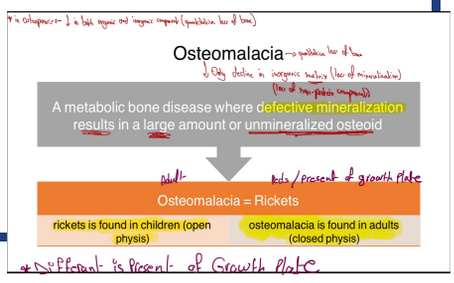
Answer A

30- Regarding Osteomalacia one is correct:

a. Appendicular fracture predominance

↳ mineralize → ↑ Risk of fracture





b. Alkaline phosphatase levels always normal

c. Defined as reduced bone mass with normal mineralization

d. Tetracycline labeling normal

e. Post-menopausal only

↳ in child.

Answer A

31- A 15-year old female patient is being assessed for scoliosis that was noticed 2 years ago, her curve measure 65 degrees. How would you counsel her with regards to this deformity?

a. Neurological exam is not mandatory in idiopathic scoliosis

b. Pain is rare with this type of deformity

c. She doesn't need treatment as it is unlikely that this curve will progress

d. A type 5 riser sign indicates that this patient is skeletally mature

e. The main goal of surgery if to be done is cosmetic

↳ To Prevent Progression

SKELETAL MATURITY – RISSER'S SIGN

- Indirect measure of skeletal maturity, whereby the ossification stage of iliac apophysis is used to judge the ossification of spinal vertebra. On a scale of 5, it gives a measure of progression of ossification; the grade of 5 means that skeletal maturity is reached.
- The curve of scoliosis often progresses most during the period of rapid skeletal growth and maturation.
- The iliac apophysis start ossifying shortly after puberty.
- Ossification extends medially and, once the iliac crests are completely ossified, further progression of the scoliosis is minimal (Riser's sign).
- This stage of development usually coincides with fusion of the vertebral ring apophysis. 'Skeletal age' may also be estimated from x-rays of the wrist and hand.

1. Grade 1 → when the ilium (bone) is calcified at a level of 25%; it corresponds to prepuberty or early puberty.
2. Grade 2 → when the ilium (bone) is calcified at a level of 50%; it corresponds to the stage before or during growth spurt.
3. Grade 3 → when the ilium (bone) is calcified at a level of 75%; it corresponds to the slowing of growth.
4. 4. Grade 4 → when the ilium (bone) is calcified at a level of 100%; it corresponds to an almost cessation of growth.
5. 5. Grade 5 → when the ilium (bone) is calcified at a level of 100 % and the iliac apophysis is fused to iliac crest; it corresponds to the end of growth.

Cobb's angle

- Full-length PA and lateral x-rays of the spine and iliac crests must be taken with the patient erect.
- The degree of curvature is measured by drawing lines on the x-ray at the upper border of the uppermost vertebrae of the curve and the lower border of the lowermost vertebra of the curve; The angle between intersecting lines drawn perpendicular to the top of the top vertebrae and the bottom of the bottom vertebrae is the Cobb angle "the angle of curvature"
  - Mild → 10 - 30°
  - Moderate → 30 - 45°
  - Severe → >45°
- If 50-90 → needs surgery to prevent progression
- <50 → conservative
- Right thoracic curves are the commonest, the great majority in girls in adolescent idiopathic scoliosis. → the apex to the Rt side → to the opposite side of heart
- Left thoracic curves are so unusual that if seen they should be further investigated by MRI to exclude spinal tumors.

imary thoracic curves are usually convex to the right, lumbar curves to the left.

Signs and symptoms

- Symptoms associated with scoliosis can include:
  - Pain in back, shoulders, and neck and buttock pain → 1/3 of pts
  - Respiratory and/or cardiac problems in severe cases
  - Constipation due to curvature causing "tightening" of stomach, intestines, etc.
  - Limited mobility secondary to pain or functional limitation in adults
  - Painful menstruation

Answer D

32- 12-year old boy had a knee x-ray after injuring his knee while playing basketball. It showed a lesion in the distal femoral metaphysis. The presence of which of these radiological findings favors a malignant entity over a benign one:

a. Cortical preservation

b. Narrow transition zone

c. Sclerotic rim

d. Well-defined margin

e. Codman's triangle

↳ osteosarcoma

General Features

- Rapid growth, warmth, and tenderness.
- Have periosteal reaction on x-rays:
  - Codman's triangle (periosteal elevation).
  - Sunburst pattern/Sunrays appearance.
  - Onion skin appearance (Ewing's sarcoma).

Radiological Appearance

Malignant lesions:

1. Could be lytic, sclerotic, or mixed.
2. Ill defined margins (wide transition zone).
3. Cortical destruction.
4. Periosteal reaction.
5. A soft tissue mass (shadow) can sometimes be seen.

Answer E

33-Which of the following statements describe the deformity best known as rocker bottom foot in a child?

a. Treatment is always surgical

b. It is basically a dislocated talocalcaneal joint

c. Its flexible

d. It is rarely bilateral

e. It carries a worse prognosis when compared to a clubfoot

Congenital vertical talus (Rocker-bottom foot):

- Irreducible dorsal dislocation of the navicular on the talus producing a rigid flatfoot deformity:
  - Irreducible dorsolateral navicular dislocation
  - Vertically oriented talus
  - Calcaneal eversion with attenuated spring ligament
- Soft tissue contractures:
  - Displacement of peroneal longus and posterior tibialis tendon so they function as dorsiflexors rather than plantar flexors
  - contracture of the Achilles tendon
- Worse prognosis than club foot.

- High incidence with various congenital anomalies and neuromuscular diseases; such as:
  - ✓ Myelomeningocele
  - ✓ DDH
  - ✓ Arthrogryposis
  - ✓ Trisomy 13
  - ✓ Marfan syndrome
- Presentation: (Rigid rocker-bottom deformity)
  - Fixed hindfoot equinovalgus: due to contracture of the Achilles and peroneal tendons
  - Rigid midfoot dorsiflexion: secondary to the dislocated navicular
  - Forefoot abducted and dorsiflexed: due to contractures of the EDL, EHL and tibialis anterior tendons

Answer E

34-A 20-year old male patient with a closed fracture in his right proximal tibia presented with severe pain and swelling in his calf, the earliest sign suggestive of compartment syndrome is:

a. Pain upon passive stretching of the involved compartment muscles

b. Absent distal pulses

c. Excessive swelling of the calf muscle

d. Change in the skin color

e. Paralysis of his foot

7-Compartment syndrome. (Important)

Increased pressure in an enclosed osteo-fascial space that inhibits capillary perfusion necessary for tissue viability.
This is commonest after tibia fractures swelling in the tightly bound compartments cause venous engorgement in the compartment, further raising pressure and subsequently causing muscle necrosis.

Clinical signs ("6 Ps")

*Pain with passive muscle motion	*Paresthesia	*Pallor; in late stages,
*Pulselessness	*Paralysis	*Poikilothermia

Swelling, pain with a passive range of motion of the joints distally is the most sensitive early sign of elevated compartment pressure.

Treatment

= Remove casts and circumferential dressings down to the skin
= Splint or immobilize fractures
= Compartment syndrome is an emergent indication for surgery and requires immediate attention if suspected; delayed treatment results in ischemic contracture or limb loss.
= Perform fasciotomies for patients with compartment
N.B: Compartment syndrome can be masked by regional anesthesia & analgesia.

Answer A

35-The earliest motion to be lost in adhesive capsulitis is:

a. Abduction

b. Extension

c. Adduction

d. External rotation (in an idiopathic pathology)

e. All movements are lost to the same degree

4-Adhesive Capsulitis (Frozen Shoulder)

A disorder characterized by progressive pain and stiffness of the shoulder usually resolving spontaneously after 18 months.

A-Mechanism

Primary adhesive capsulitis
- Idiopathic, usually associated with DM.
- May resolve spontaneously in 9-18 months.
- More common in older patients (40–60 y).

Secondary adhesive capsulitis
- Due to prolonged immobilization
- Shoulder-hand syndrome - a type of chronic regional pain syndrome
- Following myocardial infarction. Stroke, shoulder trauma.

B-Pathology

Inflammatory thickening of the capsule.
Starts at the rotator cuff interval between the supraspinatus and subscapularis.

30

The 1st movement to be lost is external rotation while in stiff shoulder abduction.

C-Stages
- 0-6m → painful stage, a gradual increase in pain & decrease of ROM.
- 6-12m →adhesive stage, severe pain, minimal ROM.
- 12-18m →recovery stage, decreased pain, restoration of ROM.

D-PF: *(Female, DM x5, MI, Trauma, surgery, Hyperthyroidism, Stroke)*

E-Clinical Features
- Gradual onset of diffuse shoulder pain with decreased active and passive ROM.
- Pain worse at night.
- Increased stiffness as the pain subsides: continue for 6-12 months after the pain has disappeared.
- Loss of both active and passive ROM; internal rotation is usually first affected. Diagnosis of frozen shoulder is primarily by clinical examination (restriction of both the active and passive range of motion of the shoulder)

G-Treatment

Full recovery may take up to 3 years.

Answer D

36-In a 20-year-old male patient who had a shoulder dislocation, what is the most common complication?

a. Greater tuberosity fracture

b. Rotator cuff tear

c. Bankart lesion

d. Axillary nerve injury

e. Chondrolysis

Complications:
- Depend on age.
- Around age of 20 : bankart lesion (most common), it is caused by avulsion of labrum, anterior and inferior glenohumeral ligaments are incompetent. This will cause 100% risk for recurrence
- In middle ages
  - In anterior dislocation → fractures at greater tuberosity,
  - In posterior dislocation → fracture at greater or lesser tuberosity
- In older ages : rotator cuff tear
- Most common nerve to be injured is axillary nerve
- Neurovascular injury : (axillary artery , nerve)
- Late :
  - 1- AVN of humeral head
  - 2- Heterotopic calcification
  - 3- Recurrence

A-Anterior shoulder dislocation

Clinical Features of anterior dislocation
• Pain, tenderness, deformity (flat deltoid)
• Arm held in slight abduction, external rotation; internal rotation is blocked
• "Squared off" shoulder.
The best way to test the axillary nerve is to assess sensation over the deltoid 'regimental badge' area.

Look for Concomitant Injuries,
1- **Bony:** Bankart lesion, Hill-Sachs Lesion, Glenoid Fracture, Greater tuberosity fracture.
- **Bankart lesion**
  Injury of the anterior (inferior) glenoid labrum of the shoulder due to anterior shoulder dislocation. When this happens, a pocket at the front of the glenoid forms that allow the humeral head to dislocate into it.
- **Hill-Sachs Lesion**
  A cortical depression in the posterolateral head of the humerus. It results from forceful impaction of the humeral head against the anteroinferior glenoid rim when the shoulder is dislocated anteriorly.

2- **Soft Tissue:** Subscapularis tear, Rotator cuff tear (older pts.)
3- **Nerve:** Axillary nerve neuropraxia.

X-ray: AP, Scapular Y, Axillary views
Essential before any manipulation, as fractures may be present, either of the humeral neck, the glenoid, or the avulsion of the greater tuberosity.

Management: Urgent closed reduction
Post reduction
= X-ray confirms reduction or fracture = Pain control.
= Immobilization in a sling for 7-10 days then begin progressive ROM.
= Rehabilitation of shoulder muscles.

Complications
A- According to age
1-Younger age (20s)
= Bankart lesion, (glenoid rim chip #) → recurrent dislocation
= Recurrence rate depends on the age of 1st dislocation: <20 yrs. = 65-95%; 20-40 yrs. = 60-70%;
2-Middle age (30s) →Fracture greater tuberosity
3-Older age → Rotator cuff tear
4- All age groups → Hill–Sachs lesion, humeral head depression by the glenoid.

B- Others → Axillary nerve injury +AVN

Answer C

37-During a gait training session, you observed the midstance phase of gait from the anterior (front) view of the left lower extremity. The pelvis has an exaggerated downward tilt on the right side, and the right lower extremity is in swing phase. What muscle would the you assess for adequate strength?

a. Left hip adductors

b. Left hip abductors

c. Right hip abductors

d. Right hip adductors

e. Left hip extensors

Answer B

38-A 30-year female patient presented with 1week history of mechanical low back pain. without radicular symptoms or red flags. On examination the pain becomes worse with flexion and extension although the patient can do full range of motion. The best course of management is:

a. Oral steroids

b. Analgesia, limited bed rest, and return to work as pain permits

c. Lumbar spine MRI

d. Facet joint injection

e. Lumbo-sacral spine x-ray

Answer B

39-ONE is in favor of intertrochanteric fractures when compared to femur neck fractures in adults:

a. Intracapsular in position

b. Presence of high cortical to cancellous bone

c. Low risk of nonunion

d. Impaired hematoma formation

e. Poor vascular supply

Table 2. Hip Fracture Classification and Characteristics

Category	*Characteristic*	*Significance*
Extracapsular Intertrochanteric Subtrochanteric	Large amount of cancellous bone and good blood supply	Typically heals well, although subtrochanteric has higher rate of impact device failure
Intracapsular Femoral head Femoral neck	Little cancellous bone and relatively poor blood supply	Higher incidence of avascular necrosis, nonunion, malunion, and degenerative changes

Information from reference 30.

Answer C

40-One of the following fracture patterns is more associated than the others with the development of compartment syndrome:

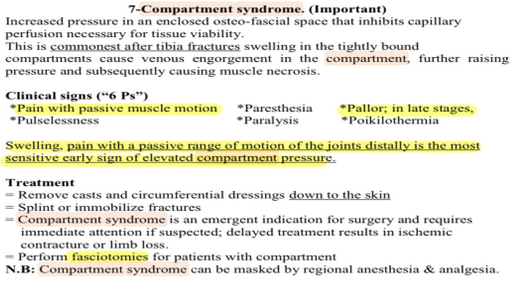
a. Oblique

b. Segmental

c. Avulsion

d. Transverse

e. Spiral



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Treatment
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= Splint or immobilize fractures
= Compartment syndrome is an emergent indication for surgery and requires immediate attention if suspected; delayed treatment results in ischemic contracture or limb loss.
= Perform fasciotomies for patients with compartment
N.B: Compartment syndrome can be masked by regional anesthesia & analgesia.

Explanation:

- Compartment syndrome occurs when pressure within a closed muscle compartment increases to the point that it compromises the circulation and function of the tissues within that compartment.
- Segmental fractures involve the bone breaking into two or more separate segments. These fractures can result in significant soft tissue injury, including disruption of blood vessels and muscle, which can contribute to the development of compartment syndrome.
- The presence of multiple fracture segments can lead to a greater degree of soft tissue disruption, hemorrhage, and edema, all of which can increase compartment pressures and predispose the patient to compartment syndrome.
- While other fracture patterns such as oblique, avulsion, transverse, and spiral fractures can also cause soft tissue injury, segmental fractures are particularly prone to extensive soft tissue damage due to the multiple fracture fragments.

Therefore, option b, segmental fractures, is more strongly associated with the development of compartment syndrome compared to the other fracture patterns listed.

Answer B

41-The most common mechanism that will cause hand infection is:

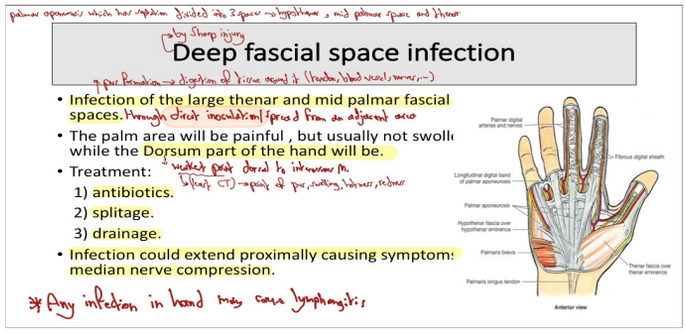
a. Lymphatic spread from the forearm and arm

b. Hematogenous spread

c. Direct spread

d. Direct inoculation

e. Infected thrombi



Answer D

42-Which one of the following is true with regards to peripheral nerve injuries?

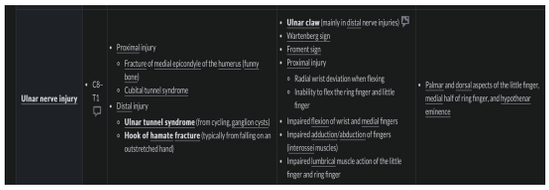
a. Median nerve injury: wrist drop

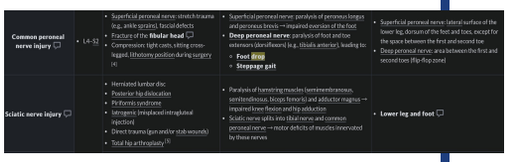
b. Radial nerve injury: absent ok sign

c. Femoral nerve injury: foot drop

d. Sciatic nerve injury: weak adductors

e. Ulnar nerve injury: positive froment's sign





Answer E

43-Which of the following physical exam maneuvers would be MOST expected for a patient with a Segond's fracture on his radiograph?

a. Positive lachman test

b. Positive McMurray's test with leg internally rotated

c. Positive McMurray's test with leg externally rotated

d. Positive external rotation dial test with knee flexed at 30 degrees

e. Positive posterior drawer test

Answer A

44-Genu Varus following proximal tibial growth plate injury, results from:

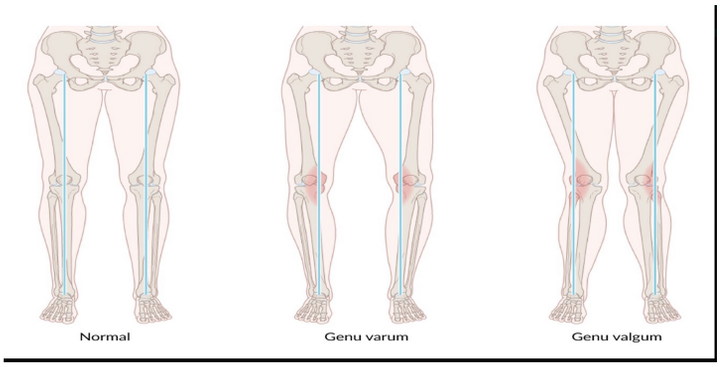
a. Injury to the medial side of the growth plate

b. Injury to the lateral side of the growth plate

c. Injury to the anterolateral side of the growth plate

d. Injury to the anterior side of the growth plate

e. Injury to the posterior side of the growth plate



45-Pain and numbness at night with thenar atrophy and thumb weakness : positive Tinel sign at wrist.

Wrist and hand injuries		
Guyon canal syndrome	Compression of ulnar nerve at wrist. Classically seen in cyclists due to pressure from handlebars.	May also be seen with fracture/dislocation of the hook of hamate.
Carpal tunnel syndrome 	Entrapment of median nerve in carpal tunnel (between transverse carpal ligament and carpal bones) → nerve compression → paresthesia, pain, and numbness in distribution of median nerve. Thenar eminence atrophies A but sensation spared, because palmar cutaneous branch enters hand external to carpal tunnel.	Suggested by ⊕ Tinel sign (percussion of wrist causes tingling) and Phalen maneuver (90° flexion of wrist causes tingling). Associated with pregnancy (due to edema), rheumatoid arthritis, hypothyroidism, diabetes, acromegaly, dialysis-related amyloidosis; may be associated with repetitive use.
Metacarpal neck fracture 	Also called boxer's fracture. Common fracture caused by direct blow with a closed fist (eg, from punching a wall). Most commonly seen in the 5th metacarpal B.	

A-Carpal tunnel syndrome (CTS). Important

Most common compressive neuropathy in the upper extremity >Idiopathic form
Risk factors
Obesity, Pregnancy, DM, hypothyroidism, Rhd A. Chronic Renal Failure, Advanced age and Vibratory exposure during occupational activity.

Diagnosis
- Paresthesia and pain (often at night) in the volar aspect of radial 3 1/2 digits (thumb, index, long and radial half of the ring).
- **Provocative test**
  1- Carpal tunnel compression test (Durkan test). 60 seconds
  2- Tinel and Phalen's tests.
- **Sensory testing**
  Large sensory fibers (light touch, vibration) are affected before small fibers (pain and temperature).
  Semmes-Weinstein monofilament testing is sensitive for diagnosing early CTS. (large fibers).
- Weakness, loss of fine motor control, and abnormal 2-point discrimination are later findings.
- Thenar eminence atrophies but the sensation of the thenar eminence is spared because the palmar cutaneous branch enters the hand external to the carpal tunnel.

Differential diagnoses of CTS.
1-Cervical radiculopathy, 2-Brachial plexopathy, 3-Thoracic outlet syndrome, 4-Pronator syndrome, 5-Peripheral neuropathy.

Treatment
- **Non-operative treatment.**
  1- Activity modification, Night splints, and NSAIDs.
  2- Single corticosteroid injection yields transient relief in approximately 80% after six weeks, but only 20% are symptom-free by 1year.
- **Operative treatment options**
  1- Open, Mini-open
  2- Endoscopic release of the transverse carpal ligament.

Provocative wrist and hand tests

- **Tinel sign**
  - Procedure: The examiner taps the area over the examinee's carpal canal.
  - Interpretation: Shooting pain and/or tingling in the areas innervated by the median nerve suggests carpal tunnel syndrome.
- **Phalen maneuver**
  - Procedure: The examiner flexes the examinee's wrist to 90° and holds it for approx. one minute.
  - Interpretation: Paresthesia in the areas innervated by the median nerve indicates carpal tunnel syndrome.
- **Hand elevation test**
  - Procedure: The examinee elevates their arm above their head and holds it for approx. two minutes.
  - Interpretation: Paresthesia in the areas innervated by the median nerve indicates carpal tunnel syndrome.
- **Finkelstein test**
  - Procedure: The examiner grasps the examinee's affected thumb and exerts longitudinal traction across the palm of the hand towards the ulnar side.
  - Interpretation: Pain in the thumb indicates de Quervain tenosynovitis.

2019

46- True about intra-articular fracture complications – Caused post-traumatic arthritis.

- Intertrochanteric fracture → more area for reduction, more blood supply, tends to mal-union
- Intra Articular fracture → bad healing, synovial fluid prevents hematoma, so increased risk of posttraumatic Osteoarthrosis

Hip dislocation:

- leg and foot can be elevated and treated with ice-packs until the swelling subsides
- Displaced intra-articular fractures are best treated by open reduction and internal fixation with plates and screws.

47- In comparison with femur neck fractures, what is true about subtrochanteric fracture?

Table 2. Hip Fracture Classification and Characteristics

Category	*Characteristic*	*Significance*
Extracapsular Intertrochanteric Subtrochanteric	Large amount of cancellous bone and good blood supply	Typically heals well, although subtrochanteric has higher rate of impact device failure
Intracapsular Femoral head Femoral neck	Little cancellous bone and relatively poor blood supply	Higher incidence of avascular necrosis, nonunion, malunion, and degenerative changes

Information from reference 30.

48-Patient with compartment syndrome, what to do? – Fasciotomy.

49- Which feature favors malignant over benign tumor on X-ray – ill-defined margin. * Above

Ewing ... ←

50- 11-year-old girl with bone pain and lytic lesion on X-ray, what is the most likely tumor? – Aneurysmal bone cyst (couldbe)

Ewing sarcoma	Most common in White patients, generally males < 15 years old.	Diaphysis of long bones (especially femur), pelvic flat bones.	Anaplastic small blue cells of neuroectodermal (mesenchymal) origin (resemble lymphocytes) 2. Differentiate from conditions with similar morphology (eg, lymphoma, chronic osteomyelitis) by testing for t(11;22) (fusion protein EWS-FLI1). "Onion skin" periosteal reaction. Aggressive with early metastases, but responsive to chemotherapy. 11 + 22 = 33 (Patrick Ewing's jersey number).

Clinical features

- Frequently first manifests with localized pain (progressive, worsens at night), hyperthermia, and swelling after trauma to the bone (tissue mass that is tender to palpation and accompanied by erythema)
- B symptoms are common.

Diagnostics

- **Conventional X-ray**
  - Lytic bone lesions
  - **Onion skin appearance** of the periosteum
- Biopsy

51- Not caused by poor mineralization of the bone – osteoporosis.

Osteoporosis is...

"...a systemic skeletal disease characterized by **low bone mass** and **microarchitectural deterioration** with a consequent increase in bone fragility with susceptibility to fracture..."

Definition from WHO

Osteomalacia → qualitative loss of bone
↓ Only decline in inorganic matrix (loc of mineralization)
(loc of non-protein component)

A metabolic bone disease where defective mineralization results in a large amount or unmineralized osteoid

Adult — Peds / present of growth plate

Osteomalacia = Rickets

rickets is found in children (open physis)	osteomalacia is found in adults (closed physis)

52-Patient with L1 fracture after car accident, the most common accompanied fracture - basal skull fracture.

53- What is the mechanism of chance fracture of the spine – flexion-distraction injury (seatbelt fx)

3-Chance fracture (Seat Belt #)

Flexion-distraction injury is the classic "seat belt injury," with failure of the middle and posterior columns and preservation or compressive failure of the anterior column, depending on the location of the axis of rotation. Abdominal visceral injuries are commonly associated with flexion-distraction injuries in the thoracolumbar spine, in 50% of these patients.

57

All three columns are involved → Surgical stabilization is necessary.

54- Patient with L2/L3 disc herniation, which of the following physical signs will not be present? Positive straight leg raising test.

SLR (straight leg rising) test is not specific. SLR is helpful in diagnosis of *(L4*-L5) and (L5-S1) disc prolapse only. The patient should left the leg with knee straight, to increase the pressure on the sciatic nerve the cervical spine flexed and the ankle is dorsiflexed. For the test to be positive the pt should feel pain from THE BACK down the leg, it should be sharp and painful not merely a discomfort. The angle should be less than 60 for it to be positive. This test is just for a sciatic pain.

- The straight leg raising (SLR) test, also known as the straight leg raise or Lasegue test, is typically used to assess for sciatic nerve irritation or compression, often due to lumbar disc herniation.
- A positive SLR test is characterized by reproduction of pain along the sciatic nerve distribution (radiating pain down the back of the leg) when the leg is raised between 30 to 70 degrees while the patient is lying supine.
- Since the L2/L3 level is higher up in the lumbar spine, involvement of this level is less likely to produce the characteristic sciatic nerve symptoms observed with a positive SLR test, which usually involves lower lumbar levels (e.g., L4/L5 or L5/S1).
- Instead, disc herniation at the L2/L3 level may present with other signs and symptoms such as lower back pain, referred pain to the groin or anterior thigh, weakness in hip flexion, or sensory changes in the anterior thigh.

Therefore, a positive straight leg raising test would not typically be present with an L2/L3 disc herniation.

55-Simple transverse fracture of humerus shaft, what is the most likely mechanism? - - direct falling on a step.

- If the cause was a twisting injury, the result is a spiral fracture. (it appears as an oblique line on both AP and lateral views of the X-ray).
- If it was a bending injury, then the fracture would be oblique (it appears as an oblique line on one view and a transverse line on the other).
- A direct injury causes a transverse fracture.

*direct trauma :- transverse fracture (more soft tissue injury)
* falling down and put out hand :- oblique (falling down on outstretched hand with bending force
* = = and twisting (twisting) :- spiral → best healing (due to more contact area and less energy trauma

Bassem Haddad, MD

56-Distal radial fracture in the growth plate, which of the following is associated with the best bone remodeling? - Fracture is in sagittal plane.

The power of remodeling
- Children have a tremendous power of remodeling
- Can accept more angulation and displacement
- Rotational mal-alignment especially diaphyseal does not remodel

Factors affecting remodeling potential.
- Years of remaining growth – the most important factor
- Position in the bone – the nearer to physis the better remodeling (worst) for diaphyseal rotation deformity.
- Plane of motion – Greatest in sagittal, the frontal, and least for transverse plane
- Physeal status – if damaged, less potential for a correction
- The growth potential of adjacent physis e.g., the upper humerus is better than the lower humerus

Injuries of the proximal humerus and close to the wrist remodel much faster than injuries of the elbow and proximal forearm.
Remodeling is fastest at the knee (distal femur and proximal tibia) than in the proximal femur and distal tibia.
Because of the **relative contributions of the growth plates to the longitudinal growth of the upper and lower limb**.

57-A 15-week-old female child with a positive family history of DDH, delivered as breech, X-ray showed acetabular index of 27 and 29 in both hips, what to do? – Reassurance that there is no hip pathology.

Given the positive family history of DDH and the breech delivery, along with acetabular index values of 27 and 29 in both hips, it's prudent to seek further evaluation from a pediatric orthopedic specialist. While the values are within the normal range for a 15-week-old infant, the risk factors warrant close monitoring to ensure that any potential hip dysplasia is promptly addressed. Therefore, reassurance alone may not be sufficient, and a specialist's assessment would be advisable to rule out any underlying hip pathology and provide appropriate guidance for the child's hip development.

3. **Acetabular index "angle"** is angle between Hilgenreiner line and line drawn from triradiate cartilage to lateral edge of acetabulum.
   - This angle decreases with age and should measure less than 30 by 1 year and less than 20° by 2 years of age.

58-True about Perkin's line – Used to diagnose subluxation and dislocation

3months

B. Plain radiographs, Figure 8-9
I. Hilgenreiner line
A line is drawn horizontally through each triradiate cartilage of the pelvis.
II. Perkin line
Perpendicular line to the Hilgenreiner line at the lateral edge of the acetabulum.
This will divide the hip region into four quadrants, (the normally ossific nucleus of the head in the inner lower quadrant, in subluxation it is in the outer lower quadrant, and in a dislocation in the upper outer quadrant).
III. Shenton line
A continuous arch is drawn along the medial border of the femoral neck and the superior border of the obturator foramen.
N.B: False positive in young children with high femoral anteversion
IV. Acetabular index angle (AIA) (Mirror of DDH)
The angle formed by an oblique line (through the outer edge of the acetabulum and triradiate cartilage) and the Hilgenreiner line.
(a) In the infant <3months, a normal value < 30°.
(b) By 9months of age, the acetabular index decreases to 25°.

59-First movement to be affected in frozen shoulder - External rotation.

60-Patient with features of OM, what is the best modality to diagnose the condition? - MRI.

Routine imaging [10][13][14]

- **X-ray**: low sensitivity and specificity for osteomyelitis [15]
  - Indication: initial evaluation as can also exclude differential diagnoses of osteomyelitis
  - Characteristic findings
    - Acute osteomyelitis: typically no pathological findings [5]
    - Subacute/chronic osteomyelitis: bone destruction, sequestrum formation, periosteal reactions [15]
- **MRI with and without IV gadolinium**: **most sensitive** study [15]
  - Indications
    - Suspected acute osteomyelitis (evidence of inflammation can be seen ≤ 5 days after onset of infection)
    - Negative x-ray but high clinical suspicion [13]
    - Evaluation of the extent of osteomyelitis
  - Characteristic findings [15]
    - Acute/subacute osteomyelitis: cortical destruction, bone marrow inflammation, soft-tissue involvement
    - Chronic osteomyelitis: fibrotic scarring of the marrow

= **In neonates:**
*Loss of movement of the limb. *Irritable, refuse to feed
*Failure to thrive. *Cries when the limb is moved.

Radiographic changes include the following:
= Soft tissue swelling (early)
= Bone demineralization and periosteal reaction (10 days after infection).

Differential diagnosis – Osteomyelitis
1- Cellulitis 2- Neoplasm (in leukemia 30% have bone pain) 3- Sarcoma
4-Trauma (but not normally with raised ESR) 5- E. granuloma 6- Bone infarction

Diagnosis
CBC: leukocytosis with a shift to the left
ESR: 90% raised, **CRP** raised, **Blood culture** positive in 50%
C-reactive protein is the most sensitive monitor of the course of infection.
Nuclear medicine studies may be helpful in equivocal cases.
MRI: 100% sensitivity

Management
I.V Broad-spectrum antibiotics
Antibiotics usually control septicemia and fever quite quickly.
Newborn (up to 4 months of age)
Flucloxacillin (anti-staph.) plus a third-generation cephalosporin (gram-negative).
Alternative therapy: Vancomycin (MRSA) plus a 3rd generation cephalosporin (Gram-negative).

Children 4 months of age or older
Augmentin or Flucloxacillin (anti-staph.)
Alternative therapy: Vancomycin (MRSA) plus a 3rd generation Cephalosporin (Gram-negative).
If antibiotics are given early enough (no abscess), the antibiotics may control the infection and complete healing may then take place.

61-Most common presentation of post-operative infection? – Pain. → مكرر اكثير

62-Patient with total knee replacement, presented with infection after three months, the most likely causative organism is -Staph. epidermidis.

Causative organisms

- Early onset (< 3 months of placement): Staph aureus
- Delayed onset (3–24 months of placement): Staph. Epidermidis
- Late-onset (> 24 months of placement): Staph aureus.

63-The most common bone to overgrow after amputation – Humerus. → Dr. Ziad

64-Basketball player developed immediate swelling of the medial knee after a rebound fall, what is the structure most likely to be injured – ACL.

Knee

ACL

- Anterior cruciate ligament injury is when the anterior cruciate ligament (ACL) is either stretched, partially torn, or completely torn. Injuries are most commonly complete tears.
- ACL direction, described from proximal to distal, → anteriorly, distally, medially. Starts from the medial surface of the lateral femoral condyle to tibial spine.
- Hamstrings is more important in stabilizing ACL deficient knee
- Quadriceps is more important in stabilizing PCL deficient knee
- ACL tear aspiration → blood (acutely)
  - Meniscal tear aspiration → synovial fluid
- Signs and symptoms
  - Symptoms include pain, a popping sound during injury "طقة", instability of the knee, and joint swelling. Swelling generally appears within a couple of hours.
  - An individual may feel or hear a "pop" in their knee during a twisting movement or rapid deceleration, followed by an inability to continue participation in the sport and early swelling from hemarthrosis. This combination is said to indicate a 90% probability of rupture of the anterior cruciate ligament. An individual may experience instability in the knee once they resume walking and other activities, and they may feel their knee is "giving out".
  - Severe pain when bending the knee and buckling or locking of the knee during movement.
  - The player cannot complete the game → off field
  - There will be acute swelling within hours → because ACL is vascular structure "middle branch of geniculate artery" (note that meniscus is avascular → no bleeding so no acute swelling)
  - Knee flexion decrease pain → less pressure on the joint
  - Chronic Signs and symptoms → knee gives away رجلك بتخونك و بتفلت
    - Swelling → synovial fluid
    - Pain → mild pain
    - Click because of concomitant meniscal injury
- In approximately 50% of cases other structures of the knee such as ligaments, cartilage, or meniscus are damaged
- The underlying mechanism often involves

→ osgood

65-Most common structure to be injured in lateral tibial condyle avulsion fracture is – ACL.

Also called traction apophysitis. Overuse injury caused by repetitive strain and chronic avulsion of the secondary ossification center of proximal tibial tubercle. Occurs in adolescents after growth spurt. Common in running and jumping athletes. Presents with progressive anterior knee pain.

4- Osgood-Schlatter disease (traction apophysitis). important
Overuse injury caused by repetitive strain and chronic avulsion of the secondary ossification center of the proximal tibial tubercle.
Occurs after a growth spurt in running and jumping athletes.
Presents with progressive anterior knee pain.

Clinical Findings
Symptoms vary from mild aching at the tubercle to severe pain with patellar function and exaggerated bursal tenderness.
Radiographs of the proximal lateral tibia show characteristic fragmentation.

Treatment
Treatment is symptomatic, including analgesics, knee pads to avert direct pressure, quadriceps stretching, avoidance of sports activities, and brief casting or splinting for painful cases. The disorder resolves spontaneously when the physis closes at skeletal maturity. No evidence indicates that physical activity within the limits of pain is harmful to the child with Osgood-Schlatter disease.

66-True about meniscus injury – Positive McMurray test (there was a description of the test, not its name).

c. Medial and Lateral **M**enisci → **M**cmurray test (valgus and external rotation or varus and internal rotation) both are from flexion to extension

Meniscal tear

- A tear of a meniscus is a rupturing of one or more of the fibrocartilage strips in the knee called menisci. When doctors and patients refer to "torn cartilage" in the knee, they actually may be referring to an injury to a meniscus at the top of one of the tibiae
- Acute ACL → more commonly associated with lateral meniscus tear
- Chronic ACL → more commonly associated with medial meniscus tear
- Mechanism of injury: contact trauma.
- Acute complaint: pain, swelling but after several hrs, locking, click (pop).
- Chronic complaint: locking and click
- Timing
  - Acute → in pediatric patients → needs surgery
  - Chronic → in old patients →not necessarily needs surgery
- Types:
  - Vertical tear
  - Bucket-handle (special type of vertical tear)
  - Horizontal tear
  - Radial tear
  - Meniscal cyst associated with horizontal tear if no tear we call it meniscal ganglion.
- Meniscus is avascular while ACL and PCL → vascular
- Meniscus is repaired (sutured), but not reconstructed
- A tear of the medial meniscus can occur as part of the unhappy triad, together with a tear of the anterior cruciate ligament and medial collateral ligament.
- Meniscus repair rate of healing is higher if there is accompanying ACL reconstruction, as this ACL reconstruction will cause bleeding (vascular structure) and bleeding will stimulate healing
- Physical examination:
  - The knee is examined for swelling. In meniscal tears, pressing on the joint line on the affected side typically produces tenderness. The McMurray test involves pressing on the joint line while stressing the meniscus (using flexion-extension movements and varus or valgus stress). Similar tests are the Steinmann test (with the patient sitting) and the Apley grind test (a grinding maneuver while the person lies prone and the knee is bent 90°). Bending the knee (into hyperflexion if tolerable), and especially squatting, is typically a painful maneuver if the meniscus is torn. The range of motion of the joint is often restricted.
- Dx → MRI
- Tx
  - Presently, treatments make it possible for quicker recovery. If the tear is not serious, physical therapy, compression, elevation and icing the knee can heal the meniscus. More serious tears may require surgical procedures. Surgery, however, does not appear to be better than non-surgical care.
  - Initial treatment may include physical therapy, bracing, anti-inflammatory drugs, or corticosteroid injections to increase flexibility, endurance, and strength
  - Surgery: open or arthroscopic
    - Repair or removal (meniscectomy) or reconstruction (transplantation)

67-True about club foot –

68-A patient with disc herniation and signs of sciatica, what is the most likely finding that will support you to continue non-operative management – Straight leg raising test of 40 degrees.

Treatment is conservative unless surgery is indicated in cases of:

1. not responding to conservative treatment (pain can't be tolerated anymore)
2. developing weakness, paresthesia or urinary or stool incontinence.
3. cauda equina

69-A patient with nerve injury, loss of sensation over the first web space, which of the following findings will also be present?– wrist drop

↳ Radial

Radial nerve injury	• C5-T1	• Compression of the radial nerve (most common) within the axilla ◦ Crutch palsy ◦ Saturday night palsy • Mid-arm: midshaft fracture of the humerus • Wrist ◦ Radial fracture ◦ Wearing tight bracelets or handcuffs ◦ Repeated supination/pronation (e.g., screwing movements)	• Axillary injury: impaired forearm extension at elbow, **wrist drop** • Mid-arm injury: wrist drop • ↓ Grip strength: Maximal flexion can only be achieved when the wrist is extended.	• Dorsal arm and forearm • Hand: dorsal aspect of the thumb, index, and the middle fingers

70-Most reliable sign to diagnose septic arthritis over transient synovitis (Kocher criteria) – Inability to bear weight.

مكرر

Kocher Criteria to differentiate between septic arthritis and reactive arthritis

Groin pain with

1. inability to bear weight (most important)
2. T > 37.8
3. ESR > 40 or CRP > 20
4. White Blood Cell Count > 11.8

If all ..... More than 90 % septic arthritis

If nil ..... Less than 10% septic arthritis

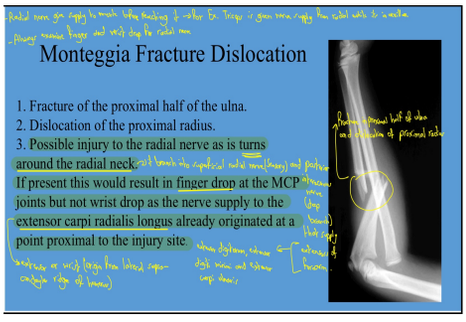
If in doubt ..... Deal as septic

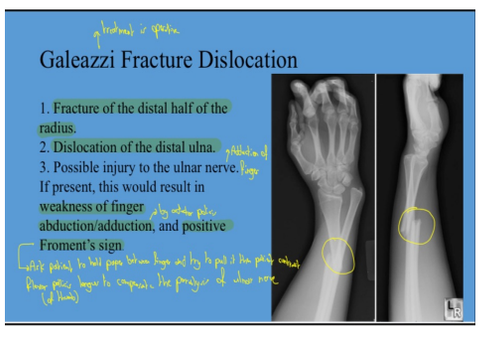
71-The fracture that is most likely to indicate child abuse is – spiral fracture

IV-Child Abuse (Battered baby syndrome) (NAI)

A-Suspicion raised NAI
– < 3 years old – Multiple healing bruises, skin marks, burns.
= Unreasonable histories = Delay in seeking treatment = Posterior ribs
– Corner #: Bucket handle # (traction & rotation) at junction of meta. and physis)
B- Nonorthopaedic injuries: Skin, head, burns, and blunt abdominal,
B- Fracture Type & location.
= Humerus, tibia, and femur, in that order.
– Spiral humerus # and distal humeral physeal separations are highly suggestive.
= Transverse femur shaft fracture <1 y of age (60-70% NAI)
= Spiral >common than transverse
– Diaphyseal fractures are four times more common in abuse cases than metaphyseal fractures.
Treatment
1- Skeletal survey in children <5y and bone scan if older.
-Early involvement of social workers and pediatricians
2- Treat according to the fracture pattern.
Prognosis
If the abuse is missed, there is a greater than 33% chance of further abuse and a 5% to 10% chance of death in affected children.

72-A question about Monteggia fracture





73-A 50-year-old man with inability to extend his thigh, what is the most likely structure to be injured in the extension apparatus? – Quadriceps tendon rupture.

Etiology [26][30][27]

- Falls: eccentric contraction of the quadriceps muscle when the knee is partly flexed and the foot planted (most common)
- Trauma (e.g., direct blow) to the suprapatellar region (rare)
- Most common in adults aged > 40 years with systemic disease [27]

Clinical features [26][30][27]

- Acute intense pain
- Inability to actively extend the knee
- A palpable gap in the quadriceps tendon
- Other: cracking or tearing sensation, swelling

Diagnostics [26][30][27]

- **Full knee X-ray series**
  - Confirmatory finding: low-riding patella, forward shift of the proximal pole of the patella
  - Other findings: suprapatellar mass (retracted tendon), suprapatellar calcification (avulsed bone)
  - Not sensitive for a partial tear of the tendon [4]

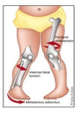
Treatment [26][30][27]

See "Initial management of knee tendon injuries" for acute therapy.

- **Partial tears**
  - Immobilization with a hinged knee brace
  - Resistance training following immobilization
- **Complete tears**: operative repair as soon as possible [27]

74-A question about ACL – * Above

75-True about in-toeing – (to remember : toe gait = Equinus gait>> due to plantar flexor contracture or short leg)



In-Toeing:

Causes:

1. **Metatarsus adductus (infants):** (Lateral aspect of the foot is (c) shaped) Mechanism thought to be related to packaging disorder caused by intra-uterine positioning (forefoot is adducted, lateral foot border is convex instead of straight, a medial soft-tissue crease indicates a more rigid deformity, normal hindfoot and subtalar motion)
2. **Internal Tibial Torsion (toddlers):** Observe foot-thigh angle in prone position, and > 10° of internal rotation is indicative of tibial torsion (normal is 0-20° of external rotation). Most common cause of in-toeing in toddlers.
3. **Excessive (High) femoral anteversion:** Hip motion shows >70° internal rotation (normal is 30-60°), decreased external rotation (<20°) and the patella internally rotated. Seen in early childhood (3-6 years), twice as frequent in girls than boys, often bilateral. Most correct spontaneously with growth. (W position)
   - Hip motion (tested in the prone position)
     - Increased internal rotation of >70° (normal is 30-60°)
     - Decreased external rotation of < 20° (normal 30-60°)

- Diagnosis: by lying the patient in prone position.
- Treatment: If severe enough and persistent is surgical correction not before 5 years for MW, 8 years for TT, and 10 years for FA.

76-Origin of osteoclast – Hematopoietic stem cells.

77-One of the following is associated with anatomical reduction and absolute stability – Lag screws.

Primary Bone Healing

- Seen in:
  - Absolutely stable fractures
    - e.g. lag screws
      compression plates
      tension band wiring

N.B. all other fracture fixation methods result in relative stability, and thus indirect (secondary bone healing).

* Exam Q

78-Patient with pelvic fracture and chest injury, what is the most likely cause of early death? – Hypovolemia (most likely)

Complications of fractures.

1-Acute

1- Shock (Hypovolemic or Neurogenic)
2- ARDS
3- Fat embolism, DVT, Thromboembolism.
4- Crush syndrome.
5- Fracture Blisters.
6- Neurovascular injuries

2-Chronic

A-General: Post - traumatic psychological disturbances.

B-Local

1- Delayed, non-union, or mal-union.
2- Growth disturbance, LLD in Children.
3- Late wound sepsis with skin breakdown.
4- Failure of fixation e.g. breakage or cutting out of plates or nails
5- Joint stiffness and contracture.
6- Regional pain syndrome
7- Avascular necrosis
8- Volkmann Ischemic Contracture
9- Myositis ossificans
10- Post-traumatic arthritis in intra-articular fractures, mal-union
11- Problems of immobilization. thrombosis, pneumonia, bed sores, UTI, osteoporosis, muscle wasting, renal calculi.

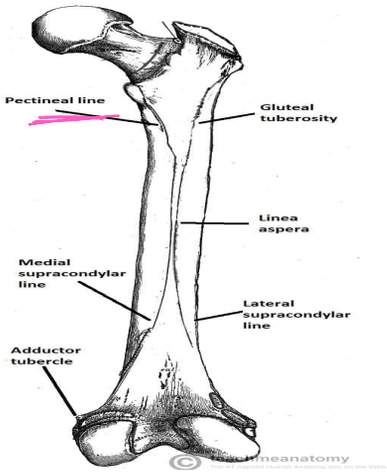
1-Shock (Hypovolemia)

= Femoral shaft fractures-blood loss could range from 500- 2000 ml
= Pelvic fractures-blood loss could range from 1000-2500 ml.
It could be much more in multiple fractures. = More loss in compound #

2-Deep Vein Thrombosis

79-Which of the following is associated with the highest risk of DVT? – Emergent lower limb surgery (the others were elective surgeries and surgeries in the UL).

80-Which of the following is present on the posterior aspect of the femur? – Pectineal line.



81-True about ulnar nerve injury – Clawing is caused by loss of lumbricals function.

Upper extremity nerves *(continued)*

NERVE	CAUSES OF INJURY	PRESENTATION
Median (C5-T1)	Supracondylar fracture of humerus → proximal lesion of the nerve Carpal tunnel syndrome and wrist laceration → distal lesion of the nerve	"Ape hand" and "Hand of benediction" Loss of wrist flexion and function of the lateral two Lumbricals, Opponens pollicis, Abductor pollicis brevis, Flexor pollicis brevis (LOAF) Loss of sensation over thenar eminence and dorsal and palmar aspects of lateral 3 1/2 fingers with proximal lesion
Ulnar (C8-T1)	Fracture of medial epicondyle of humerus (proximal lesion) Fractured hook of hamate (distal lesion) from fall on outstretched hand Compression of nerve against hamate as the wrist rests on handlebar during cycling	"Ulnar claw" on digit extension Radial deviation of wrist upon flexion (proximal lesion) ↓ flexion of ulnar fingers, abduction and adduction of fingers (interossei), thumb adduction, actions of ulnar 2 lumbrical muscles Loss of sensation over ulnar 1 1/2 fingers including hypothenar eminence
Recurrent branch of median nerve (C5-T1)	Superficial laceration of palm	"Ape hand" Loss of thenar muscle group: opposition, abduction, and flexion of thumb No loss of sensation

82-Pointing index sign is associated with – Median nerve injury.

Median nerve injury	• C5-T1	• Proximal injury: supracondylar fracture of humerus • Distal injury ◦ **Carpal tunnel compression** ◦ Wrist laceration (suicide attempt) • **Pronator teres syndrome**: compression of the median nerve between the humeral and ulnar heads of the pronator teres	• **Atrophy of thenar muscles** • Impaired flexion of wrist, thumb, index, and middle finger • Proximal injury (above the anterior interosseus nerve origin) ◦ **Hand of benediction** (when trying to make a fist) ◦ Ulnar deviation upon wrist flexion • Distal injury (below the anterior interosseus nerve origin): median claw (when extending the fingers) • Deep injury to the wrist or forearm impairing the thenar muscles' functions: **ape hand** • Positive pinch sign in anterior interosseus nerve syndrome	• Proximal injury ◦ Thenar eminence ◦ Palmar aspect of thumb, index and middle fingers, lateral ring finger • Distal injury: same as proximal injury

Overview of peripheral nerve injuries in the upper extremity

Injured nerve	Nerve roots	Common causes	Motor deficits	Sensory deficits
Axillary nerve injury	• C5-C6	• Anterior **shoulder dislocation** • Fracture of **surgical neck** of the humerus • Iatrogenic (e.g., shoulder reconstruction procedures, rotator cuff surgery, osteosynthesis of humeral fractures) • Compression due to mass in the axilla (e.g., nodular fasciitis, schwannoma)	• Paralysis of the deltoid muscle → impaired **arm abduction** (> 15°) • Paralysis of the teres minor muscle → impaired **external rotation** of the arm • Muscle atrophy: **flattened deltoid**	• Lower part of the deltoid region and lateral arm
Musculocutaneous nerve injury	• C5-C7	• Trauma • Upper trunk **compression** (e.g., Erb palsy)	• Paralysis of brachialis and coracobrachialis muscles → impaired **elbow flexion** • Paralysis of biceps brachii → impaired **forearm supination** • Reduced biceps reflex (C5–C6)	• Lateral forearm, from the elbow to the base of the thumb
Radial nerve injury	• C5-T1	• Compression of the radial nerve (most common) within the axilla ◦ Crutch palsy ◦ Saturday night palsy • Mid-arm: midshaft fracture of the humerus • Wrist ◦ Radial fracture ◦ Wearing tight bracelets or handcuffs ◦ Repeated supination/pronation (e.g., screwing movements)	• Axillary injury: impaired forearm extension at elbow, **wrist drop** • Mid-arm injury: wrist drop • ↓ Grip strength: Maximal flexion can only be achieved when the wrist is extended.	• Dorsal arm and forearm • Hand: dorsal aspect of the thumb, index, and the middle fingers

2018

84- The most important index for DDH diagnosis – acetabular index

85- Mostly seen in a child above 3 years with bilateral DDH – wide perineum

2. Clinical examination (in frank dislocation)

A. In the neonatal period, (<6 months), e.g., Ortolani test, (Barlow test is not recommended).

B. In infants older than six months *–walking.*

* Limitation of abduction (>20°), most sensitive test for DDH,
* Apparent limb shortening in unilateral DDH.
* Abnormal deep long groin crease.

C. In toddlers, *(+after walking)*

* Wide perineum in bilateral DDH
* Lumbar lordosis in bilateral DDH
* Trendelenburg's sign and gait.
* Limping in unilateral DDH
* LLD in unilateral DDH

86- Best remodeling in a distal femur fracture of a 1-year old child – 25 degree angulation posteriorly

The acceptable degree of angulation in a fracture varies depending on the age of the patient, the bone involved, and the specific circumstances of the injury. Here's a general guideline for angulation in pediatric fractures:

1. **Infants and Toddlers (up to 3 years old):**
   - In general, infants and toddlers have a greater capacity for remodeling due to their active growth plates.
   - Acceptable angulation may be higher in this age group, often up to 20-30 degrees, depending on the bone and location of the fracture.
2. **Children (3 to 10 years old):**
   - As children grow older, their capacity for remodeling gradually decreases.
   - Acceptable angulation tends to be lower compared to infants and toddlers, typically around 10-20 degrees, depending on the bone and location.
3. **Adolescents (10 to 18 years old):**
   - In adolescents, skeletal maturity is approaching, and the capacity for remodeling is reduced compared to younger children.
   - Acceptable angulation is generally lower, often around 5-10 degrees, depending on the bone and location.

Keep in mind that these are general guidelines, and there can be variations based on individual factors and the specific characteristics of the fracture. Additionally, certain bones, such as the forearm bones (radius and ulna), may tolerate more angulation compared to weight-bearing bones like the femur or tibia. Ultimately, the management of pediatric fractures requires careful consideration of various factors, including age, skeletal maturity, fracture stability, and potential for remodeling. Consultation with a pediatric orthopedic specialist is crucial for determining the appropriate treatment plan in each case.

87- Correct about prognosis for remodeling for pediatric fractures – proximal humeral fractures have better remodeling than distal humerus

Injuries of the proximal humerus and close to the wrist remodel much faster than injuries of the elbow and proximal forearm.
Remodeling is fastest at the knee (distal femur and proximal tibia) than in the proximal femur and distal tibia.
Because of the **relative contributions of the growth plates to the longitudinal growth of the upper and lower limb**.

88- A man with distal humerus fracture and loss of sensation over dorsal surface of first web space, will mostly be –unable to extend his middle finger (MCP drop)

Radial (C5-T1)

Compression of axilla, eg, due to crutches or sleeping with arm over chair ("Saturday night palsy")
Midshaft fracture of humerus
Repetitive pronation/supination of forearm, eg, due to screwdriver use ("finger drop")

Injuries above the elbow cause loss of sensation over posterior arm/forearm and dorsal hand, wrist drop (loss of elbow, wrist, and finger extension) with ↓ grip strength (wrist extension necessary for maximal action of flexors)
Injuries below the elbow cause distal paresthesias without wrist drop
Tricep function and posterior arm sensation spared in midshaft fracture

89-The most likely complication of a femoral neck fracture treated with emergent ORIF – osteonecrosis .

The Femoral Neck Fractures. (important)
Fractures of the femoral neck occur most often in elderly patients with the osteopenic bone after a fall directly on the greater trochanter, or fall from twisting injury or catching the toes in the carpet.
In young patients due to high-energy trauma

Clinical picture
Severe pain externally rotated abducted and shortened limb.
Inability to move the hip.

Radiographic evaluation.
AP pelvis radiograph, AP, and lateral radiographs of the hip; If no fractures are detected in an elderly patient with persistent hip pain, one should consider MRI or bone scan to look for a nondisplaced or incomplete fracture.

Fractures of the femoral neck may be classified according to the location (sub-capital, trans-cervical, & basi-cervical), or based on the stability of the # pattern.

Post-operative
= Prophylaxis against thromboembolism
=Early mobilization

Complications
1-Bed sores
2-DVT
3-AVN 30% in displaced fractures, 10% in un-displaced #.

1) Young: Urgent reduction and surgery for fixation.
2) Elderly: depend of type of fracture. → mostly replacement

- Complication: fat embolism, bed sores, and AVN.
  - Necrosis of the femoral head occurs in about 30% of patients with displaced fractures and 10% of those with undisplaced fractures

90- Most likely complication of intra-articular fractures – joint stiffness

91- Most commonly associated injury in high-energy pelvic trauma – urethral injury.

92- A draining sinus seen after one year of ORIF surgery to a fractured tibia, most likely cause → S epidermidis

Prosthetic joint infection or Metal (after ORIF)

Etiology
Incidence
- Primary joint replacement 1-2% TKA vs. 0.3-1.3% THA
- Revision joint replacement 5-6% TKA vs. 3-4% THA

Causative organisms
- Early onset (< 3 months of placement): Staph aureus
- Delayed onset (3–24 months of placement): Staph. Epidermidis
- Late-onset (> 24 months of placement): Staph aureus.

Clinical findings: prolonged minimal swelling, mild pain, and diffuse redness.

93- Most important indicator of septic arthritis → positive culture

Joint aspiration criteria for infection
White cell count >50 000 diagnostic of infection
Neutrophils >90% diagnostic
Bacteria on gram stain diagnostic
Positive culture is pathognomonic

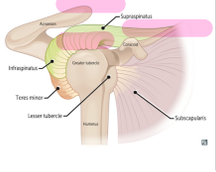
94- Most commonly affected tendon in impingement syndrome → supraspinatus

Rotator cuff muscles

Shoulder muscles that form the rotator cuff:
- Supraspinatus (suprascapular nerve)—abducts arm initially (before the action of the deltoid); most common rotator cuff injury (trauma or degeneration and impingement → tendinopathy or tear [arrow in F3]), assessed by "empty/full can" test
- Infraspinatus (suprascapular nerve)—externally rotates arm; pitching injury
- teres minor (axillary nerve)—adducts and externally rotates arm
- Subscapularis (upper and lower subscapular nerves)—internally rotates and adducts arm

Innervated primarily by C5-C6.

SItS (small t is for teres minor).



Arm abduction

DEGREE	MUSCLE	NERVE
0°–15°	Supraspinatus	Suprascapular
15°–100°	Deltoid	Axillary
> 90°	Trapezius	Accessory
> 100°	Serratus anterior	Long thoracic

95- Correct about talipes equinovarus → congenital foot deformity with cavus, adductus, varus and equinus

96- Correct about pediatric foot → rocker bottom feet are associated with congenital vertical talus

97- Not a cause of in-toeing → pes planus

In-Toeing:

Causes:

1. **Metatarsus adductus (infants):** (Lateral aspect of the foot is (c) shaped) Mechanism thought to be related to packaging disorder caused by intra-uterine positioning (forefoot is adducted, lateral foot border is convex instead of straight, a medial soft-tissue crease indicates a more rigid deformity, normal hindfoot and subtalar motion)
2. **Internal Tibial Torsion (toddlers):** Observe foot-thigh angle in prone position, and > 10° of internal rotation is indicative of tibial torsion (normal is 0-20° of external rotation). Most common cause of in-toeing in toddlers.
3. **Excessive (High) femoral anteversion:** Hip motion shows >70° internal rotation (normal is 30-60°), decreased external rotation (<20°) and the patella internally rotated. Seen in early childhood (3-6 years), twice as frequent in girls than boys, often bilateral. Most correct spontaneously with growth. (W position)
   - Hip motion (tested in the prone position)
     - Increased internal rotation of >70° (normal is 30-60°)
     - Decreased external rotation of < 20° (normal 30-60°)

- Diagnosis: by lying the patient in prone position.
- Treatment: If severe enough and persistent is surgical correction not before 5 years for MW, 8 years for TT, and 10 years for FA.

98- Antibiotics used in a IIIa grade open fracture→ augmentin + gentamicin

- 3A: could be closed by an orthopaedic surgeon, i.e. no skin loss.
- 3B: Needs a Plastic (plastic → Blastic→ B → needs flaps) surgeon , there is skin loss and needs a flap
- 3C: Circulatory injury or compromise

Management of open fractures

- **Irrigation:** 3L in Type 1, 6L in Type 2, 9L in type 3.

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- Normal saline (or its derivatives) is most commonly used .
- Tap water can be used if no other choice is available (ex in war zones); it is considered sterile in comparison to the contaminated open wound.
- Contraindications: Ringer lactate and 0.45 glucose normal saline.You really don't want to feed the bacteria! .

- **Splinting** and Dressing.
- **Analgesia** (morphine) and **Antibiotics** (augmentin in class 1+2+3 , in class 3a+3b → augmentin + gentamicin).
- **Tetanus Prophylaxis** → It is not mandatory; almost all of us are vaccinated, but a booster might be needed.
  - Anti tetanus serum (ATS) should be given if there is gross contamination with soil and the patient is not vaccinated.
- Any illness can be a predisposing factor
- Athletes → not a predisposing factor

- **Posttraumatic osteomyelitis**
  - Following open fractures, Staph. aureus is the most common cause of infection in open fractures.
    - GUSTILO Classification of open fractures and their management

Gustilo Grade	Definition
I	wound <1 cm in length ,Open fracture, clean wound
II	wound > 1 cm but < 10 cm in length,Open fracture, **without** extensive soft-tissue damage, flaps, avulsions
III	(>10 cm), Open fracture **with** extensive soft-tissue laceration , or loss or an open segmental fracture. This type also includes open fractures caused by farm injuries, fractures requiring vascular repair, or fractures that have been open for 8 hr prior to treatment. This indicates a high energy trauma.
IIIA	adequate periosteal coverage
IIIB	Significant periosteal stripping
IIIC	arterial injury requiring repair, irrespective of degree of soft-tissue injury → vascular repair is required to revascularize the leg

99- Most common shoulder dislocation → anterior inferiorly .

Types

According to the direction in which the humerus exits the joint:

1. Anterior 95%
2. Posterior 5%
3. Inferior (luxatio erecta) extremely rare

Multidirectional (habitual) - painless

100- Most likely a complication of anterior dislocation in a 20-year old → Bankart lesion

101-True about idiopathic scoliosis→ a 3D deformity with right thoracic curve

Classification

- **According to age**
  - < 10 years: **adolescent idiopathic scoliosis**
    - ♂ > ♀
    - Most frequent type (~ 80% of cases)
    - Usually manifests as a right convex thoracic curvature
  - 4–9 years: **juvenile idiopathic scoliosis**[2]
    - ♂ > ♀
    - Usually manifests as a left convex thoracic curvature
    - Deteriorates progressively[3]
  - 0–3 years: **infantile idiopathic scoliosis**
    - ♂ > ♀
    - Often manifests as a c-convex thoracic curvature with bending to the left
  - Special type: **congenital functional scoliosis**
    - This term does not refer to a structural scoliosis, but rather to a functional (nonstructural) type that may occur during the first months of life.
    - It usually manifests as a C-shaped, elongated thoracolumbar curvature with bending to the left, showing only a small degree of rotation.
    - Usually heals spontaneously
- **According to the pattern of the curvature:** C-shaped scoliosis, S-shaped scoliosis, double S-shaped scoliosis (triple scoliosis)
- **According to the apex of the major curvature**
  - Cervical: C2 to C6
  - Cervicothoracic: C7 to T1
  - Thoracic: T2 to T11
  - Thoracolumbar: T12 L1
  - Lumbar: L2 and L4
  - Lumbosacral: L5 or below

Scoliosis:

- It is a 3-dimensional deformity of the spine with lateral deviation more than 10 degrees, sagittal plane deformity (change of the normal kyphosis/lordosis ratios) and rotation of the vertebrae.
- Scoliosis is a medical condition in which a person's spine has a sideways curve. The curve is usually "S"- or "C"-shaped. In some the degree of curve is stable, while in others it increases over time. Mild scoliosis does not typically cause problems, while severe cases can interfere with breathing . Pain is present in up to 1/3 of patients.
- The commonest form of scoliosis is actually a triplanar deformity with lateral, anteroposterior and rotational components.
- Risk factors include other affected family members.
- Diagnosis is confirmed with plain X-rays.
- Scoliosis is typically classified as either structural in which the curve is fixed or functional in which the underlying spine is normal
- Signs and symptoms

102- Not normally seen in idiopathic scoliosis→ asymmetric abdominal superficial reflex

- Signs and symptoms
  - Symptoms associated with scoliosis can include:
    - Pain in back, shoulders, and neck and buttock pain → 1/3 of pts
    - Respiratory and/or cardiac problems in severe cases
    - Constipation due to curvature causing "tightening" of stomach, intestines, etc.
    - Limited mobility secondary to pain or functional limitation in adults
    - Painful menstruation
  - The signs of scoliosis can include:
    - Uneven musculature on one side of the spine
    - Rib prominence or a prominent shoulder blade, caused by rotation of the rib cage in thoracic scoliosis
    - Uneven hips, arms or leg lengths
    - Slow nerve action
    - Heart and lung problems in severe cases
- More common in females

103- patient with Femur fracture & hypotension, bradycardia and priapism → neurogenic shock

Shock

Neurogenic shock

Diagnosis

Neurogenic shock is a clinical diagnosis.

- Classic presentation: hypotension, bradycardia, vasodilation [5]
- Exclude other reasons for shock (e.g., other injuries).
- Other neurological deficits may be present.

In a patient who develops low blood pressure following high-energy trauma, neurogenic shock is a diagnosis of exclusion that is made after hypovolemic and obstructive shock have been ruled out.

Management [68][69][70]

- **Treatment**
  - **Fluid resuscitation**
    - First-line therapy
    - Avoid aggressive fluid boluses in patients with poor fluid responsiveness, because of the risk of fluid overload.
  - **Vasopressors**: commonly required as shock is often refractory to fluids
  - Consider **atropine** or cardiac pacing to treat bradycardia (see "Unstable bradycardia" for details). [71]
  - Consult a spine surgeon early to evaluate whether the patient is a candidate for urgent spinal decompression.
- **Monitoring**
  - Insert a urinary catheter early. [72]
  - Hemodynamic targets should be individualized in consultation with a specialist.
  - Monitor for cardiovascular complications (e.g., ACS, stroke).

- **Supportive care** [68]
  - Prevent hypothermia ; monitor temperature frequently and use warm IV fluids or warming devices as needed.
  - Patients may have allodynia; careful patient handling and pain management are required.
  - Vasovagal responses can be increased and can lead to refractory shock.
  - Autonomic dysreflexia and vascular dysfunction may be present and can complicate management and recovery. [73][71]

Patients with neurogenic shock can have increased vasovagal responses to common procedures (e.g., suctioning, endotracheal intubation), which can trigger rapid changes in heart rate and blood pressure and increase the risk for complications and refractory shock. [74]

FEEDBACK

104- Most important in primary survey in case of vertebral fracture → careful transportation

◆ **Management:**

Always remember the priorities in management:

life> limb> wound> fracture

- Life: ATLS
- Limb: decompress if compartment syndrome.
- Wound: if open tetanus toxoid, antibiotics, and irrigation
- Fracture: reduction (closed or open), immobilization (by traction, cast, external fixation, internal fixation) and rehabilitation.

In any case :

- Prevent further soft tissue damage.
- Pain relief.
- Decrease the incidence of clinical fat embolism and shock.
- Facilitates patient transport and radiographic studies.

ATLS

- Treat the greatest threat to life.
- The lack of definitive diagnosis should never impede the application of an indicated treatment.
- Detailed history was not essential to begin the evaluation and treatment.
- ABCDE.

105- 75 year old woman with acute lumbar, localized back pain of 1 week aggravated by movement in all directions. History of COPD – vertebral fracture

↳ osteoporosis → so most common fracture is vertebral

106- Hyperextension, non-contact, pivoting lower limb trauma with acute hemarthrosis – ACL tear

- Signs and symptoms
  - Symptoms include pain, a popping sound during injury "طقة", instability of the knee, and joint swelling. Swelling generally appears within a couple of hours.
  - An individual may feel or hear a "pop" in their knee during a twisting movement or rapid deceleration, followed by an inability to continue participation in the sport and early swelling from hemarthrosis. This combination is said to indicate a 90% probability of rupture of the anterior

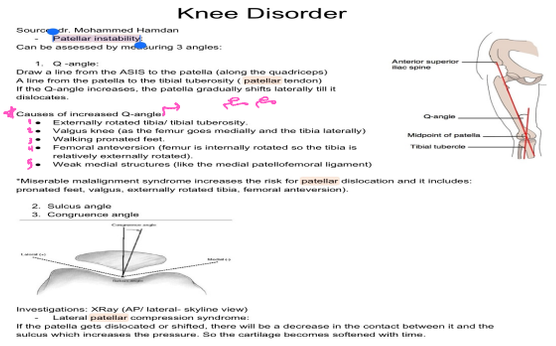
107- Non-contact, after a jump lower limb trauma with delayed effusion → medial meniscus tear

- Acute complaint: pain, swelling but after several hrs, locking, click (pop).
- Chronic complaint: locking and click

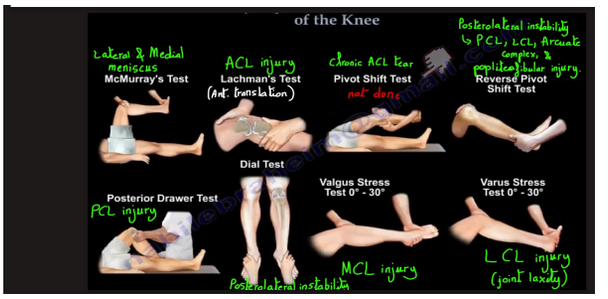
108- Deduct in lateral femoral facet and medial patellar cartilage, positive test → apprehension test

↳ Patellar instability.

109- Predisposes for lateral maltracking of patella → increased Q angle OR weak vastus medialis .



110- In isolated medial longitudinal ligament injury of the knee, positive → valgus stress at 30 degrees



111- Least force is created in → fast concentric contraction (mostly)

112- Iliopsoas undergoes concentric contraction during – pre swing phase Dr. Ziad / lec 1

113- Most likely injury in child abuse – fractures

IV-Child Abuse (Battered baby syndrome) (NAI)

A-Suspicion raised NAI
= < 3 years old = Multiple healing bruises, skin marks, burns.
= Unreasonable histories = Delay in seeking treatment = Posterior ribs
= Corner #: Bucket handle # (traction & rotation) at junction of meta. and physis)
B- Nonorthopaedic injuries: Skin, head, burns, and blunt abdominal.
B- Fracture Type & location.
= Humerus, tibia, and femur, in that order.
= Spiral humerus # and distal humeral physeal separations are highly suggestive.
= Transverse femur shaft fracture <1 y of age (60-70% NAI)
= Spiral >common than transverse
= Diaphyseal fractures are four times more common in abuse cases than metaphyseal fractures.
Treatment
1- Skeletal survey in children <5y and bone scan if older.
-Early involvement of social workers and pediatricians
2- Treat according to the fracture pattern.
Prognosis
If the abuse is missed, there is a greater than 33% chance of further abuse and a 5% to 10% chance of death in affected children.

114- Most articular cartilage of joint is composed of – water

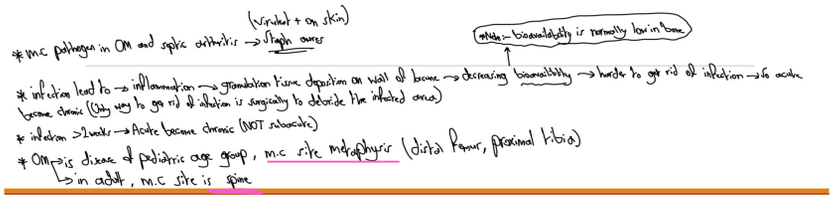
1- water
2- collagen
3- Proteoglycan

115- Most pain sensitive part of bone – capsule

Here's a general ranking of pain sensitivity in bone structures, from most to least:

1. Joint capsule
2. Periosteum
3. Ligaments and tendons attached to the bone
4. Bone itself (when fractured or damaged)
5. Bone marrow

116- Most common site of osteomyelitis – distal metaphysis of femur (for children)



117- Most sensitive study of osteomyelitis – MRI

Imaging

- X-ray

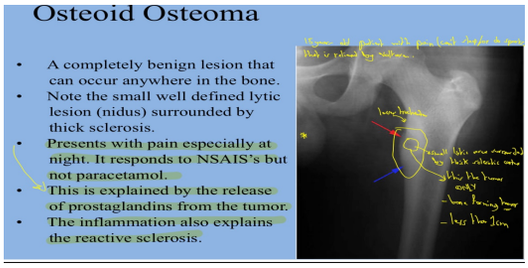
For the first 10 days X-ray is normal : no bone findings (bone edema can be detected early via MRI , there is only soft tissue edema

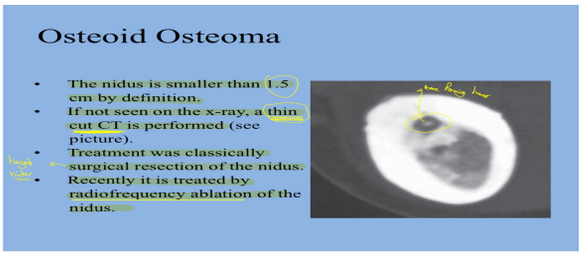
- Periosteal reaction on X-ray which is the earliest sign of CHRONIC O.M.
- The sequestrum appears a bit whiter than normal bone on x-ray; because of the loss of normal bone structure

- MRI (bone vs soft tisuue infection) 100% Sensitive (-ve MRI can rule out O.M) but not specific
- FNA : To confirm Dx (not performed if MRI is done)
- U/S: presence of an abscess

118- Malignant sign on X Ray – wide transitional zone → مكرر

119- Characteristic of osteoid osteoma – medial proximal femoral wall thickening and sclerosis with a very small radiolucent mass





120- A type of spondylolisthesis without fracture of pars interarticularis → degenerative (in facet joint)

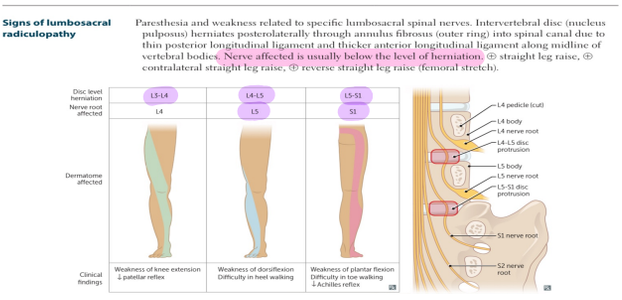
Defect in pars interarticularis (either congenital or because of minor repetitive trauma) will cause Spondylolisthesis.

Unilateral pars defect is called spondylolysis "fracture without slippage", It's a fracture in Pars on one side without anterior slippage of the vertebra. Treated as any fracture.

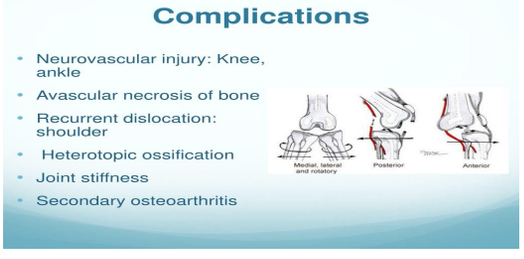
- Types of spondylolisthesis :

1. Dysplastic type: congenital seen in children, associated with protruding abdomen, painless but the mother may notice the unduly protruding abdomen
2. Lytic type: because of increase in amount of stress on pars interarticularis. Basically it is a stress fracture. The commonest. Adults and intermittent backache is the usual presenting symptom
   Signs:
   buttocks look curiously flat,
   sacrum appears to extend to the waist
   transverse loin creases may be prominent.
3. Degenerative type: of a problem in facet joint. Mostly osteoarthritic changes. Female >40

121- Nerve affected in L4/L5 spondylolisthesis - L5



122- Most serious complication of posterior knee dislocation – vascular injury



123- Definition of osteoporosis – bone density <2.5 SD than a young woman → Above

2016

124- Paraffin: conduction

↳ Dr. Ziad / حفظ

vii. Paraffin Bath → most common
1. kept at 52-55 °C → cause no burn as the energy conducted through Paraffin is low
2. useful for Contractures in burns, RA & Scleroderma
3. Paraffin : Mineral oil + Wax in a ratio of (5 : 1) , (50 - 55 C } of low heat conductivity (no risk of burn)
4. Used for distal parts (feet, hands and ankles) contractures

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125- THR rehab, what to avoid: add flex int rotation

↳ Dr. Ziad / حفظ

THR & TKR Rehabilitation

Source: Dr.Ziad Hawamdeh

THR (Total Hip Replacement)

- Before surgery
  - Increase muscle strength → hip abductors and extensors
- One of the complication of the surgery is hip dislocation (after surgery)
  - Caused by extreme movements (extreme flex.+ ext. or IR+ER or abd+add), so advise the pt to avoid extreme movements
  - In posterior approach surgery
    - Avoid adduction, flexion >90, internal rotation. For the first 3 months after surgery
    - Ex:
      - Crossing legs رجل على رجل
      - Setting → flexion >90 → use high chair
      - Leaning forward
      - To avoid adduction → use wedge pillow between the thighs
  - In anterior approach surgery
    - Avoid adduction,extension, external rotation. For the first 3 months after surgery
- Risk of immobilization is high→ early mobilization is recommended
  - Pt should move as soon as possible
  - 1st day post op
    - On walker
      - If cemented THR → weight bearing as tolerated
      - If uncemented THR → non weight bearing or weight bearing but with caution
  - After 6 wks

126- ACL injury case → مكرر

128- Osteoclast cause osteolytic lesion

Cell biology of bone

Osteoblast	Builds bone by secreting collagen and catalyzing mineralization in alkaline environment via ALP. Differentiates from mesenchymal stem cells in periosteum. Osteoblastic activity measured by bone ALP, osteocalcin, propeptides of type I procollagen.
Osteoclast	Dissolves ("crushes") bone by secreting H^+ and collagenases. Differentiates from a fusion of monocyte/macrophage lineage precursors. RANK receptors on osteoclasts are stimulated by RANKL (RANK ligand, expressed on osteoblasts). OPG (osteoprotegerin, a RANKL decoy receptor) binds RANKL to prevent RANK-RANKL interaction → ↓ osteoclast activity.
Parathyroid hormone	At low, intermittent levels, exerts anabolic effects (building bone) on osteoblasts and osteoclasts (indirect). Chronically ↑ PTH levels (1° hyperparathyroidism) cause catabolic effects (osteitis fibrosa cystica).
Estrogen	Inhibits apoptosis in bone-forming osteoblasts and induces apoptosis in bone-resorbing osteoclasts. Causes closure of epiphyseal plate during puberty. Estrogen deficiency (surgical or postmenopausal) → ↑ cycles of remodeling and bone resorption → ↑ risk of osteoporosis.

129- fracture with most severe soft tissue injury: segmental Fx

Yes, segmental fractures can indeed result in severe soft tissue injuries. Segmental fractures involve the bone breaking in two or more places, which can lead to extensive damage to the surrounding soft tissues, including muscles, blood vessels, nerves, and skin. The presence of multiple fracture sites can cause significant disruption and trauma to the soft tissue structures adjacent to the fractured bone segments. Therefore, segmental fractures can indeed be associated with severe soft tissue injuries.

130- pathognomonic to Septic arthritis: positive culture of aspirate → مكرر *

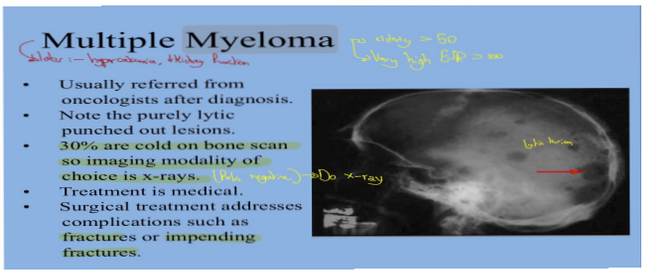
131- Septic hip and tenosynovitis, how to differentiate: inability to bear weight → مكرر *

132- Infx in THR prosthesis within 10 days: Staph aureus

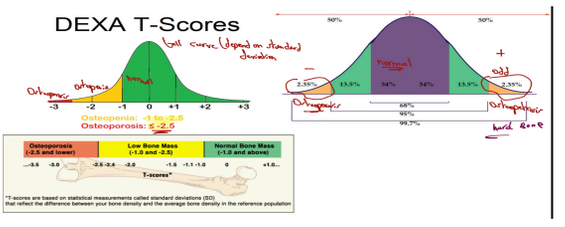
Causative organisms

- Early onset (< 3 months of placement): Staph aureus
- Delayed onset (3–24 months of placement): Staph. Epidermidis
- Late-onset (> 24 months of placement): Staph aureus.

152- Tumor associated with hypercalcemia: MM



134- Dexa scan, T -3.5 - osteoporosis



135- Stable to Unstable spinal fractures: kyphosis angle >30, pain and paresthesia, more than one vertebrae

- Stable and unstable fractures:

1. **Stable fractures:**
   - stability means the ability to withstand with normal physiological load (eg: standing, walking,...) with no pain and no neurological deficit.
   - ONLY one column of vertebra is affected
   - Treatment is conservative
2. **Unstable fractures:**
   - normal physiological load will cause pain or neurological deficit
   - 2 columns or more are affected
   - Treatment is surgery

136- Spinal stenosis: cauda equina

Cauda equina is the only emergency in disc prolapse and it's rare. It is compression of L2-L5 + S1-S5 + coccygeal nerve. Present with bilateral sciatica, saddle anesthesia, paresthesia, weakness, incontinence (urinary and fecal).

137- Doesn't cause Angular kyphosis: ankylosing spondylitis

Kyphosis is divided into:

1. **Postural Kyphosis:**
   - Common "round back" or "Drooping shoulders"
   - Seen in tall and shy people.
   - Increased but flexible curvature of the spine.
   - Occurs mostly in adolescents, no associated pain.

2. **Structural Kyphosis:**

A) **Sweeping or generalized**, Involving the ***whole spine.***
Classified according to age
   - Old age: most common cause is osteoporosis.
   - Young: most common cause is ankylosing spondylitis.

B) **Angular or localised**: Any local pathology of the spine.
   - Congenital deformity
   - Fractures
   - Infections
   - Tumor
   - TB

138- To diagnose osteoporosis: DEXA

139- Calcific tendonitis: supraspinatus

***Calcific tendonitis:**

- Calcific tendinitis is a form of tendinitis, a disorder characterized by deposits of hydroxyapatite (a crystalline calcium phosphate) in any tendon of the body, but most commonly in the tendons of the rotator cuff (shoulder), causing pain and inflammation. The condition is related to and may cause adhesive capsulitis ("frozen shoulder").
- Analgesics and nonsteroidal anti-inflammatory drugs (NSAIDs) are useful to a limited extent. Corticosteroid injections may be useful when the shoulder is acutely inflamed but otherwise are not generally useful except for the temporary relief of pain.

- 2% in the 5th decade, but zero% in the 6th decade, this means it is self-limiting

*__NOTE__: in all shoulder disorders, **supraspinatus** is the the most affected one → ex; Calcific tendonitis and rotator cuff tear.

140- Degenerative spondylolisthesis: osteoarthritic changes in facet joint (intact pars interarticularis)

3. Degenerative type: of a problem in facet joint. Mostly osteoarthritic changes. Female >40

137

Pain is due to tension "traction", it is burning sensation, increase with extension, as extension increases this anterior slippage.
On physical examination: guarding, tenderness on the affected segment, Range Of Motion : normal flexion with limited extension
-Best imaging is CT scan
-X-ray taken here is best taken in an oblique view.

141- Not a risk factor for compartment syndrome: low energy injuries

142- Not seen in septic shock : HTN

Septic shock is often characterized by hypotension despite adequate fluid resuscitation along with signs of inadequate tissue perfusion. However, one of the notable features not typically seen in septic shock is elevated blood pressure. Unlike other forms of shock, such as cardiogenic shock, septic shock tends to manifest with low blood pressure rather than high blood pressure.

143- Associated with ulnar tunnel syndrome: ganglion cyst

Ulnar nerve compression

- At the elbow
  - behind the medial epicondyle
  - occurs spontaneously, more commonly in middle-aged men (as opposed to carpal tunnel syndrome which is more common in women).
- At the wrist
  - in front of the wrist just radial to the pisiform
  - The cause is usually a ganglion from the underlying joint, but neurological symptoms may also be produced by external pressure – e.g. in cyclists who lean too heavily on their handlebars
- Dx → clinical +MRI

144 - Pediatric skeleton, wrong: High cancellous bone allows for propagation of fracture.

Fractures in children

Source: Dr. Omar Samarah

Pediatric vs adult skeleton

Things found in Pediatric in compared to adults

1. The presence of growth plate → increases longitudinal growth
2. The presence of perichondral plate → increases the bone thickness
3. Thick periosteum → Advantages: better healing and prevent dislocation of fracture
4. More cancelous bone→ less propagation of fracture (focused in one area)
   - Less stiffness → bending of bone rather than fracture
5. Under Stressed by compression more than tendon
6. On X-ray : More radiolucency because cartilaginous portion is more than the ossified portion so that may result in underestimation of fracture
7. Tensile strength of ligaments is more than bones; so bones are more prone to be injured than ligaments for the same mechanism of injury (unlike adults).
8. Have avulsion fractures (a fracture occurs in bone which is attached to ligament or capsule or tendon)
9. May have a deformity of bone due to injury before fracture appears because of elasticity, and then after reach the maximum point we reach something called plasticity. (Plastic deformation: permanent deformation occurs in the bone once we are exceeding the maximum point of elasticity).
10. Blood supply :
    - peculiarity (certain areas have only one blood supply e.g head of femur which has risk of avascular necrosis "AVN" with usage of piriformis entry point during surgery)
    - Anastomoses: (e.g greater trochanter)

Common sites of bone fracture according to age group seen on X-ray

- Infants: diaphysis (midshaft) → 1st site of ossification
- Toddlers: metaphysis
- Adolescent: epiphysis

145- Fixed flat foot not caused by: metatarsus adductus

1. Rigid (Stiff, which cannot be corrected passively should), caused by
   - Congenital vertical talus
   - Coalition of tarsals (calcaneo-navicular, or talo-calcaneal (often a bar of bone connecting the calcaneus to the talus or the navicular)
   - Juvenile chronic arthritis.
2. Flexible (Mobile, most common), asymptomatic but is associated with

146- Screening for DDH: pathognomonic clinical

147- Guyon's canal syndrome , the most common cause is : ganglion cyst

The ulnar nerve is most commonly compressed at or near the cubital tunnel of the elbow and Guyon canal of the wrist.

	Cubital tunnel syndrome	Guyon canal syndrome
Location	• At the medial epicondyle of the humerus (cubital tunnel)	• At the wrist (within the Guyon canal)
Etiology	• Prolonged flexion of or other stress on the elbow ◦ Leaning at the desk ◦ Compression during general anesthesia • Sports injuries (e.g., baseball, bodybuilding) • Blunt trauma at the elbow • Masses at the cubital tunnel (e.g., hematomas) • Metabolic conditions associated with neuropathy (e.g., diabetes)	• Sports injuries e.g., ◦ Cycling (likely caused by direct pressure from the handlebars) ◦ Racket sport ◦ See also, "Compression neuropathies in sport." • Blunt trauma at the wrist (e.g., hook of hamate fracture causing Guyon canal compression) • Masses at the Guyon canal (e.g., ganglion cysts) • Fibrous bands • Anomalous muscle insertions • Ulnar artery aneurysm or thrombosis
Motor deficit	• Muscle atrophy and weakness (less common than sensory symptoms) ◦ Loss of dexterity ◦ Decreased grip strength ◦ Difficulty lifting	• Weakness and atrophy of the intrinsic hand muscles innervated by the ulnar nerve
Sensory deficit	• Paresthesia or sensory loss of the palmar and dorsal aspects of the medial side of the hand, little finger, and ulnar side of the ring finger • Referred pain in the forearm	• Paresthesia or sensory loss of the palmar and dorsal aspects of the medial side of the hand, little finger, and ulnar side of the ring finger

148- Positional scoliosis, not seen : 3D deformity on X-ray

Postural Scoliosis

- One dimensional deformity, A secondary or compensatory deformity to a condition originating outside of the spine, such as:
- A short leg or a pelvic tilt due to contracture of the hip.
- Usually presented with thoracolumbar 'curvature'. When the patient bends forwards (upon flexion), the deformity disappears; this is typical of postural scoliosis.
- Short-leg scoliosis disappears when the patient sits (which cancel leg length asymmetry).
- This is a false deformity, and on x-ray: no rotation of pedicles, transverse processes or spinous processes.

149- Contraindication for bone graft: multi-trauma

A contraindication for a bone graft procedure is a condition or factor that makes it unsafe or inadvisable for a patient to undergo the surgery. Some common contraindications for bone grafting include:

1. Active infection at the graft site: Infection can compromise the success of the graft and increase the risk of further complications.
2. Poor bone quality: If the patient has severely compromised bone quality, such as osteoporosis, it may not be suitable to perform a bone graft as the bone may not adequately support the graft or heal properly.
3. Smoking: Smoking can impair blood flow and hinder the body's ability to heal, increasing the risk of graft failure.
4. Radiation therapy: Previous radiation therapy to the graft site can damage tissue and impair healing, making bone grafting less effective.
5. Certain medical conditions: Patients with certain medical conditions, such as uncontrolled diabetes or autoimmune disorders, may have a higher risk of complications from bone graft surgery.
6. Allergy to bone graft materials: If the patient is allergic to materials used in the bone graft, such as bone graft substitutes or bone morphogenetic proteins, alternative treatment options may need to be considered.

It's essential for healthcare providers to thoroughly assess each patient's medical history and overall health status to determine whether a bone graft is appropriate and safe for them.

150- Femur neck fracture increased mortality by : Alzheimer.

Alzheimer's disease can impair cognitive function and balance, increasing the risk of falls. Additionally, individuals with Alzheimer's may have difficulty following safety precautions or may be prone to wandering, further increasing the risk of accidents and injuries such as femur neck fractures. These fractures can lead to complications such as immobility, pneumonia, and other medical issues that can contribute to increased mortality in this population.

151- 14 male with knee pain, normal physical and knee X-ray, what next: hip and pelvis X-ray

↳ SCFE ↳ refered Pain

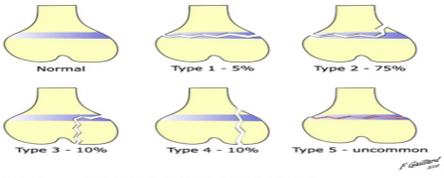
152- Post THR, with infection, first presenting sign : Pain ↳ مكرر

153- Poor prognosis fracture:
a- type 1 SH
b- SH type 3 even if repaired and fixated well
c- Supracondylar with angulation

The higher the grade of classification , the higher the severity, the worse the prognosis, with the younger the age. (5>4>3>2>1)

The long bone has 2 growth plates, do they contribute for same growth potential? No.

Prognostic factors:
1) Severity of injury
2) Patient's age (the younger, the worse the prognosis)
3) The physis injured
4) The anatomic type of fracture
5) The treatment



 # SALTER mnemonic for classification
The mnemonic "SALTER" can be used to help remember the first five types. This mnemonic requires the reader to imagine the bones as long bones, with the epiphyses at the base.
- I – S = Slip (separated or straight across). Fracture of the cartilage of the physis (growth plate)
- II – A = Above. The fracture lies above the physis, or Away from the joint.
- III – L = Lower. The fracture is below the physis in the epiphysis.
- IV – TE = Through Everything. The fracture is through the metaphysis, physis, and epiphysis.
- V – R = Rammed (crushed). The physis has been crushed.

154- Pedestrian hit by vehicle bumper, what is the most likely pattern of fracture seen?
a) Transverse
b) oblique
c) butterfly
D) spiral

Tibial plateau Fractures
- Strong bending forces combined with axial loads, e.g. a car striking a pedestrian on the side of the knee (hence the term 'bumper fracture') or a fall from a height in which the knee is forced into valgus or varus.
- patient is nearly always an adult
- Symptoms include pain, swelling, and a decreased ability to move the knee,joint is swollen and has the doughy feel of a haemarthrosis
- Dx → multiple views x-ray, CT
- Treatment
  - function is more important than an anatomical reduction
  - Pain may be managed with NSAIDs, opioids, and splinting.
  - In those who are otherwise healthy, treatment is generally by surgery.Occasionally, if the bones are well aligned and the ligaments of the knee are intact, people may be treated without surgery

155- Not seen in club foot:

- Pronation of forefoot

- adduction of forefoot

- hindfoot varus

- midfoot cavus

Answer A

2015

157. The most important factor in bone healing is

a. Blood supply

b. Bone contact

c. Stability

Factors that affect bone healing.

A- Internal factors

1- Blood supply (most important)
2- Head injury may increase osteogenic response
3- Mechanical factors
- Mechanical stability/strain
- Location of injury
- Degree of bone loss
- Pattern (segmental or fractures with butterfly fragments)

B -Patient factors

1- Vitamin D and calcium
2- Protein malnourishment decreases fracture callus strength
3- Diabetes mellitus
4- Nicotine
5- Medications affecting healing

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Factors that dictate the type of healing

Fracture stability (mechanical stability) governs the mechanical strain

- When the strain is below 2%, primary bone healing will occur
- When the strain is between 2% and 10%, secondary bone healing will occur.

1. Inflammation → repair
(soft callus followed by hard callus) →ending in remodeling)
2. Blood supply (bone blood flow): the most important factor

Answer A

158. A fracture was managed with compression plate , the type of healing is :

a. Primary bone healing

b. Secondary bone healing

c. Callus formation

Primary Bone Healing

- Seen in:

Absolutely stable fractures

e.g. lag screws
compression plates
tension band wiring

N.B. all other fracture fixation methods result in relative stability, and thus indirect (secondary bone healing).

Answer A

159. Which of the following fractures is most commonly associated with non/delayed union :

a. Humerus

b. Inter-trochanteric

c. Calcaneus

d. Distal tibia

Causes of non-union

(1) Distraction and separation of the fragments, e.g. interposition of soft tissues between the fragments.
(2) Excessive movement at the fracture line.
(3) Severe injury that renders the local tissues nonviable or nearly so
(4) Poor local blood supply
(5) Infection.

Types of Non-union.

A-Hypertrophic non- union: excess poor callus around the fracture gap, the result of insufficient stability.
B- Oligotrophic non-union: produced by inadequate reduction with fracture fragment displacement
C-Atrophic non-union: usually arise from an impaired repair process.

Answer D

160. Osteoclasts originates from :

a. Osteocytes

b. Osteoblasts

c. Bone marrow hematopoietic cells

d. Chondroblasts

e. Fibroblast precursors

Answer C

161. The last center to ossify of the following is : (mnemonic: CRITOE)

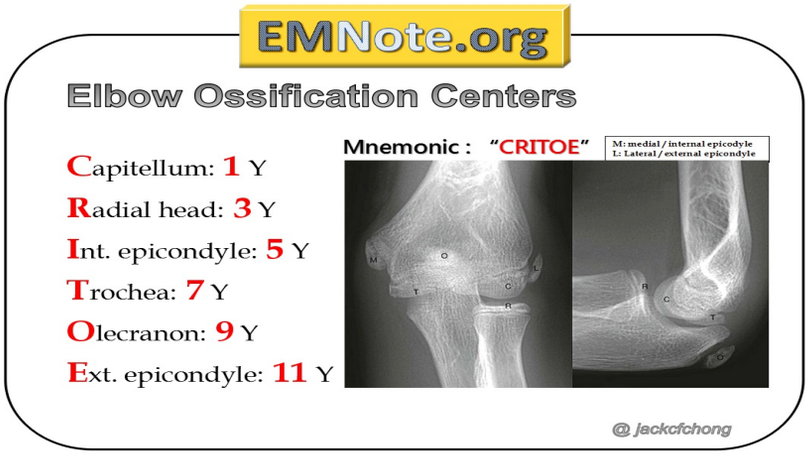
a. Capitulum

b. Radial head

c. External (lateral) epicondyle

d. Trochlea

e. Internal (medial) epicondyle



Answer c

162. A child was presented with knee pain , after distal femur fracture , this X-ray belongs to him : , your diagnosis is :

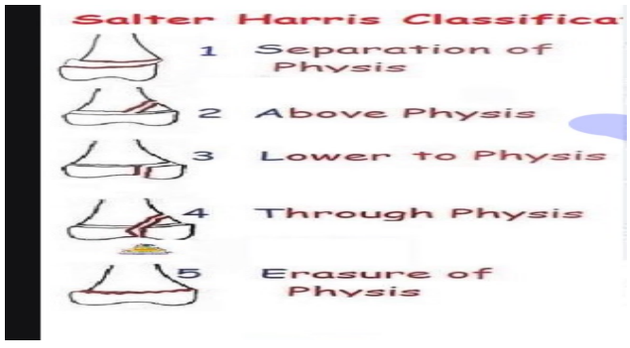
a. Salter Harris class I

b. Salter Harris class II

c. Salter Harris class III

d. Salter Harris class IV

e. Salter Harris class V



Answer; based on picture;(

163. Rocker – Bottom deformity presents most commonly in :

a. Clubfoot

b. Metatarsus adductus

c. Congenital vertical talus

d. Pes Cavus

e. Pes Planus

Answer C

164. Plantar – flexion muscles are most powerful during which phase :

a. Initial stance

b. Loading response

c. Mid-stance

d. Terminal stance

e. Pre-swing

Answer E

165. Concerning upper limb fractures , the wrong match is :

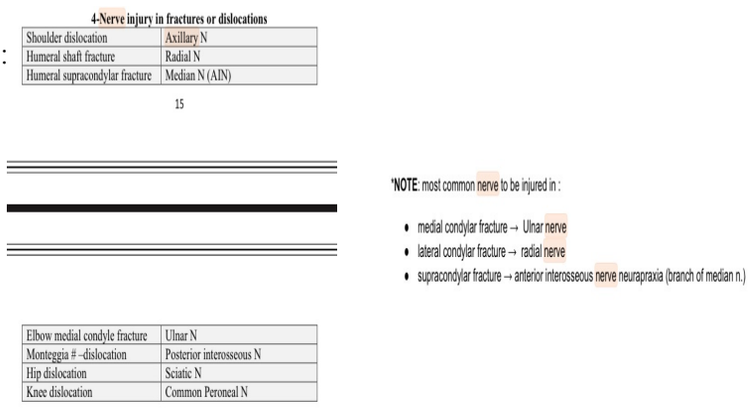
a. Supracondylar fracture – Ant. Interosseous nerve

b. Shaft of humerus – Radial nerve

c. Shoulder – Axillary nerve

d. Lateral epicondyle – radial nerve

e. Distal radius – Ulnar nerve



4-Nerve injury in fractures or dislocations

Shoulder dislocation	Axillary N
Humeral shaft fracture	Radial N
Humeral supracondylar fracture	Median N (AIN)

15

*NOTE: most common nerve to be injured in :

- medial condylar fracture → Ulnar nerve
- lateral condylar fracture → radial nerve
- supracondylar fracture → anterior interosseous nerve neurapraxia (branch of median n.)

Elbow medial condyle fracture	Ulnar N
Monteggia # -dislocation	Posterior interosseous N
Hip dislocation	Sciatic N
Knee dislocation	Common Peroneal N

Answer A

166. 30 year old female developed suddenly a back pain , which has only been increasing during the last week during her 3 vacuuming sessions , P/E was normal & no neurological abnormalities , and lab studies were normal , the most appropriate management is :

a. Send her home , bed rest , with re-evaluation after 2 weeks

b. MRI of the spine

c. CT of the spine

d. Physiotherapy

Answer A

167. An open segmental tibial shaft fracture , 8 cm ,with no vascular injury, requiring **p**lastic reconstructive surgery , according to Gustilo classification , it's :

a. Class I

b. Class II

c. Class IIIA

d. Class III**B**

e. Class IIIC

- **Posttraumatic osteomyelitis**
  - Following open fractures, Staph. aureus is the most common cause of infection in open fractures.
    - GUSTILO Classification of open fractures and their management

Gustilo Grade	Definition
I	wound <1 cm in length ,Open fracture, clean wound
II	wound > 1 cm but < 10 cm in length,Open fracture, **without** extensive soft-tissue damage, flaps, avulsions
III	(>10 cm), Open fracture **with** extensive soft-tissue laceration , or loss or an open segmental fracture. This type also includes open fractures caused by farm injuries, fractures requiring vascular repair, or fractures that have been open for 8 hr prior to treatment. This indicates a high energy trauma.
IIIA	adequate periosteal coverage
IIIB	Significant periosteal stripping
IIIC	arterial injury requiring repair, irrespective of degree of soft-tissue injury → vascular repair is required to revascularize the leg

    - 3A: could be closed by an orthopaedic surgeon, i.e. no skin loss.
    - 3B: Needs a Plastic (plastic → **B**lastic→ B → needs flaps) surgeon , there is skin loss and needs a flap
    - 3**C**: **C**irculatory injury or compromise
  - Management of open fractures
    - **Irrigation**: 3L in Type 1, 6L in Type 2, 9L in type 3.

22

B → Blastic

Answer D

168. The most common fracture in child abuse of the following is :

a. Humerus

b. Spine

c. Tibia

d. Fibula

e. radius

IV-Child Abuse (Battered baby syndrome) (NAI)

A-Suspicion raised NAI
= < 3 years old = Multiple healing bruises, skin marks, burns.
= Unreasonable histories = Delay in seeking treatment = Posterior ribs
= Corner #: Bucket handle # (traction & rotation) at junction of meta. and physis)
B- Nonorthopaedic injuries: Skin, head, burns, and blunt abdominal.
B- Fracture Type & location.
= Humerus, tibia, and femur, in that order.
= Spiral humerus # and distal humeral physeal separations are highly suggestive.
= Transverse femur shaft fracture <1 y of age (60-70% NAI)
= Spiral >common than transverse
= Diaphyseal fractures are four times more common in abuse cases than metaphyseal fractures.
Treatment
1- Skeletal survey in children <5y and bone scan if older.
-Early involvement of social workers and pediatricians
2- Treat according to the fracture pattern.
Prognosis
If the abuse is missed, there is a greater than 33% chance of further abuse and a 5% to 10% chance of death in affected children.

Answer A

169. Sequestrum is :

* دكتور همان حتا بسأل عنها

a. Active bone healing in acute osteomyelitis

b. Active bone healing in chronic osteomyelitis

c. Necrotic segment of bone that form a nidus for infection in chronic osteomyelitis

- Mechanism of OM →
  - Inflammation» edema» increases intra-osseous pressure (pain)» WBC's »pus formation» through haversian canals» to surface of bone (Olaca to sinuses}»
  - elevation of the peri-osteum» lying new bone (dealt with as a fracture) as periosteal reactions
  - The pus surrounding blood vessels will cause thrombosis and compression » ischemia and necrosis » sequestrum (dead bone) hyper-dense "collapsed trabeculae"
  - The new bone formed is called (involucrum) , the edema and stagnation of blood in the bone causes hypo-dense areas called rarefaction

Answer C

170. 14 year old male , presented with new onset knee pain , no other symptoms , on P/E nothing suspicious , the most appropriate management is :

a. Send him home

b. Knee scan

c. Knee MRI

d. Pelvis & hip X-Ray

↳ SCFE
↳ Refered Pain → so Doing Pelvic + hip x-ray

Developmental dysplasia of the hip	Abnormal acetabulum development in newborns. Risk factor is breech presentation. Results in hip instability/dislocation. Commonly tested with Ortolani and Barlow maneuvers (manipulation of newborn hip reveals a "clunk"). Confirmed via ultrasound (x-ray not used until ~4–6 months because cartilage is not ossified).
Legg-Calvé-Perthes disease	Idiopathic avascular necrosis of femoral head. Commonly presents between 5–7 years with insidious onset of hip pain that may cause child to limp. More common in males (4:1 ratio). Initial x-ray often normal.
Slipped capital femoral epiphysis	Classically presents in an obese young adolescent with hip/knee pain and altered gait. Increased axial force on femoral head → epiphysis displaces relative to femoral neck (like a scoop of ice cream slipping off a cone). Diagnosed via x-ray.

10F
Test
Test

Answer D

171. 25 year old male , had anterior dislocation while playing handball , the most common complication is

a. Supraspinatus muscle tear

b. Avulsion of the humeral head in the glenohumeral joint

c. Biceps muscle tear

* معكوس

d. Bankart lesion

e. Axillary nerve injury

Answer D

172. Female developed knee pain after contact injury, continued playing , with swelling 24 hours later , on P/E McMurray's was positive (mentioned how it was done , not the name) , your diagnosis is :

a. Meniscal injury

b. ACL injury

c. MCL injury

d. PCL injury

e. LCL injury

- **Meniscal tear**
  - A tear of a meniscus is a rupturing of one or more of the fibrocartilage strips in the knee called menisci. When doctors and patients refer to "torn cartilage" in the knee, they actually may be referring to an injury to a meniscus at the top of one of the tibiae
  - Acute ACL → more commonly associated with lateral meniscus tear
  - Chronic ACL → more commonly associated with medial meniscus tear
  - Mechanism of injury :contact trauma. مرة واحدة
  - Acute complaint: pain, swelling but after several hrs, locking, click (pop).
  - Chronic complaint: locking and click
  - Timing
    - Acute → in pediatric patients → needs surgery
    - Chronic → in old patients →not necessarily needs surgery
  - Types:
    - 1- Vertical tear
    - 2- Bucket-handle (special type of vertical tear)
    - 3- Horizontal tear
    - 4- Radical tear
    - 5- Meniscal cyst associated with horizontal tear if no tear we call it meniscal ganglion.
  - Medial Meniscus → rarely needs surgical intervention
  - Meniscus is avascular \\\ ACL and PCL → vascular
  - Meniscus is repaired (sutured), but not reconstructed
  - A tear of the medial meniscus can occur as part of the unhappy triad, together with a tear of the anterior cruciate ligament and medial collateral ligament.
  - Meniscus repair rate of healing is higher if there is accompanying ACL reconstruction, as this ACL reconstruction will cause bleeding (vascular structure) and bleeding will stimulate healing
  - Physical examination

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- The knee is examined for swelling. In meniscal tears, pressing on the joint line on the affected side typically produces tenderness. The **McMurray test** involves pressing on the joint line while stressing the meniscus (using flexion–extension movements and varus or valgus stress). Similar tests are

Answer A

173. After non-contact injury , a player developed severe pain & swelling immediately , left the field , your diagnosis is

a. Meniscal injury

b. ACL injury

c. MCL injury

d. PCL injury

e. LCL injury

A. ACL injury

Mechanism of injury (non-contact injury)
- Rapidly changing direction
- Deceleration coupled with cutting, pivoting, or sidestepping moves
- Suddenly stopping
- Slowing down while running
- Direct contact or collision (like a football tackle)

Symptoms of ACL injury
* A "popping" noise * The knee gives out *Loss of ROM
* Discomfort while walking
* Pain with swelling (hemoarthrosis) within 24 hr. after the injury.
50% of ACL injuries are associated with other injuries such as the meniscus, articular cartilage, other ligaments, or bruising of the bone.
ACL+ MCL + Medial meniscus injury → "unhappy triad."

Grades on a severity scale.
Grade 1 Sprains – slightly stretched (the knee joint stable).
Grade 2 Sprains – loose. (a partial tear), rare.
Grade 3 Sprains – complete ligament tear, (knee joint is unstable).

History and physical examination.
Noncontact pivoting injuries are associated with an audible "pop" and an immediate hemarthrosis.

Associated injuries,
Acute lateral meniscal tears are more common.
Medial meniscus tears occur > with chronic ACL deficiency.
The Lachman test is the most sensitive examination for acute ACL injury, followed by the anterior drawer test and the pivot shift test.
Performance on the pivot shift test most closely correlated with outcome after ACL reconstruction. Done under GA

Plain radiographs
A lateral capsule sign or Segond fracture may be present.

(An avulsion fracture of the anterolateral capsule of the knee and posterior fibers of ITB).
MRI is useful in confirming the diagnosis.

Chronic ACL deficiency is associated with a
- Higher incidence of complex meniscal tears and chondral injury.
- Bone bruises (trabecular micro-fracture) occur in > 50% of acute ACL injuries.

Prevention of ACL injury
Athletes should participate in neuromuscular and proprioceptive strengthening, strengthening of knee flexors, and conditioning programs. These should include plyometric exercises and coaching regarding proper positioning while landing.

Answer B

174. All of the following are true about multifragmentary fracture management except :

a. Internal fixation

b. Indirect reduction

c. Anatomic reduction

d.

e.

Anatomic reduction may not always be achievable in multifragmentary fractures due to the complexity and number of fragments involved. Instead, the goal is often functional reduction to restore alignment and stability rather than precise anatomic alignment.

Answer C

175. the cell that is responsible for bone matrix deposition is

↳ osteoblast

a. osteoblast

b. osteocyte

c. chondrocyte

d. osteoclast

e. fibroblast

Cell biology of bone

Osteoblast	Builds bone by secreting collagen and catalyzing mineralization in alkaline environment via ALP. Differentiates from mesenchymal stem cells in periosteum. Osteoblastic activity measured by bone ALP, osteocalcin, propeptides of type I procollagen.
Osteoclast	Dissolves ("crushes") bone by secreting H⁺ and collagenases. Differentiates from a fusion of monocyte/macrophage lineage precursors. RANK receptors on osteoclasts are stimulated by RANKL (RANK ligand, expressed on osteoblasts). OPG (osteoprotegerin, a RANKL decoy receptor) binds RANKL to prevent RANK-RANKL interaction → ↓ osteoclast activity.
Parathyroid hormone	At low, intermittent levels, exerts anabolic effects (building bone) on osteoblasts and osteoclasts (indirect). Chronically ↑ PTH levels (1° hyperparathyroidism) cause catabolic effects (osteitis fibrosa cystica).
Estrogen	Inhibits apoptosis in bone-forming osteoblasts and induces apoptosis in bone-resorbing osteoclasts. Causes closure of epiphyseal plate during puberty. Estrogen deficiency (surgical or postmenopausal) → ↑ cycles of remodeling and bone resorption → ↑ risk of osteoporosis.

Answer A

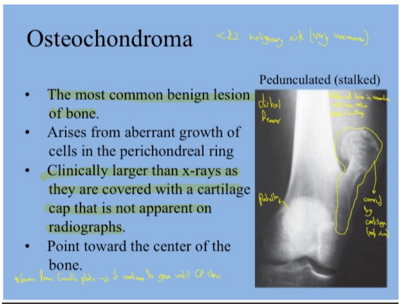
176. the most common benign bone tumor is :

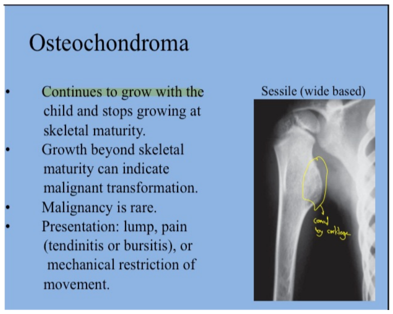
a. Hemangioma

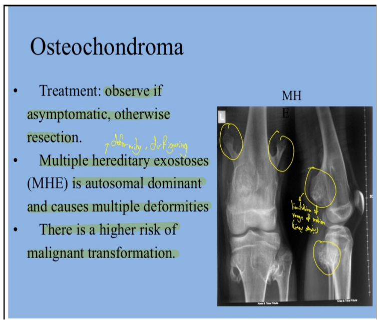
b. Bone cyst

c. Osteochondroma

d. Osteoid Osteoma







Answer c

177. 2 year old child presented with hip pain & fever , with elevated WBC & elevated ESR , your diagnosis is :

a. Legg-Calvé-Perthes disease

b. Slipped capital femoral epiphysis

c. Septic arthritis

d.

e.

Acute Suppurative Arthritis (Septic arthritis)

Microbiology
- *Staph. aureus*
- *H. infleunzae* (Common in children <4 yrs)

Clinical presentaion
- Acute pain and swelling in a single large joint

Local signs:
- Superficial joints (tenderness, erythema, swelling)
- Pseudoparesis (restricted movement due to pain and spasm)
- Picture of septicemia in infants.

Septic arthritis

Imaging
- X-ray
  - Soft tissue swelling, widened joint space, periarticular osteoporosis
  - Narrowed joint space.
  - Bone destruction
- MRI
- Bone scan

Investigations
- Joint aspiration (confirmatory)
- Blood culture (+ve in 50%)
- CBC, ESR, CRP (not diagnostic)

Septic arthritis

most common site in paediatrics is the hip

in adults, the knee.

It's a TOP MEDICAL EMERGENCY! Needs to be operated within 8 hours

Route of infection:
- Hematogenous
- Dissemination from acute osteomyelitis focus
- Dissemination from acute soft tissue infection
- penetrating injury.
- iatrogenic

Septic arthritis Treatment & Complications

Treatment
- Drainage
- Antibiotics
  - Augmentin
  - 3rd generation cephalosporin

Complications :
- Dislocation (due to tense effusion)
- Epiphyseal destruction (Tom Smith's dislocation)
- Growth disturbance
- Ankylosis (late)

Answer C

178. All of the following are contraindications for bone graft except :

a. HIV

b. Hepatitis

c. Multi-trauma

d. Alzheimer's disease

e. Malignancy

* مش مقتنعة بالجواب (احط D)

* الدكتور بالمحاضرة حكى contra-indication :-

1- Malignancy

2- HIV

3- Multi-Trauma

Hepatitis can affect the liver, leading to impaired liver function and potential complications during surgery, including bone grafting. Depending on the severity of hepatitis and its impact on liver function, it may pose a contraindication for bone grafting due to the increased risk of bleeding, infection, and impaired healing. However, the contraindication would depend on the specific circumstances of the individual case and would need to be evaluated by a healthcare professional. In some cases, with proper management and clearance from a healthcare provider, bone grafting may still be possible even with hepatitis infection.

Answer e

179. Mortality from femur neck fracture is in increased mostly with :

a. Dementia

b. DM

c. HTN

d. Smoking

e.

The correct answer is a. Dementia. Patients with dementia may have impaired mobility and cognition, which can increase the risk of falls and subsequent femur neck fractures. Additionally, dementia can complicate medical management and postoperative care, contributing to higher mortality rates associated with femur neck fractures.

Answer A

180. Which of the following isn't a risk factor for osteoporosis :

a. BMI

b. Age

c. Steroids

d. Alcohol

e.

Secondary osteoporosis

- Drug-induced/iatrogenic
  - Most commonly due to systemic long-term therapy with **corticosteroids** (e.g., in patients with autoimmune disease) [3]
  - Long-term therapy involving: [6]
    - Anticonvulsants (e.g., phenytoin, carbamazepine)
    - L-thyroxine
    - Anticoagulants (e.g., heparin)
    - Proton pump inhibitors
    - Aromatase inhibitors (e.g., anastrozole, letrozole)
    - Immunosuppressants (e.g., cyclosporine, tacrolimus)
    - Androgen deprivation therapy (ADT)
- Endocrine/metabolic: hypercortisolism, hypogonadism, hyperthyroidism, hyperparathyroidism, renal disease
- Multiple myeloma

Additional risk factors [7]

- Excessive alcohol consumption
- **Cigarette smoking**
- Immobilization or inadequate physical activity
- Malabsorption (e.g., celiac disease), malnutrition (e.g., **diet low in calcium and vitamin D**), anorexia [8]
- Low body weight
- Family history of osteoporosis
- Personal history of fracture

Answer A

181. Which of the following X-Ray findings isn't associated with Scoliosis

a. Osteoporosis → ما لها دخل

b. Lateral curvature of the spine

c.

d.

Answer A

Exam ← حكالها دكتور باسم بالكويز

182. Lytic lesions are most commonly caused by :

a. Multiple Myeloma

b. Metastasis

c. chondrosarcoma

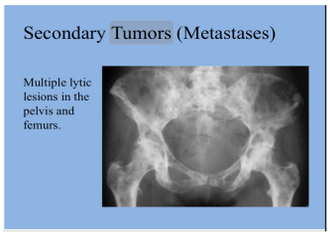
d. osteosarcoma

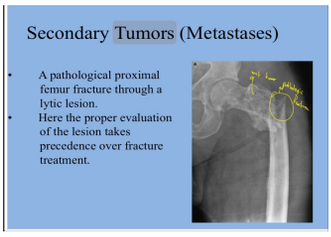
e. Osteoid osteoma

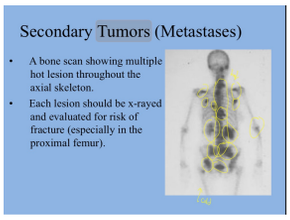
Secondary Tumors (Metastases)

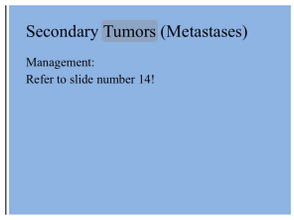
- More common than primary lesions.
- Occur mainly after the fifth decade.
- Usually in the axial skeleton.
- Most commonly from:
  - ① Lung: lytic lesions, can occur distal to the knee or elbow, poor prognosis.
  - ② Breast: mixed lesions, relatively good prognosis.
  - ③ Prostate: sclerotic lesions, good prognosis.
  - ④ Kidney: lytic hypervascular lesions.
  - ⑤ Thyroid: poor prognosis.

Exam









Answer B

183. Osteoid osteoma is characterized by which one of the following :

a. The most common primary benign tumor

b. Intermittent pain relieved by rest and NSAIDs

c. Distant metastasis

d.

e.

Primary bone tumors Metastatic disease is more common than 1° bone tumors. Benign bone tumors that start with o are more common in boys.

TUMOR TYPE	EPIDEMIOLOGY	LOCATION	CHARACTERISTICS
Benign tumors			
Osteochondroma	Most common benign bone tumor Males < 25 years old	Metaphysis of long bones	Lateral bony projection of growth plate (continuous with marrow space) covered by cartilaginous cap A Rarely transforms to chondrosarcoma
Osteoma	Middle age	Surface of facial bones	Associated with Gardner syndrome
Osteoid osteoma	Adults < 25 years old Males > females	Cortex of long bones	Presents as bone pain (worse at night) that is relieved by NSAIDs Bony mass (< 2 cm) with radiolucent osteoid core B
Osteoblastoma	Males > females	Vertebrae	Similar histology to osteoid osteoma Larger size (> 2 cm), pain unresponsive to NSAIDs
Chondroma		Medulla of small bones of hand and feet	Benign tumor of cartilage
Giant cell tumor	20–40 years old	Epiphysis of long bones (often in knee region)	Locally aggressive benign tumor Neoplastic mononuclear cells that express RANKL and reactive multinucleated giant (osteoclastlike) cells. "Osteoclastoma" "Soap bubble" appearance on x-ray C

Answer B

184. The most common presenting symptom indicating infection in a patient who had TKR is :

a. Fever

b. Pain

c. Discharge

d. Limping

e. Inability to bear weight

Answer B

185. In sciatica , the spinal innervation of bladder is through :

a. L3

b. L3, L4

c. L3,L4,L5

d. L5, S1,S2

e. S1,S2,S3

Innervation

- **Sympathetic**: causes relaxation of the detrusor muscle and constriction of the internal urethral sphincter → **retention** of urine
- **Parasympathetic**: pelvic splanchnic nerves (S2–S4) → stimulate contraction of the detrusor muscle and relaxation of the internal urethral sphincter → **emptying** of the bladder

(the closest answer is E)

186. A patient developed snuff pain after falling on his hand , the most appropriate management is :

a. No management

b. Imaging

c. Casting only

d. Casting the re-evaluation after 2 weeks with imaging

Answer B.

187. The most common nerve to be injuried in shoulder dislocation is :

a. Radial nerve

b. Brachial plexus

c. Musculucutaneous nerve

d. Long thoracic nerve

e. Axillary nerve

4-Nerve injury in fractures or dislocations

Shoulder dislocation	Axillary N
Humeral shaft fracture	Radial N
Humeral supracondylar fracture	Median N (AIN)

15

Elbow medial condyle fracture	Ulnar N
Monteggia # –dislocation	Posterior interosseous N
Hip dislocation	Sciatic N
Knee dislocation	Common Peroneal N

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Answer E

188. Trendelenburg's sign is caused by :

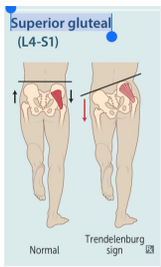
a. Superior gluteal nerve

b. Inferior gluteal nerve

c. Peroneal nerve

d. Femoral nerve

e. Obturator nerve



Motor—gluteus medius, gluteus minimus, tensor fascia latae

Iatrogenic injury during intramuscular injection to superomedial gluteal region (prevent by choosing superolateral quadrant, preferably anterolateral region)

Trendelenburg sign/gait—pelvis tilts because weight-bearing leg cannot maintain alignment of pelvis through hip abduction

Lesion is contralateral to the side of the hip that drops, ipsilateral to extremity on which the patient stands

Trendelenburg sign	• Test for neurological insufficiency of the gluteus medius and gluteus minimus muscles, which are innervated by the superior gluteal nerve	• The patient is asked to stand on one leg.	• Negative Trendelenburg sign (physiological): The pelvis remains level as it is stabilized by the gluteus medius and minimus. • Positive Trendelenburg sign (pathological): Because of insufficiency of the gluteus medius and minimus on the side of the standing leg, the pelvis drops towards the contralateral, unimpaired side. • **Duchenne sign**: The torso tilts toward the contralateral side, compensating the pelvic drop on the unimpaired side. • **Duchenne limp**: The Duchenne sign, which frequently occurs bilaterally, results in a compensatory to-and-from movement of the torso during walking.

Answer A

2014

189- what is false about proximal humerus fractures:

a. more in males

b. osteoprotic fracture

c. axillary nerve injury

d. due to fall on outstretched arm

e. increases with age

The Humerus

1. **Proximal humerus Fractures**

- Occur more commonly in osteoporotic women. We test the function of the axillary nerve by asking the patient to abduct his\her hand (function of the deltoid), however if the patient is in pain we test the sensation in the skin over the distal half of the deltoid or we simply put our hands on top of the deltoid muscle and ask him to abduct to see if there is contraction of the muscle. The axillary nerve winds around the surgical neck of the humerus, so fracture in that area can affect the axillary nerve.
- Neer's classification of proximal humeral fractures (not important) is based on the number of displaced fragments and not the number of fractures. The higher the number of displaced fragments, the less stable they are, the higher the need for surgical management.
- The anatomical neck is the junction between the head and the tuberosities, while the surgical neck is the junction between the metaphyses and the diaphysis and it has no anatomical landmarks.
  - Pain may not be very severe because the fracture is often firmly impacted. However, the appearance of a large bruise in the upper arm is very suspicious.
  - The patient should be examined for signs of axillary nerve or brachial plexus injury.

- Axillary and scapular lateral views should always be obtained, to exclude dislocation of the shoulder.
- According to Neer's classification:
  - a onepart fracture is one in which the fragments are undisplaced or firmly impacted (i.e. the humerus appears to be 'in one piece');
  - a two-part fracture is one in which the neck fracture is displaced (i.e. there are only two fragments, the humeral head and the rest of the bone);
  - three-part or four-part fractures are those in which, in addition to the neck fracture, one or both of the tuberosities is also fractured.
- Treatment
  - Impacted or minimally displaced fractures → no treatment apart from a short period of rest
  - Two-part fractures → closed reduction, the arm is then bandaged to the chest for 3 or 4 weeks
  - Three-part fractures
    - young, active individuals→ open reduction and internal fixation with a plate and screws.
    - elderly patients with osteoporotic bone → manipulative reduction followed by physiotherapy
  - Four-part fractures → prosthetic replacement
- Complications of proximal humerus fractures:
  - General complications of any fracture
  - injury to rotator cuff muscles in case of dislocation
  - avascular necrosis. (the blood supply of the head of the humerus is retrograde and this might occur in case of fracture in the anatomical neck)
  - Stiffness → minimized by starting exercises as early as possible.
  - Shoulder dislocation
  - Vascular and nerve injuries

Answer A

190- which of the following is associated with hypercalcemia?

a. osteosarcoma

b. multiple myeloma

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c. osteoid osteoma

d. chondrosarcoma

Answer B

حسب الدوسة A

191- All are found in scoliosis EXCEPT

A. breast asymmetry

B. shoulders at different levels or something like that

C. pelvic obliquity

D. true lower limb length discrepancy

- The signs of scoliosis can include:
  - Uneven musculature on one side of the spine
  - Rib prominence or a prominent shoulder blade, caused by rotation of the rib cage in thoracic scoliosis
  - Uneven hips, arms or leg lengths
  - Slow nerve action
  - Heart and lung problems in severe cases
- Lateral deviation of the axis of the spine + rotation of vertebrae.
- More common in females

Answer.. according to dr.M.Samih's Handout , ALL are found in scoliosis

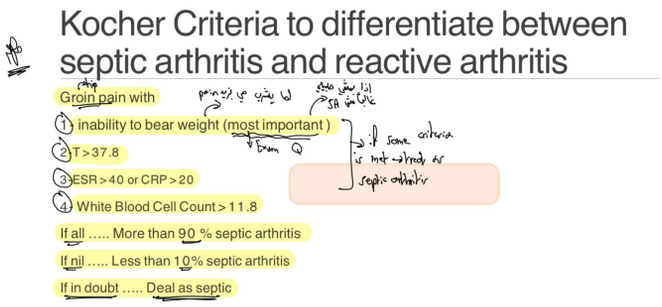
192- An 8-year old male child presents with a 6 hour history of inability to bear weight and right groin Pain. There was (mentioned in numbers) fever, elevated ESR and elevated WBC. What is the Most likely diagnosis?

a. Perthes' disease

B. slipped capitofemoral Epiphysis

C. septic hip

D. irritable hip



Answer C

193- In scapula fracture, we must do all of the following EXCEPT

A. scapula CT scan

b. ECG

C. cardiac enzymes

d.CXR

e.ABG

Fractures of the scapula

The body of the scapula is fractured by a crushing force, which usually also fractures ribs and may dislocate the sternoclavicular joint. The neck of the scapula may be fractured by a blow or by a fall on the shoulder.Shoulder movements are painful but possible. If breathing also is painful, thoracic injury must be excluded.
Treatment → The patient wears a sling for comfort, Reduction is usually unnecessary.

Answer A

194- What is the most common cause of osteomyelitis? In newly born infants?

A. streptococcal. (Didn't say group B strept)

c. haemophilus influenza B

d. E.coli

- Most common:
  - Most common site of infection → around the knee in peds and vertebrae in adults (regardless of age→ MC site is around the knee joint in the metaphysis; metaphysis has high volume of blood supply but slow velocity→ high bacterial load → high risk of bacteria to settle down).
  - Most common causative agent → staph Aureus(staph Aureus is generally the most common cause of infection in orthopedics department).
    - Other causes: osteomyelitis in pediatric age group, is part of neonatal sepsis.
    - <1 year of age → Klebsiella, Listeria, E.coli, Staph.aureus or Group B Strep.
    - 1-4 yrs → Staph. Aureus or H.influenzae B , pneumococcus
    - >4 yrs →Staph. Aureus
    - A special case and cause → Sickle cell disease
      - m.c.c in Sickle cell disease → staph aureus then Salmonella.
      - Characteristic organism in osteomyelitis in Sickle cell disease → Salmonella
      - Salmonella osteomyelitis → most common in Sickle cell disease

E. salmonella

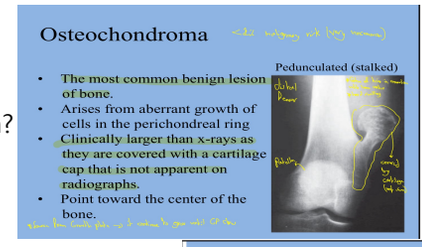
195- What does osteochondroma mean?

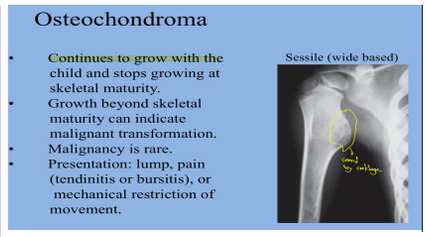
A. malignant tumor producing bone

B. malignant tumor producing cartilage

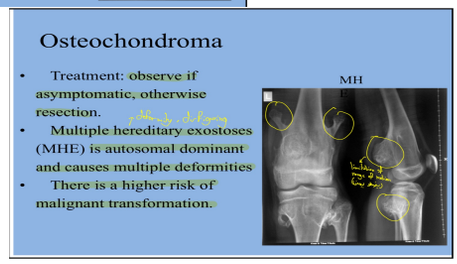
C. benign tumor producing both bone and cartilage

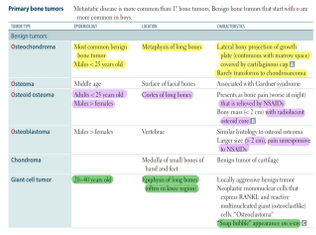
D. benign tumor producing fibrous tissue





Answer D





Answer C

196- Most commonly injured ligament in ankle sprain is

a. anterior talofibular ligament

B. posterior talofibular ligament

C. spring ligament

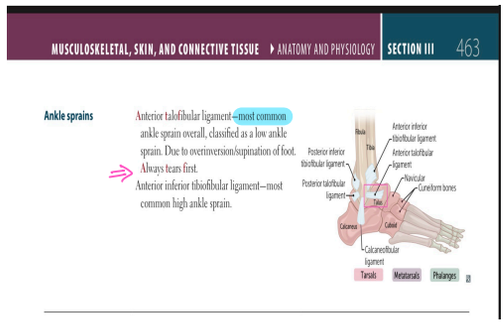
D. deltoid ligament

Ankle and Foot Fracture

Ankle ligament injuries

A sudden twist of the ankle momentarily tenses the structures around the joint. This may amount to no more than a painful wrenching of the soft tissues – a sprained ankle. If more severe force is applied, the ligaments may be strained to the point of rupture. If the tear is partial, healing is likely to restore full function to the joint; however, with complete tears, joint instability may persist. More than 90% of ankle ligament injuries involve the lateral side – usually the anterior talofibular, or both this and the calcaneofibular ligament; only in the most severe injuries is the posterior talofibular ligament torn.

- history of a twisting injury followed by pain, bruising and swelling is typical.
- Tenderness is maximal just distal and slightly anterior to the lateral malleolus, and the slightest attempt at passive inversion of the ankle is extremely painful.
- X-ray examination is called for if there is
  - Pain around the malleolus.
  - Inability to take weight on the ankle immediately after the injury.
  - Inability to take four steps in the Emergency Department.
- Treatment
  - Initial treatment consists of rest, ice, compression and elevation (RICE), which is continued for 1–3 weeks
  - NSAIDs during the acute phase can be helpful
  - protected mobilization (crutches, splint or brace)



Answer A

197- A patient with an open fracture, you shall do all the following as initial management/assessment (or so) EXCEPT

A. give antibiotics IV

B. gives tetanus booster

C. cover with sterile things

D. do angiography

E. splint

- Management of open fractures
  - **Irrigation**: 3L in Type 1, 6L in Type 2, 9L in type 3.

22

- Normal saline (or its derivatives) is most commonly used .
- Tap water can be used if no other choice is available (ex in war zones); it is considered sterile in comparison to the contaminated open wound.
- Contraindications: Ringer lactate and 0.45 glucose normal saline.You really don't want to feed the bacteria! .

- **Splinting** and Dressing.
- **Analgesia** (morphine) and **Antibiotics** (augmentin in class 1+2+3 , in class 3a+3b → augmentin + gentamicin).
- **Tetanus Prophylaxis** → It is not mandatory; almost all of us are vaccinated, but a booster might be needed.
  - Anti tetanus serum (ATS) should be given if there is gross contamination with soil and the patient is not vaccinated.
- Any illness can be a predisposing factor
- Athletes → not a predisposing factor

Answer D

198- 19 year old handball player had shoulder dislocation. What will you recommend him to do?

A. stop playing handball

B. wears something for 3 months and then plays again

C. does surgery because 100% there will be recurrence

D. back to play when there is no pain

- Treatment → emergency
  - Reduction : closed reduction (traction-countertraction). Before doing it we give the patient midazolam and morphine (these drugs causes respiratory depression) so we put the patient on monitor with O_2 mask, pulse oximeter, and cannula.
  - In traction-countertraction, the hand is tracted (pulled) in its same position, do NOT do rotation on the hand, this has a risk of fracture

- Complications:
  - Depend on age.
  - Around age of 20 : bankart lesion (most common), it is caused by avulsion of labrum, anterior and inferior glenohumeral ligaments are incompetent. This will cause 100% risk for recurrence
  - In middle ages
    - In anterior dislocation → fractures at greater tuberosity,
    - In posterior dislocation → fracture at greater or lesser tuberosity
  - In older ages : rotator cuff tear
  - Most common nerve to be injured is axillary nerve
  - Neurovascular injury : (axillary artery , nerve)
  - Late :
    - 1- AVN of humeral head
    - 2- Heterotopic calcification
    - 3- Recurrence

Answer C

199- The first inflammatory cell to arrive at site of bone healing is:

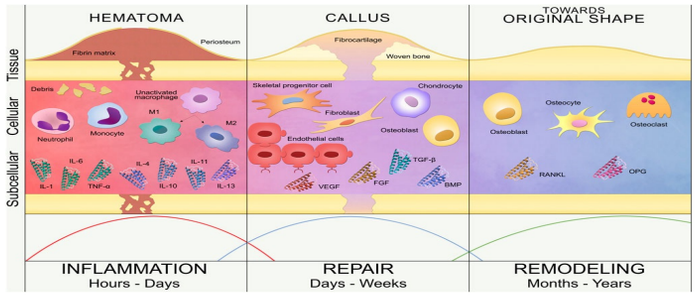
a-Macrophages

b-polymorphonuclear cells

c-osteoblasts

d-platelets

1- PMNs
2- platelets
3- macrophage
4- osteoblast



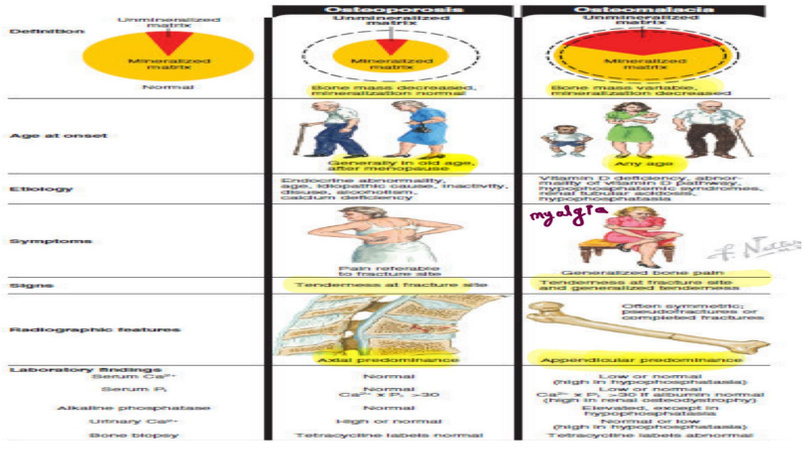
Answer B

200- male patient with uncontrolled diabetes, asthma, and on steroids, comes with proximal open Tibial fracture, intact sensation and distal pulses, he is expected to have:

-infection

-malunion

-amputation



Answer A

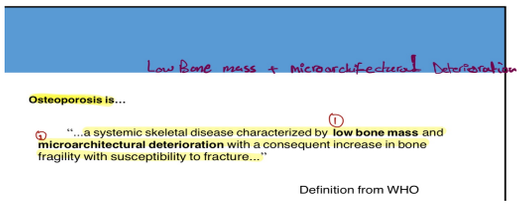
201- wrong about osteoporosis:

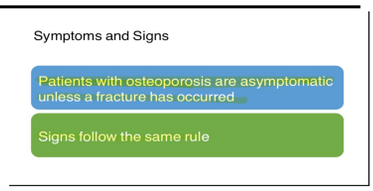
-painful without fracture

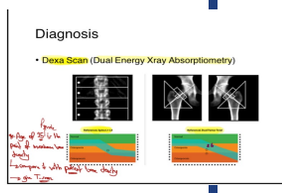
-might cause pathologic fractures

-normal ALP

-decreased bone density







Answer A

202- Osteolytic lesion in metastasis of breast cancer, the cell which causes this is:

a- osteoclasts

b-malignant cells

c-histiocytes

→ osteoclast

Answer A

203- .most common complication of clavicle fracture is:

A.Delayed union

B.Infection

C.Malunion

4-UPPER LIMB FRACTURES

1- Clavicle Fracture

The clavicle lies over the brachial plexus, the Subclavian artery and vein, and the apex of the lung →any of these structures may be injured, and careful neurovascular examination and chest auscultation are important.
Fractures of the middle third in 80% of cases.

Treatment:
Arm sling or Collar and cuff for 4 weeks
Very rarely surgery is needed
Complications: Malunion

D.Nerve injury

Answer C

204- An image showing club foot. All features are present except:

A.Rocker bottom deformity

CAVE → SO A

B.Supination of forefoot

C.Equines

D.Adduction

Answer A

205- Mortality from femur neck fractures is mostly increased by which comorbidity:

a- Dementia

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b- HTN

c- DM

d- Smoking

e- CKD

Answer A

206- In brachial plexus root avulsion, all these muscles are affected except:

A. Supraspinatus

B. Infraspinatus

C.Rhomboids

D. Serratus anterior

E.Trapezius CN XI

In brachial plexus root avulsion, which involves the tearing away of nerve roots from the spinal cord, the muscles affected are typically those innervated by the damaged nerve roots. Let's analyze each muscle:

A. Supraspinatus: This muscle is innervated by the suprascapular nerve, which arises from the upper trunk of the brachial plexus (C5-C6). It can be affected by brachial plexus injuries.

B. Infraspinatus: Similarly, the infraspinatus muscle is innervated by the suprascapular nerve and can be affected by brachial plexus injuries.

C. Rhomboids: The rhomboid muscles (both major and minor) receive innervation from the dorsal scapular nerve, which originates from the brachial plexus (C5).

D. Serratus anterior: The serratus anterior muscle is innervated by the long thoracic nerve, which arises from the brachial plexus (C5-C7). It can be affected by brachial plexus injuries.

E. Trapezius: The trapezius muscle receives innervation from the accessory nerve (cranial nerve XI), which does not arise from the brachial plexus. Therefore, it is not typically affected by brachial plexus root avulsion.

muscle	nerve supply	nerve root	Fxn
Supraspinatus	suprascapular nerve	C5	abduction
infraspinatus	suprascapular nerve	C5	External rotation
Teres minor	Axillary nerve	C5,6	External rotation
subscapularis	Subscapular nerve	C8	internal rotation
biceps	musclocutanous	C5	Flexion of shoulder
Serratus anterior	Long thoracic nerve	C5-C7	

Rotator cuff, SItS (small t is for teres minor)

Muscle	Action	Pathology
Supraspinatus	Abducts arm initially 1st 15°	Tear, degeneration, impingement ***-Empty full can test***
Infraspinatus	External R	Pitching injury
Teres minor	External R & Adducts arm	
Subscapularis	Internal R & adducts arm	

Movements.

Arm abductors

Degree	Muscle	Nerve	Joint
0°–15°	Supraspinatus	Suprascapular N	Shoulder
15°–90°	Deltoid	Axillary N	Shoulder (main muscle of the shoulder)
> 90°	Trapezius	Accessory N	Scapulothoracic
> 100°	Serratus Anterior	Long Thoracic N	Scapulothoracic

Answer E

207- Rehabilitation after THR, what should pt. avoid:

Adduction, flexion, internal rotation

* Dr. Ziad

Adduction flexion ext. rotation

* مكرر

Abduction flexion internal

Adduction extension...

Answer A

208- A pt. had femur neck fracture, fixed with pin and plate or something, he started to complain From muscle pain, all these modalities can be used except:

a-Warm packs

b-Whirlpool

c-Ultrasound

d-Diathermy

a. Warm packs: Warm packs can help relax muscles and alleviate muscle pain. This modality is commonly used for muscle discomfort and is suitable for postoperative muscle pain management.

b. Whirlpool: Whirlpool therapy involves immersing the affected area in warm water with agitation. It can help improve circulation and relax muscles, making it a suitable option for muscle pain relief in some cases.

c. Ultrasound: Ultrasound therapy uses sound waves to generate heat and promote tissue healing. While it's primarily used for deeper tissue structures, it can also be beneficial for muscle pain management after fracture repair.

d. Diathermy: Diathermy is a therapeutic modality that involves applying electromagnetic energy to generate heat deep within tissues. It can help relieve muscle pain and promote healing. However, caution should be exercised to avoid overheating metal implants, such as pins and plates, which are commonly used in femur neck fracture repair.

Answer D

209- Patient had total knee arthroplasty, the most common presenting symptom of infection of the Prosthesis is:

Fever

Pain

Discharge

X ray changes

* مكرر للمرة المليون

Answer B

210- Treatment of Osgood schlatter disease:

NSAID

Steroids

Warm packs

Ice packs

Rest and modification of activity

4- Osgood-Schlatter disease (traction apophysitis). important

Overuse injury caused by repetitive strain and chronic avulsion of the secondary ossification center of the proximal tibial tubercle.
Occurs after a growth spurt in running and jumping athletes.
Presents with progressive anterior knee pain.

Clinical Findings

Symptoms vary from mild aching at the tubercle to severe pain with patellar function and exaggerated bursal tenderness.
Radiographs of the proximal lateral tibia show characteristic fragmentation.

Treatment

Treatment is symptomatic, including analgesics, knee pads to avert direct pressure, quadriceps stretching, avoidance of sports activities, and brief casting or splinting for painful cases. The disorder resolves spontaneously when the physis closes at skeletal maturity. No evidence indicates that physical activity within the limits of pain is harmful to the child with Osgood-Schlatter disease.

Answer A

211- Not in acute osteomyelitis:

A.Increased WBC

B.Increased ESR and CRP

C.+ve MRI

D.X ray changes sequestrum → only in chronic OM.

IV-Chronic Osteomyelitis (>3 weeks)

Causative organism; Staphylococcus Aureus

Pathology

- **Sequestrum: an** avascular piece of bone surrounded by granulation tissue (it is pathognomic of chronic osteomyelitis).
- **Involucrum:** is dense sclerotic new bone surrounding the sequestrum At least 2/3rd the surface of sequestrum should be surrounded by involucrum before carrying out sequestrectomy.
- **Cloaca (sinus).**

Treatment

- Remove the sequestrum (Sequestrectomy)
- Identify the organism and control the infection (most important step)
- Fill the gap (Bone graft /Bone cement)
- Provide good soft tissue coverage.

Answer D

signature "wedging" shape of the vertebrae, causing kyphosis.
#blood supply of anterior spinal
artery< posterior spinal artery. So vertebrae becomes wedge in shape causing Kyphosis
Chief complaint of these patients easy fatigability due to tension on muscle resulted from deformity.

It's a 'developmental' disorder in which there is abnormal ossification (and possibly some fragmentation) of the ring epiphyses that appear on the upper and lower surfaces of each vertebral body in the growing spine.Sometimes there may also be small central herniation of disc material into the vertebral body; these are called Schmorl's nodes.
Examination reveals a smooth but well-marked thoracic kyphosis (or 'hyperkyphosis') which does not improve with changes in posture.
X-ray features are typical: in the lateral views one can see patchiness or irregularity of the vertebral end-plates and, in some cases, Schmorl's nodes at several intervertebral levels. Later, the vertebral bodies become noticeably wedge shaped.

Its is a type of generalized kyphosis.
A rigid thoracic hyperkyphosis defined by > 45 degrees.
Caused by anterior wedging of >5 degrees across three consecutive vertebrae.
Differentiated from postural kyphosis by rigidity of curve, and by being painful.
#On x-ray
Anterior height of vertebrae< posterior height of vertebrae in multiple vertebrae

Presentation:
- Between 13-16 yrs old, male > female.
- Painful,progressive deformity, in addition to Muscle tension caused by deformity causing easy fatigability

212- Wrong about scheuermann's disease:

a- More in females

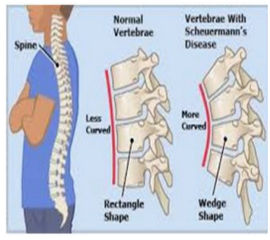
b- Presents in adolescence

c- Causes hyperkyphosis

d- Not corrected by hyperextension

e- Causes back pain due to muscle spasm

Scheuermann's kyphosis:
Scheuermann's disease is a self-limiting skeletal disorder of childhood. Scheuermann's disease describes a condition where the vertebrae grow unevenly with respect to the sagittal plane; that is, the posterior angle is often greater than the anterior. This uneven growth results in the



Answer: A

213- Not a risk factor for disc prolapsed:

a-Active lifestyle

b-Smoking

c-Driving

d-Pregnancy

Answer:A

214- Not a cause of compensatory scoliosis:

a- Leg length discrepancy

b- Lumbar disc prolapsed

c- Non-aligned pelvis

d- Duchenne muscular dystrophy

Postural Scoliosis
- One dimensional deformity, A secondary or compensatory deformity to a condition originating outside of the spine, such as:
- A short leg or a pelvic tilt due to contracture of the hip.
- Usually presented with thoracolumbar 'curvature'. When the patient bends forwards (upon flexion), the deformity disappears; this is typical of postural scoliosis.
- Short-leg scoliosis disappears when the patient sits (which cancel leg length asymmetry).
- This is a false deformity, and on x-ray: no rotation of pedicles, transverse processes or spinous processes.

answer : d

215- A young boy presents with bilateral mild bow leg deformity, you reassure the parents and tell them not to worry mainly because the condition is:

a- Symmetrical

b- Not suspected at this age

c- Localized

2-Vitamin D deficiency

Rickets
Failure of mineralization of the physis → poor calcification of the zone of calcification → weak bone with joint loading→metaphysis becomes broad and cup-shaped.

Causes
Decrease Vit D or impairment of its metabolites (defect in the pathway)
- Malnutrition
- Underexposure to sunlight
- Malabsorption syndrome
- Liver diseases, anti-epileptics → decrease 25-OH**lase**
- Renal failure → decrease 1@OH**lase**
- Hypocalcemia.

Pathogenesis
Decrease vitamin D → decrease serum Ca2+ → increase PTH secretion → decrease serum PO4 3−. Hyperactivity of osteoblasts → increase ALP.

Clinical features of rickets
A-General features
- Retarded bone growth → short stature
- Symptoms of hypocalcemia

Under the age of 18 months→ failure to thrive, restlessness, muscular hypotonia, convulsions or tetany but only minimal bone changes.

B-Localized orthopedic features

1-Genu valgum or varum	2-Anterolateral bowing of the distal tibia
3-Coxa vara	4-Anterolateral bowing of the femur
5-Waddling gait.	6-Kyphosis

Blood investigations: Decrease Calcium, phosphate levels, increase alk. Ph.
Treatment: Vitamin D + Calcium

X-linked hypophosphatemic rickets (VDRR).
* Resistance to treatment with UV radiation or vitamin D.
* Dominant inherited systemic disorder, from mutation of the phosphate-regulating gene homologous to endopeptidases on the X chromosome (*PHEX*).
* Normal Calcium level, high alk.ph, low phosphate levels.
* Massive urinary phosphate loss

Clinical features
- A slower growth rate in the first year of life.
- The next clinical sign is the patient's reluctance to bear weight when beginning to stand or walk.
- Delayed dentition in older children.
- Angular deformity in lower limbs.
- Short stature.

216- Acute respiratory distress is most commonly associated with which fracture:

a- Humerus fracture

b- Femur shaft fracture

c- Metatarsal fracture

Femoral shaft:

- The femoral shaft is well padded with muscles – an advantage in protecting the bone from all but the most powerful forces, but a disadvantage in that fractures are often severely displaced by muscle pull, making reduction difficult.
- A femoral shaft fracture is a fracture of the femoral diaphysis occurring between 5 cm distal to the lesser trochanter and 5 cm proximal to the adductor tubercle
- High energy trauma.
- Diaphyseal fractures in elderly patients should be considered 'pathological' until proved otherwise
- The pelvis and knee must always be x-rayed to avoid missing an associated injury.

- Position the patient come with:
  a. Proximal segment Leg position – abducted gluteus medius and minimus , flexed by iliopsoas
  b. distal segment will be: adducted
  c. Shortening limb

- Emergency as the limb will lose a lot of blood (Significant blood loss) and could cause deformities on the long run.
- High risk of developing compartment syndrome if it was closely reduced.
- Treatment
  - stabilization of the fracture by traction and limb splinting
  - Traction and bracing → fractures in children ,contraindications to anaesthesia
  - mostly surgery (Open reduction & internal fixation or closed reduction by intramedullary nailing). In most cases it needs from 4-6 months to be completely healed.
  - Intramedullary nailing is the method of choice for most femoral shaft fractures
  - External fixation indications→ severe open injuries,multiple injuries,severe bone loss "bone transport"
- Complications
  - blood loss, shock, fat embolism and acute respiratory distress
  - Vascular injury, Thromboembolism
  - Infection

***Etiology and risk factors in DDH.**
1. Etiology:
I-Anatomical factors.
The shallow acetabulum and capsule laxity often coexist at birth, improving the range of hip movement to aid delivery. The femoral head is >50% uncovered at birth, and this predisposes to subluxation/dislocation.
II- Iry idiopathic hip dysplasia.
III- Multifactorial.
* *Genetic inheritance* → positive family history
* *Racial*: absent in Africa
* *Mechanical*: Breech, Oligohydramnios, 1st born (tight uterus).
A breech presentation may exert its effects using the strong hamstring forces on the hip that result from a knee extension. The increased tension on the hamstrings pulls the femoral head out of the acetabulum.
* *Maternal hormone*: female child. Maternal hormones & fetal estrogen that is produced by the female infant's uterus → Ligament laxity

2- Associated Risk factors
A- Frank breech presentation (30 - 50% risk).
B- Female, Firstborn, and Family history is a strong risk factor.
i. One child has DDH, risk of another child is 6%
ii. At least one parent involved: 12% risk
iii. Parent and sibling involved: 36% risk
D-Fluid abnormality Oligohydramnios)
E- Feet Deformity (Metatarsus adductus)
F- Fetal anomalies **(for CDH)**
G-Faulty Habits (Swaddling) esp. with ligament laxity.

217- Wrong about DDH:

a-the mode of delivery is of more importance as a risk factor than the presentation

b- prematurity is a protective factor

answer: a

218- one of the following is not seen in a boy fell on his extend wrist:

a-clavicular fracture

b-radial head fx

c-flexion supracondylar fracture

3. Supracondylar Fractures

- More common in children.
- The brachial artery runs just above the condyles of the humerus.
- Also, the median nerve might be injured in the case of a supracondylar fracture.
- The elbow is second only to the distal forearm for frequency of fractures in children. Most of these injuries are supracondylar fractures, the remainder being divided between condylar, epicondylar and proximal radial and ulnar fractures.
- Boys are injured more often than girls and more than one half of the patients are under 10 years old.
- The usual accident is a fall directly on the point of the elbow or onto the outstretched hand with the elbow forced into valgus or varus. Pain and swelling are often marked

answer : c

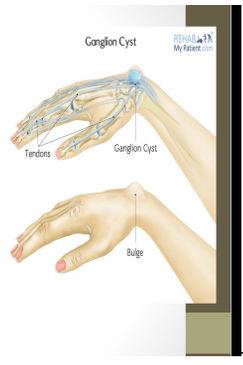
219- The dorsal ganglion is located in :

a- Scapholunate

b- Dorsal capsule or something

1-Ganglion Cyst

- = Fluid-filled swelling overlying joint or tendon sheath, most commonly at the dorsal side of the wrist. (Scapho lunate lig.) arises from the herniation of dense connective tissue.
- = Painless Swelling.
- Treatment: • Aspiration and steroid injection alleviates ~80% of ganglion cysts,but there is a high recurrence rate
- • Recurrent Symptomatic cysts ; excision, taking the entire stalk.



answer :a

2013

1. Child abuse.....>

Antalgic gait→ pain in leg ,acute ,stance phase is shorter than swing phase

different stages of healing.

2. Antalgic gait--> → Dr. Ziad

short stance phase in the affected side

3. Most common complication of amputations in immatures... Dr. Ziad

terminal overgrowth!

4. Osteolytic lesion in spine→

breast CA

5. Boy in football game, with knee pain and normal exam:

A. knee MRI → for Ligament injury

h. Hip X ray

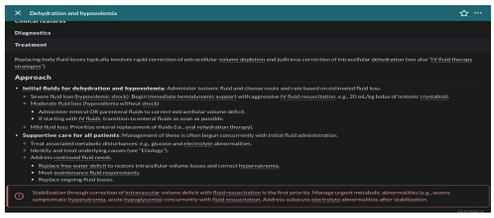
A knee MRI would provide detailed imaging of the knee joint and surrounding structures, allowing for a comprehensive evaluation to identify any potential soft tissue injuries, ligament tears, or other abnormalities contributing to the knee pain.

Answer: a

6. In hypovolemia:

a.ringer lactates

b.Packed RBCs



Ringer lactate solution is a balanced crystalloid solution that is commonly used for fluid resuscitation in hypovolemia. It helps replenish intravascular volume and provides electrolytes to support cellular function.

Packed red blood cells (PRBCs) are indicated in cases of severe anemia or hemorrhage with significant blood loss but are not typically the first-line treatment for hypovolemia. Instead, fluid resuscitation with crystalloid solutions is initially used to restore intravascular volume. If there is concurrent anemia, PRBCs may be administered in addition to fluid resuscitation to improve oxygen-carrying capacity. However, in the context of hypovolemia without significant anemia, PRBCs alone are not the appropriate treatment.

Answer: A

7. in osteoporosis:

intertrochanteric fracture

Intertrochanteric fracture:

- Within the intertrochanteric line, it's an extracapsular fracture.the extracapsular intertrochanteric fractures usually unite quite easily and seldom cause avascular necrosis
- Mainly osteoporotic patient or falling elderly.
- Needs surgery as early as possible and can be easily reduced.
- Tx
  - These fractures are almost always treated by early internal fixation — not because they fail to unite with conservative treatment (they unite quite readily), but (1) to obtain the best possible position and (2) to get the patient up and walking as soon as possible.

8. All biological healing in fracture except??

A. immobilization

B. nerve injury

C. vascular injury

A. Immobilization: Immobilization helps stabilize the fracture site, allowing the bone to heal properly. It is a critical aspect of fracture management and supports the biological healing process.

B. Nerve injury: Nerve injury is not directly involved in the biological healing of the bone itself. However, it can impact the sensation around the fracture site and potentially affect the patient's experience during the healing process.

C. Vascular injury: Vascular injury, particularly damage to blood vessels supplying the fractured bone, can significantly impact the biological healing process. Adequate blood supply is essential for delivering oxygen and nutrients to the bone, facilitating cellular activity and tissue repair.

Answer: B

9. Doesn't cause calcaneal fracture?/ does not associated with calcaneal fracture

a. Clavicle

h. SI joint

c. Skull base

1. The Calcaneus (Important)

Fracture of the Calcaneus
Most intra-articular calcaneus fractures are the result of axial loading where the talus is driven into the calcaneus during a fall from a significant height or motor vehicle accident. 10-20% of calcaneal fractures are associated with a thoracic or lumbar compression fracture, pelvis, or hip fracture.

Types of fractures
Intra-articular fracture (posterior facet) versus extraarticular pattern
The Bohler angle is usually 20-40°.
A decrease in this angle indicates significant depression of the weight-bearing posterior facet. CT scan offers the best diagnosis
Complications
1-Subtalar OA 2-Broad heel 3-Impingement of peroneal tendons

Answer is A

10. 60 year old female. with sever knee pain and on analgesia & not respond .. with duodenal ulcer **? next step**

-->total knee replacment

11. anti- healing: cortisone.

12. Scoliosis more than 20 degrees in a 15 year old girl:

A. observation

B. brace

Treatment principles:

1. Patients with a curve <20 degree regardless of age observe.
2. Patients with a curve >50 degree may progress more →surgery is needed.
3. Those between 20-50→ depends on maturation; if skeletally mature and risk of progression is low observe for a while to make sure it won't exceed the 50 degrees mark. /if skeletally immature then need bracing to control the curve during this period of rapid growth.

B مفروض ← Answer is A

13. A boy has a deformity in long bone (or something), all indicates pathological etiology except:

A. symmetrical involvement

B. local lesion

C. rapidly growing

D. not associated with age

Answer is B

14. Open fractures:

A. higher grade in operation room

15. Painful scoliosis, Which tumor:

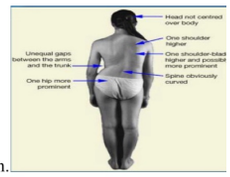
A. osteoid osteoma

B. osteosarcoma

C. giant cell tumor

d. aneurysmal bone tumor

spinous processes.



Structural Scoliosis

- Causes: (idiopathic, congenital, neuromuscular, syndromic)
- Idiopathic (infantile, juvenile, adolescent)
- It is a non-correctable 3D deformity.
- A True leg length discrepancy is present and gets worse upon flexion.
- Rotation of the spinous processes and the transverse processes.
- It is an asymptomatic disease, incidental finding, most common type is idiopathic adolescent scoliosis.
- If painful scoliosis present, think of underlying etiology like osteoid osteoma
- Scoliosis is a progressive disease.

Answer is A

16. Mcc of OM in Sickle cell:

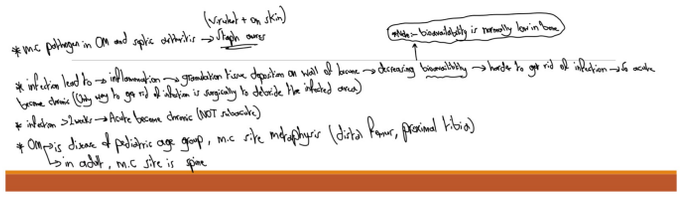
a. GBS
b. salmonella
c. E.coli
d. Klebsiella

- Most common:
  - Most common site of infection → around the knee in peds and vertebrae in adults (regardless of age→ MC site is around the knee joint in the metaphysis; metaphysis has high volume of blood supply but slow velocity→ high bacterial load → high risk of bacteria to settle down).
  - Most common causative agent → staph Aureus(staph Aureus is generally the most common cause of infection in orthopedics department).
    - Other causes: osteomyelitis in pediatric age group, is part of neonatal sepsis.
    - <1 year of age → Klebsiella, Listeria, E.coli, Staph.aureus or Group B Strep.
    - 1-4 yrs → Staph. Aureus or H.influenzae B , pneumococcus
    - >4 yrs →Staph. Aureus
    - A special case and cause → Sickle cell disease
      - m.c.c in Sickle cell disease → staph aureus then Salmonella.
      - Characteristic organism in osteomyelitis in Sickle cell disease → Salmonella
      - Salmonella osteomyelitis → most common in Sickle cell disease

Answer is B

17. Osteomyelitis, adult age group, most common in:

a. Spine



18. Septic hip in children... Except:

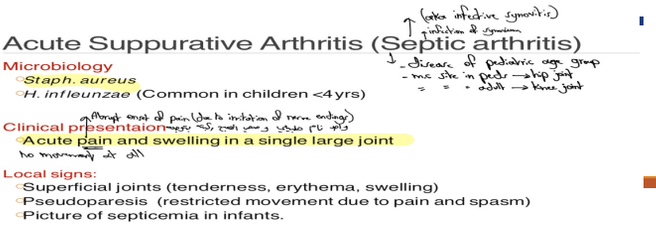
a- Fever

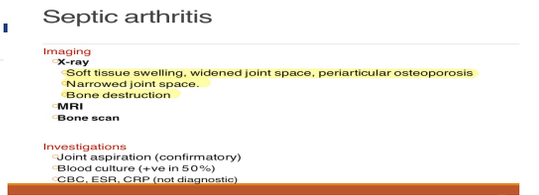
b- Refuse to walk

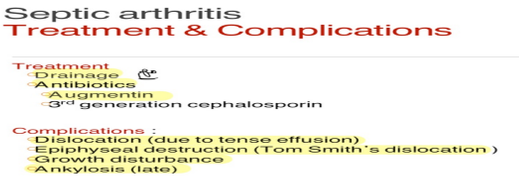
c- History of recent URTI

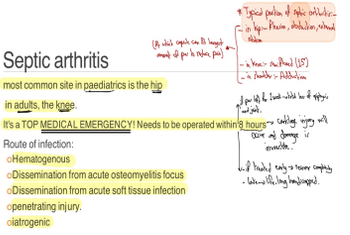
d- A high erythrocyte sedimentation rate (ESR)

e - A white blood count greater than 12,000









answer is C

19. X-ray → left hip dislocation.

20. First thing affected on median nerve injury:

A. motor

B. temperature

C. fine touch

D. pressure

E. vibration

Median nerve

- Wrist or high up in the forearm.
- Low lesions → wrist, thenar eminence is wasted and thumb abduction and opposition are weak. Sensation is lost over the radial three and a half digits
- High lesions → forearm fractures or elbow dislocation, long flexors to the thumb, index and middle fingers are paralyzed

Answer is A

21. Left femur tumor with lytic lesion and hypercalcemia → Multiple myeloma

22. Bone scan advantage in tumors —> finds other osseous disease foci

23. warm packs... heat transfer is by:

A. conduction

B. convection

C. radiation

answer is A

24. Boy presented with recurrent dislocation of the shoulder:

a. elderly

b. young

C. trauma injuries

D. sport injuries

E. RTA's.

Answer is D.

25. Osteoarthrosis of the knee, wrong:

A. periarticular osteopenia

B. cyst

C. subchondral sclerosis

D. osteophyte

E. narrow space joint

- General features: loss
  - Asymmetrical joint space loss
  - Subchondral sclerosis
  - Subchondral cyst
  - Osteophyte formation

pical degenerative arthritis:

Answer is A

26. Earliest sign in compartment syndrome

A. pain on stretching muscles

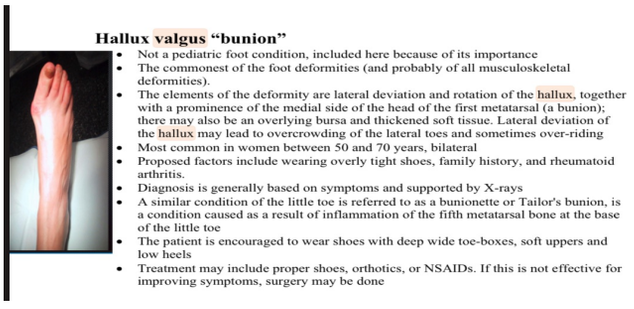
B. change of skin color

C. diminished pulses

Answer is A

27. Hallux valgus deformity, surgical indication :

pain



Hallux valgus "bunion"

- Not a pediatric foot condition, included here because of its importance
- The commonest of the foot deformities (and probably of all musculoskeletal deformities).
- The elements of the deformity are lateral deviation and rotation of the hallux, together with a prominence of the medial side of the head of the first metatarsal (a bunion); there may also be an overlying bursa and thickened soft tissue. Lateral deviation of the hallux may lead to overcrowding of the lateral toes and sometimes over-riding
- Most common in women between 50 and 70 years, bilateral
- Proposed factors include wearing overly tight shoes, family history, and rheumatoid arthritis.
- Diagnosis is generally based on symptoms and supported by X-rays
- A similar condition of the little toe is referred to as a bunionette or Tailor's bunion, is a condition caused as a result of inflammation of the fifth metatarsal bone at the base of the little toe
- The patient is encouraged to wear shoes with deep wide toe-boxes, soft uppers and low heels
- Treatment may include proper shoes, orthotics, or NSAIDs. If this is not effective for improving symptoms, surgery may be done
- Treatment may include proper shoes, orthotics, or NSAIDs. If this is not effective for improving symptoms, surgery may be done

28. Fracture associated with delayed or nonunion:

Extra-Articular

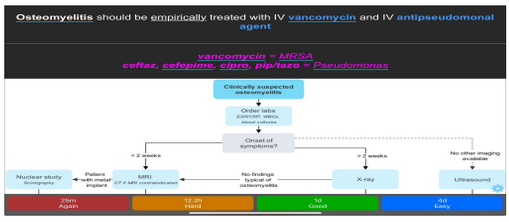
colles fracture.

Colles' Fracture

- A distal radius extra-articular fracture.
- Occurs in the elderly after a simple trauma (fragility fracture).
- Dorsally displaced (see the lateral view on the x-ray).
- Presents with wrist swelling called dinner fork deformity.
- Treatment usually closed reduction and casting for 6 wks.

29. Empiric treatment in a child with osteomyelitis:

Vancomycin, Ciprofloxacillin, erythromycin



Osteomyelitis should be empirically treated with IV vancomycin and IV antipseudomonal agent

vancomycin = MRSA

ceftaz, cefepime, cipro, pip/tazo = Pseudomonas

Clinically suspected osteomyelitis

Order labs (ESR/CRP, WBC, blood culture)

Onset of symptoms?

< 2 weeks

> 2 weeks

No other imaging available

Nuclear study (scintigraphy)

Patient with metal implant

MRI (CT if MRI contraindicated)

No findings typical of osteomyelitis

X-ray

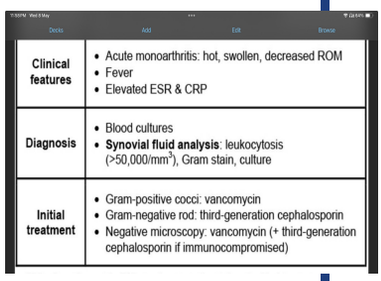
Ultrasound

25m Again

72.2h Hard

1d Good

4d Easy



Clinical features	• Acute monoarthritis: hot, swollen, decreased ROM • Fever • Elevated ESR & CRP
Diagnosis	• Blood cultures • **Synovial fluid analysis**: leukocytosis (>50,000/mm^3), Gram stain, culture
Initial treatment	• Gram-positive cocci: vancomycin • Gram-negative rod: third-generation cephalosporin • Negative microscopy: vancomycin (+ third-generation cephalosporin if immunocompromised)

30. Boy with perthes, 57 years old, pain resolved with analgesics, which of the following is a prognostic factor:

a.response to analgesics

b.degree of femoral head collapse

c.gender

d.date

e.education

8. Complications of Perthes disease.

a. Femoral head deformity.
   * Premature physeal arrest patterns * Osteochondritis dissecans,
   * Labral injury, and * Late osteoarthritis.

b. The most important *prognostic factor*
   1- Shape of the femoral head and its congruency at skeletal maturity
   2- patient age at onset of disease.

c. Degenerative changes in the hip joint in the fifth or sixth decade of life.

Differential diagnoses

Unilateral Perthes disease	Bilateral Perthes disease
– Transient synovitis – Infection – Lymphoma, and leukemia. – Juvenile chronic arthritis – Rheumatic fever. – Sickle cell disease.	– Hypothyroidism – Multiple epiphyseal dysplasias – Spondyloepiphyseal dysplasia – Gaucher's disease.

Poor prognostic factors in Perthes disease.

1->6 years old **2**-Female: mature earlier with less remodeling potential
3-Obesity
4-Progressive loss of hip motion
5-Advanced stage of disease at diagnosis (B, C)
6-Advanced grade (loss of containment).

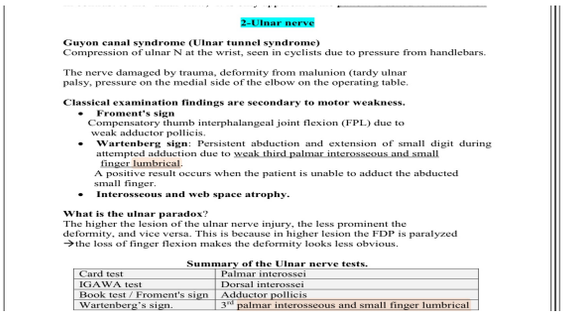
Answer B

31. Contraindication to spinal anesthesia:

a.coagulopathy

B.L3/L4 spinal surgery

c.pregnancy



2-Ulnar nerve

Guyon canal syndrome (Ulnar tunnel syndrome)
Compression of ulnar N at the wrist, seen in cyclists due to pressure from handlebars.

The nerve damaged by trauma, deformity from malunion (tardy ulnar palsy, pressure on the medial side of the elbow on the operating table.

Classical examination findings are secondary to motor weakness.

- **Froment's sign**
  Compensatory thumb interphalangeal joint flexion (FPL) due to weak adductor pollicis.
- **Wartenberg sign**: Persistent abduction and extension of small digit during attempted adduction due to weak third palmar interosseous and small finger lumbrical.
  A positive result occurs when the patient is unable to adduct the abducted small finger.
- **Interosseous and web space atrophy.**

What is the ulnar paradox?
The higher the lesion of the ulnar nerve injury, the less prominent the deformity, and vice versa. This is because in higher lesion the FDP is paralyzed →the loss of finger flexion makes the deformity looks less obvious.

Summary of the Ulnar nerve tests.

Card test	Palmar interossei
IGAWA test	Dorsal interossei
Book test / Froment's sign	Adductor pollicis
Wartenberg's sign.	3rd palmar interosseous and small finger lumbrical

Answer is A

32. lumbricals & interossei:

flex the fingers at the MCP & extend them at interphalangeal joints.

2012

1- 20 year old male was playing football and had a non-contact sudden severe knee pain while playing and could not continue. the injury is most probably at:

a- medial meniscus

b- lateral meniscus

c- anterior cruciate ligament

d- posterior cruciate ligament

e- chondral injury

answer is C

2- secondary osteosarcoma, can be 2ry for all of the following except:

- 1-Osteoid osteoma
  - Shaft of tibia and femur
  - Present with night pain that responds to NSAIDS." theory; these tumors produce PGs which causes pain , inflammation (sclerosis), and responds to pain medication(NSAID)"
  - < 2 cm
  - DDx: Brodie's abscess "subacute osteomyelitis" but not cortical → > 2 cm
    Night pain relieved by NSAID is seen in Osteoid osteoma and Brodie's abscess
  - May Resolves spontaneously in 3 years in certain cases but because it's painful patient does not wait for 3 year!!
  - Nidus can be removed surgically or now radiofrequency ablation
  - No malignant transformation

a-osteoid osteoma.

3- most important surgical indication for SCFE is:

a- pain

b- limping

c- correct malformation

d- correct leg discrepancy

- Treatments:
  - Surgery, either In situ fixation using screws or osteotomy if there's deformity.
  - Closed reduction is dangerous and should not be attempted.
- Complications: AVN and chondrolysis. + deformity

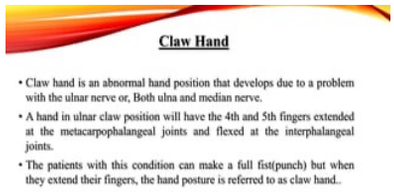
answer B

4- wrong about nursemaid (pulled elbow):

Nursemaid's elbow

- "radial head subluxation", "Pulled elbow"
- Presentation: extended pronated upper limb.
- Usually, the annular ligament holds the radial head in place.
- It occurs when a child's elbow is pulled and partially dislocates, causing the radial head to slip out from underneath the annular ligament.
- We reduce it by forcefully supinating and then flexing the elbow.the ligament slips back with

occur with traction to flexed arm. –> (the correct : on extended arm)



5- clawing hand

a- MCP hyperextension- PIPJoint flexion - DIP Joint flexion

6- kienbock's disease all true except:

a- type of AVN of lunate bone

b- age 40-50

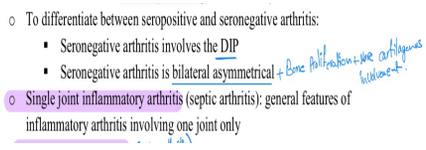
c- ass.with osteoarthritis of the wrist

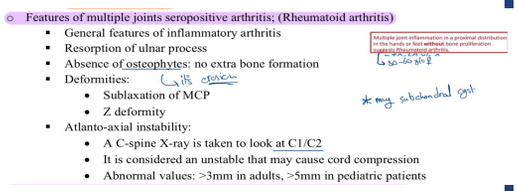
Kienbock disease	• Lunate bone of the hand	• Age of onset: 20-30 years	• Typically associated with repetitive impact trauma (e.g., from playing volleyball)	• Dorsal wrist pain • Limited range of motion of the wrist

answer is B

7- Rheumatoid arthritis, wrong one:

a- involve DIP





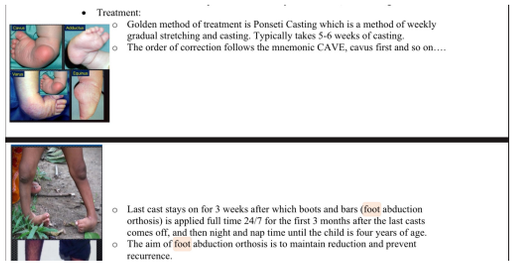
8- Club foot, method of treatment:

a- fibular shortening

b- Navicular medial subluxation

C- wt. bearing AP20>

d- ponseti surgery



- The fulcrum for correction during casting is the talar neck.
- The last part of the deformity to correct is the equinus, and usually tendo-achilles tenotomy (complete percutaneous cut) is needed in 70-90% of the patients
- It is better to start correction early, first few weeks of life.
- Ponseti casting remains the gold standard for older patients, recurrence, persistent deformities and even for patients with previous surgical releases.
- Surgical release is sometimes needed, and the surgical dose depends on the amount of deformity present, we try to minimize the dose as possible to decrease the amount of deep scarring, and reduce the incidence of future stiffness, premature degeneration and arthrosis. A frequently needed surgical procedure is tibialis anterior transfer to the lateral cuneiform to correct a dynamic supination deformity.

answer is D

9- patient with ankle trauma and healed ,but on internal fixation in the past. now she have osteoarthritis with severe daily restricting ..management:

a- arthrodesis

b- total ankle arthroplasty

c- hemiarthroplasty

- **Surgical**: replacement (total, partial or excisional fibroblasty), arthrodesis(surgical fusion) or Osteotomy (realignment)
- Arthrodesis is best choice in wrist and ankle joints destruction

Answer: A

10- For a total hip replacement posterior approach, the pt must avoid:

a- flexion, adduction, internal rotation.

مكرر

11- Rehabilitation guidelines following total knee replacement (one true):

TKR (Total Knee Replacement)

- Pre op rehabilitation → Increase muscle strength
- Pain control after surgery → analgesia and ice for the swelling
- All TKR are cemented → As tolerated WB
- Driving, sports and sexual activity → like THR
- Expected ROM after surgery
  - At discharge → 0-90
  - On the long term → 0-120
- Walking at the level needs 65 knee flexion, at the stairs 85-110 knee flexion
- Pt should move as soon as possible
  - 1st day post op → weight bearing as tolerated
- Orthosis (braces or splints)
  - Not recommended except if there is muscle weakness or post op complications
- Stairs
  - Starts at 3-5 days post op
  - Up with the good (non operated), down with the bad (operated)

a- allowed to drive after 6 weeks post op

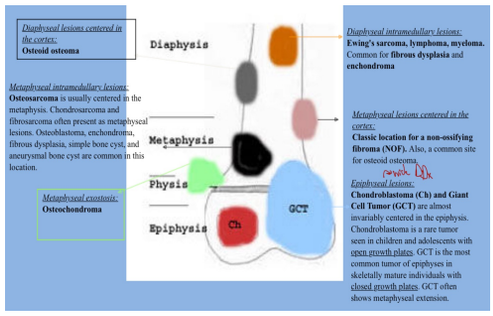
b- Can do low impact sports like tennis, football.. *Dr. Ziad *احفظ

c- Repetitive passive extension for the knee...

d- Not weight bearing for one week

Answer: A

12- Most common site for osteosarcoma:



a- distal femur

13-wrong about open fracture:

a- m.c at radius and ulna

b- tissue viability is most important prognostic factor

Answer A

14- most common fracture to be corrected surgically:

a- proximal femoral fracture

The most common site for open fractures is the tibia, particularly the distal third (lower part) of the tibia. This is due to its subcutaneous location and vulnerability to injury, especially in high-energy trauma such as motor vehicle accidents or falls. However, open fractures can occur in any bone, depending on the mechanism of injury and the force applied. Other common sites for open fractures include the femur, radius, and fibula.

b- proximal humerus fracture

Answer A

15-wrong about structural scoliosis:

spinous processes.

Structural Scoliosis

- Causes: (idiopathic, congenital, neuromuscular, syndromic)
- Idiopathic (infantile, juvenile, adolescent)
- It is a non-correctable 3D deformity.
- A True leg length discrepancy is present and gets worse upon flexion.
- Rotation of the spinous processes and the transverse processes.
- It is an asymptomatic disease, incidental finding, most common type is idiopathic adolescent scoliosis.
- If painful scoliosis present, think of underlying etiology like osteoid osteoma
- Scoliosis is a progressive disease.

Structural scoliosis refers to a curvature of the spine caused by abnormal bone structures or abnormalities in the vertebrae. However, not all cases of structural scoliosis are associated with bone or skeletal abnormalities. Some cases may be idiopathic, meaning the cause is unknown and there are no identifiable bone or skeletal abnormalities.

a- always ass.with bone and skeletal abnormality

b- there is a lump at a concave side in the thorax

c- don't change with change in position

d- may increase in severity with growth

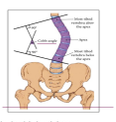
Answer A

16- Scoliosis measured by:

Imaging:

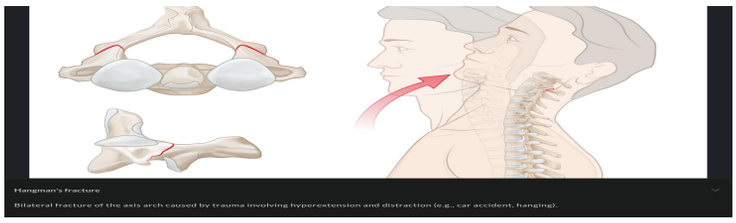
Cobb's angle

- Full-length PA and lateral x-rays of the spine and iliac crests must be taken with the patient erect.
- The degree of curvature is measured by drawing lines on the x-ray at the upper border of the uppermost vertebrae of the curve and the lower border of the lowermost vertebra of the curve; The angle between intersecting lines drawn perpendicular to the top of the top vertebrae and the bottom of the bottom vertebrae is the Cobb angle "the angle of curvature"
  - Mild → 10 - 30°
  - Moderate → 30 - 45°
  - Severe → >45°
- If 50-90 → needs surgery to prevent progression
- <50 → conservative
- Right thoracic curves are the commonest, the great majority in girls in adolescent idiopathic scoliosis. → the apex to the Rt side → to the opposite side of heart
- Left thoracic curves are so unusual that if seen they should be further investigated by MRI to exclude spinal tumors.
- Primary thoracic curves are usually convex to the right, lumbar curves to the left.



a- Cobb's angle

17- Hangman fracture:



a- There are a fracture of both pedicles

b- Occur with hyper flexion

- **Specific forms**: **hangman's fracture**
  - Definition: bilateral fracture of the axis arch
  - Etiology: trauma with hyperextension and distraction (e.g., car accident)
- **Diagnostics**: x-ray of the spinal cord to discern an atlantoaxial dislocation, CT, or MRI
- **Treatment**: immobilization for stable fractures, surgery for dislocations

c- Don’t affect the spinal cord

Answer A

18- Not risk developing osteosarcoma:

a- osteoid osteoma

b- Chronic osteomyelitis

Answer A

19- All can cause knee pain in an adult except:

a- osteochondritis dissecans

b- hypoplastic patella

Disease definition

Isolated patella aplasia-hypoplasia is an extremely rare genetic condition characterized by congenital absence or marked reduction of the patellar bone described in only a few families to date.

Answer B

20- hot bags:

a- radiation

b- conduction

c- convection

Hot bags transfer heat to their surroundings through different mechanisms. Let's assess each option:

a. Radiation: Radiation involves the transfer of heat through electromagnetic waves. Hot bags typically do not emit significant amounts of electromagnetic radiation to transfer heat.

b. Conduction: Conduction involves the transfer of heat through direct contact between materials. Hot bags primarily transfer heat through conduction when they come into direct contact with another object or surface.

c. Convection: Convection involves the transfer of heat through the movement of fluids (liquids or gases). While convection can occur in some heating systems, it is not typically the primary mechanism by which hot bags transfer heat.

Answer is B

21-Indication for hand internal fixation …. all true except:

a- comminuted fracture

b- compound fracture

c- tendon interrupted between the fracture

d- muscle interrupted

- Casting, Functional bracing, special splints.

II- Open Reduction Internal Fixation (ORIF)

Advantages of ORIF

= Allows accurate reduction and maintenance of position
= Allows early mobility of the patient and joints, thus avoiding ‘fracture disease.’ (Stiffness and edema).
= May encourage union, but only if sufficiently strong.
= Diminishes hospital time.

Disadvantages of ORIF

1-Infection
2-Operative complications due to poor technique, or poor equipment.
3-Union may be disrupted. 4-Implant failure.
5-Refracture: due to the early removal of metals implants 18- 24 m safer.
6-Further surgery may be needed to remove the device.

Types of orthopaedic implants for ORIF

1- *Screws* – inter-fragmentary compression, e.g., the malleoli.
2- *Plate and screws* – most suitable in the forearm or around the metaphysis
3- *Flexible intramedullary nails* – for long bones in children.
4- *Interlocking nail and screws* – ideal for the femur and tibia;
5- *Dynamic compression screw and plate* – ideal for the proximal and distal ends of the femur;
6- *Simple K-wires* – for fractures around the elbow and wrist
7- *Tension-band wiring* – for olecranon or fractures of the patella.
8- *Hemiarthroplasty* for fracture neck femur in elderly.

Answer is D

22-- bone grafting…., all true except:

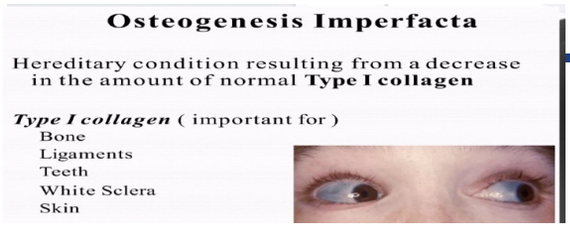
a- fresh fracture

b- old fracture

c- fill cavity

d- fill the gap

e- lengthening of long bone but not small one



Answer is B

23- The defect in osteogenesis imperfecta:

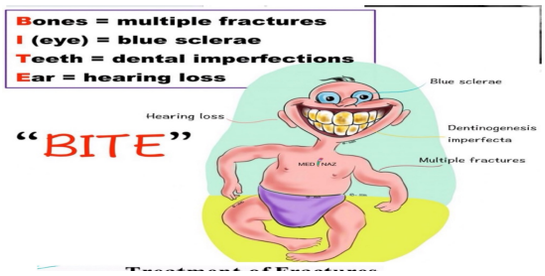
a- abnormal cross linking in collagen

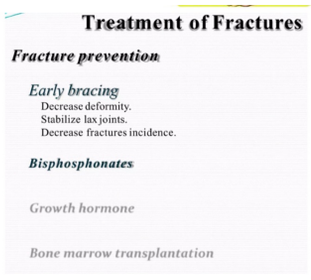
b- at the level of DNA

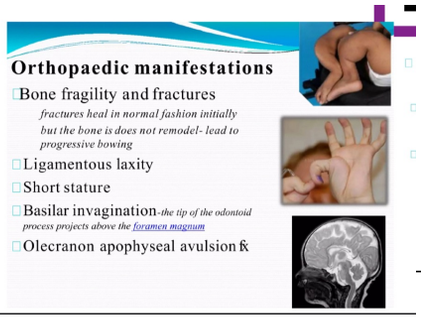
c- defect of hydroxylation

d- defect of glycosylation

e- defect of procollagen







answer is A

Others (extra fun 😬)

Slipped Capital Femoral Epiphysis (SCFE):

- Slipped capital femoral epiphysis (SCFE or skiffy, slipped upper femoral epiphysis) is a medical term referring to a fracture through the growth plate (physis), which results in slippage of the overlying end of the femur (epiphysis). Normally, the head of the femur, called the capital, should sit squarely on the femoral neck. Abnormal movement along the growth plate results in the slip. The femoral epiphysis remains in the acetabulum, while the metaphysis move in an anterior direction with external rotation.
- SCFE is the most common hip disorder in adolescence. SCFEs usually cause groin pain on the affected side, but sometimes cause knee or thigh pain. One in five cases involve both hips, resulting in pain on both sides of the body. SCFEs often occur in **obese adolescent males**, especially young Black males, although it also affects females.
- Symptoms include the gradual, progressive onset of thigh or knee pain with a painful limp. Hip motion will be limited, particularly internal rotation.
- Disorder of the proximal femoral physis that leads to slippage of the epiphysis relative to the femoral neck in the hypertrophic zone.
- Caused by weakness of the perichondral ring
- It affects obese adolescent males, especially young black males. The reason why it affects overweight patient is that they usually walk with a slight external rotation, and the anteversion becomes retroversion, so the growth plate undergoes shearing forces.
- Associated with puberty and the average age is 13 for boys and 12 for girls.
- Present with Gradual, progressive onset of thigh or knee pain (referred pain) with a painful limp (Charlie Chaplin gait/ Toes out gait).
- Hip motion will be limited, particularly internal rotation and flexion.
- Symptoms are present for months before diagnosis.
- Diagnosis: pelvic Xray
  - Epiphysiolysis (growth plate widening or lucency)
  - Klein line is a line drawn along the superior border of the femoral neck that would normally pass through a portion of the femoral head.
    - If not, slipped capital femoral epiphysis is diagnosed. → Trethowan's sign
- Treatments:
  - Surgery, either In situ fixation using screws or osteotomy if there's deformity.
  - Closed reduction is dangerous and should not be attempted.
- Complications: AVN and chondrolysis. + deformity

1- One is true about slipped epiphysis:

a- Usually due to trauma

b- Limbs is internally rotated

c- 70% are of acute onset

d- X-ray is necessary

2- One is false about medial meniscal tear

a- Usually no immediate swelling

b- Due to twisting

c- Locking

d- May cause osteochondritis if not treated

18-KNEE DISORDERS AND SPORTS

I-Meniscal injuries and diseases

A. Meniscal Tears
= Caused by axial loading with rotation, but maybe a trivial incident
= Lateral meniscus tears may be associated with ACL tears and major sports injuries.
= The medial meniscus is torn approximately three times more often than the lateral meniscus.
= Patients may complain of pain at the joint line area, locking, clicking, and giving way, and swelling with activity.
= Swelling (effusion) in the joint after 24 hours.
= Joint line tenderness to palpation
• Obtain radiographs to rule out extra-articular causes of knee pain.
Severe knee injury involving complete or partial tears of three major structures of the knee occurs with contact sports or MVA
Unhappy Triad (ACL tear + MM tear + MCL tear).
There is an increased rate of OA in knees after meniscal tears and meniscectomy.

Clinical picture
1-Instant acute swelling. 2-Audible pop or tear in the knee at the time of injury.3-Pain upon knee movement., 4-Bruising appears within a couple of days.

Types of meniscal tears.
Traumatic meniscal tears are common in young patients with sports-related injuries. Degenerative tears usually occur in older patients and can have an insidious onset. Tears in the peripheral third have the highest potential for healing MRI or arthroscopy confirms the Dx.

B. Meniscal cyst. Occur in conjunction with horizontal cleavage tears of the lateral meniscus.

C. Popliteal (Baker's) cysts
A fluid-filled cyst that occurs between the medial head of the gastrocnemius and semimembranosus tendons.
The name of Baker's cyst derives from the **London surgeon M.W. Baker**. Normally a weakening of the joint capsule exists (mostly in combination with meniscus damage).

Symptoms
Mass and pain in the posterior aspect of the knee; the mass tends to enlarge after vigorous exercise and subside during rest. Cysts are frequently associated with intra-articular pathology (i.e., meniscal tears, degenerative arthritis, or rheumatoid arthritis). 82% of popliteal cysts are associated with meniscal tears (two-thirds, medial meniscus tears; one-third, lateral)

MRI is more frequently used because it is also helpful in identifying concurrent intra-articular pathology.

11

Knee Arthroscopy
1. This is the gold standard for the diagnosis of knee disease.
2. The benefits of arthroscopic surgery include (smaller incisions, less morbidity, improved visualization, and decreased recovery time).

Complications of knee arthroscopy
1. Iatrogenic articular cartilage damage.
2. Instrument breakage, hemarthrosis, infection, and injury to the infrapatellar branches of the saphenous nerve.

3- Muscle responsible for knee movement during heel strike:

a- Hamstring

b- Calf muscle

* Dr. Ziad

*

c- Quadriceps

d- Gastrocnemius

4- Nerve injury in the axilla which is first nerve to be recovered:

a- Ulnar

b- Radial

e- Median

d- Three together

e- Variability of predilection

B ✱ المفروض

The median nerve is susceptible to injury in the axilla, particularly in cases of trauma or compression. However, compared to the radial nerve, the median nerve is positioned deeper in the axilla and may be more prone to injury in certain traumatic events or surgical procedures involving the region.

In cases of nerve injury in the axilla, the radial nerve tends to have a better prognosis for recovery compared to the median nerve due to its relatively superficial course and less vulnerable position in the axilla. Therefore, while the median nerve can certainly be affected by injuries in the axilla, it typically does not recover as quickly as the radial nerve in such cases.

5- After peripheral nerve injury, steppage gait and loss of eversion of the big toe, there is:

a- Femoral

b- Peroneal

c- Tibial

d- Sural

Peroneal nerves

- common peroneal nerve may be damaged in lateral ligament injuries when the knee is forced into varus, or by pressure from a splint or a plaster cast, or from lying with the leg externally rotated.
- The patient develops a drop-foot in which both dorsiflexion and eversion are weak, causing a tendency to trip and fall while walking. Sensation is lost over the front and outer half of the leg and the dorsum of the foot.
- superficial branch→ peroneal muscles are paralysed and eversion is lost, but dorsiflexion is intact,loss of sensation over the outer side of the leg and foot.
- deep branch → anterior compartment syndrome, sensory loss around the first web space on the dorsum of the foot.

6- One muscle is not attached to bone:

a- Lumbricals

b- Palmer interossei

c- Dorsal interossei

d- Adductor pollicis brevis

e- Flexor digiti minimi brevis

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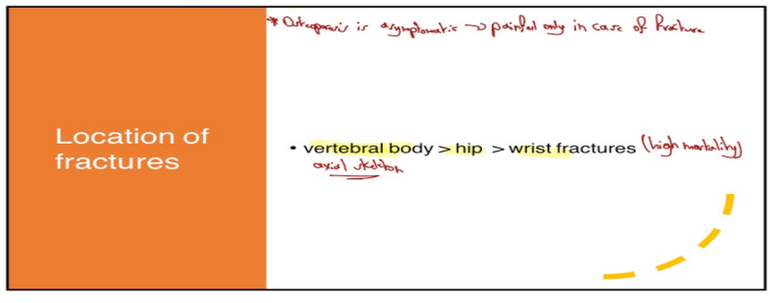
7- Most common bone to be affected With osteoporosis:

a- Femur

b- Vertebra



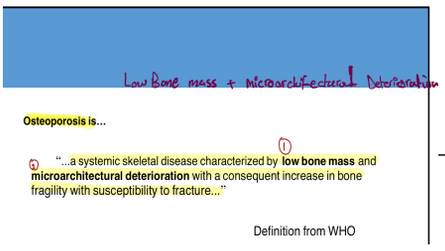
8- One is correct about osteoporosis:

a- Biochemistry is not normal

b- Can cause spontaneous fracture

c- Dietary treatment is helpful

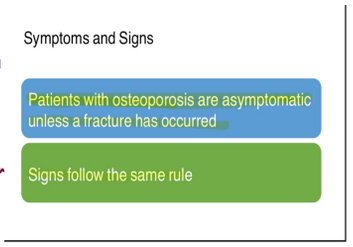
d- Splintage is effective

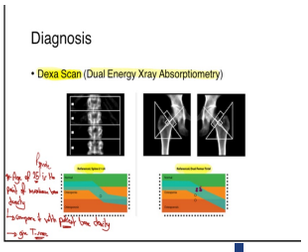


Osteoporosis is...

① "...a systemic skeletal disease characterized by **low bone mass** and **microarchitectural deterioration** with a consequent increase in bone fragility with susceptibility to fracture..."

Definition from WHO





9- The fracture in children that need operation:

a- Femur shaft

b- Femur neck

c- Bilateral forearm fracture

d- Tibia

e- Humerus

Femoral shaft:

- The femoral shaft is well padded with muscles – an advantage in protecting the bone from all but the most powerful forces, but a disadvantage in that fractures are often severely displaced by muscle pull, making reduction difficult.
- A femoral shaft fracture is a fracture of the femoral diaphysis occurring between 5 cm distal to the lesser trochanter and 5 cm proximal to the adductor tubercle
- High energy trauma.
- Diaphyseal fractures in elderly patients should be considered 'pathological' until proved otherwise
- The pelvis and knee must always be x-rayed to avoid missing an associated injury.

- Position the patient come with:
  a. Proximal segment Leg position – abducted gluteus medius and minimus , flexed by iliopsoas
  b. distal segment will be: adducted
  c. Shortening limb

- Emergency as the limb will lose a lot of blood (Significant blood loss) and could cause deformities on the long run.
- High risk of developing compartment syndrome if it was closely reduced.
- Treatment
  - stabilization of the fracture by traction and limb splinting
  - Traction and bracing → fractures in children ,contraindications to anaesthesia
  - mostly surgery (Open reduction & internal fixation or closed reduction by intramedullary nailing). In most cases it needs from 4-6 months to be completely healed.
  - Intramedullary nailing is the method of choice for most femoral shaft fractures
  - External fixation indications→ severe open injuries,multiple injuries,severe bone loss "bone transport"
- Complications
  - blood loss, shock, fat embolism and acute respiratory distress
  - Vascular injury, Thromboembolism
  - Infection

10-One is false about scaphoid fracture:

a- Clinical diagnosis is important

b- Leads to avascular necrosis

c- X-ray is diagnostic early

1-Fracture of the Scaphoid (important)

The scaphoid is the carpal bone most commonly fractured.

Physical examination

1-Scaphoid lift test (pain with a dorsal-volar shifting of the scaphoid)
2-Watson test (painful dorsal scaphoid displacement as the wrist is moved from the ulnar to a radial deviation with compression of the tuberosity).

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Radiographic evaluation

"Scaphoid view," in addition to the standard wrist series.
Initial radiographs are non-diagnostic in up to 25% of cases.

11-In hand injury one is false:

a- Early operation

b- Elevation for edema

c- Primary care for bone before skin

12-Most important substance for bone growth is:

a- PTH

b- Thyroxin

c- Androgen

d- Cortisol

e- Citrate

13-One does not have risk of malignancy:

a- Olier's disease

b- Osteoclastoma

c- Amyloidosis

d- Multiple enchondroma

14-The most important slow growing killing tumor is:

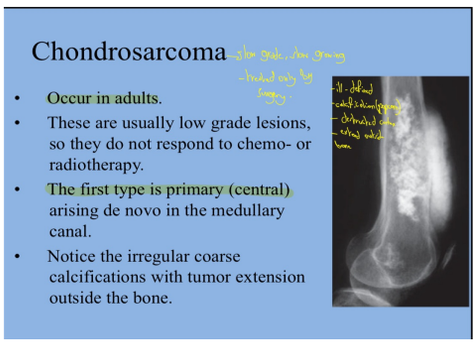
a- Chondrosarcoma

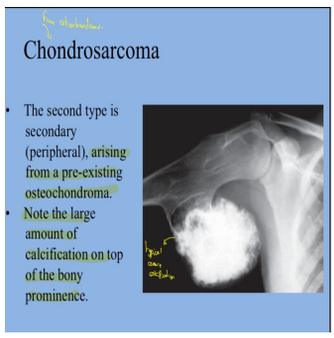
b- Ewing's sarcoma

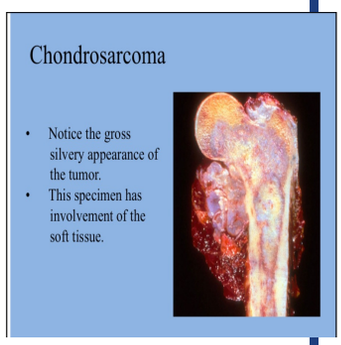
c- Malignant synovium

d- Osteosarcoma

e- Rhabdomyosarcoma







15-Which is wrong about 2ry bone tumors:

a- Hematogenous spread

b- Thyroid cancer is the most common 2ry

c- They may present with pathologic fractures

16- Which Is incorrect about septic arthritis:

a- Mostly caused by staph pyogenes

b- Can cause necrosis and destruction of bone

c- Cold lesions on bone scan has good prognosis

Option c suggests that cold lesions on a bone scan have a good prognosis in septic arthritis, which is incorrect. In fact, cold lesions on a bone scan can indicate areas of decreased blood flow or avascular necrosis, which may indicate more severe joint involvement and potentially a worse prognosis in septic arthritis. Therefore, option c is incorrect.

Septic arthritis is most commonly caused by Staphylococcus aureus (including Methicillin-resistant Staphylococcus aureus, MRSA), not Staphylococcus pyogenes. Staphylococcus pyogenes is not a common cause of septic arthritis. Therefore, option a is incorrect.

17- Which Is more likely diagnosis for 45 year old male with 2ry hx knee pain that's relieved by walking around:

a- Osteomalasia

b- Osteoporosis

c- Osteoarthrosis

d- Osteochondroma

e- Osteopetrosis

Osteochondroma is a benign bone tumor that typically presents as a painless, slow-growing mass rather than as joint pain relieved by movement. Additionally, osteochondromas are more commonly diagnosed in individuals during adolescence and early adulthood, rather than at the age of 45. Therefore, based on the symptoms described for the 45-year-old male with knee pain relieved by walking around, osteochondroma is less likely as a diagnosis compared to osteoarthrosis (osteoarthritis), which presents with symptoms consistent with the described clinical presentation.

18-All can cause knee swelling except:

a- Osteoarthrosis

b- Osteochondritis dissecans

c- Prepatellar bursitis

d- Synovial chondromatosis

e- Peripheral meniscal tear

Osteoarthritis vs rheumatoid arthritis

	Osteoarthritis A	Rheumatoid arthritis B
PATHOGENESIS	Mechanical—wear and tear destroys articular cartilage (degenerative joint disorder) → inflammation with inadequate repair. Chondrocytes mediate degradation and inadequate repair.	Autoimmune—inflammation C induces formation of pannus (proliferative granulation tissue), which erodes articular cartilage and bone.
PREDISPOSING FACTORS	Age, female, obesity, joint trauma.	Female, HLA-DR4 (4-walled "rheum"), tobacco smoking. ⊕ rheumatoid factor (IgM antibody that targets IgG Fc region; in 80%), anti-cyclic citrullinated peptide antibody (more specific).
PRESENTATION	Pain in weight-bearing joints after use (eg, at the end of the day), improving with rest. Asymmetric joint involvement. Knee cartilage loss begins medially ("bowlegged"). No systemic symptoms.	Pain, swelling, and morning stiffness lasting > 1 hour, improving with use. Symmetric joint involvement. Systemic symptoms (fever, fatigue, weight loss). Extraarticular manifestations common.*
JOINT FINDINGS	Osteophytes (bone spurs), joint space narrowing (asymmetric), subchondral sclerosis and cysts. Synovial fluid noninflammatory (WBC < 2000/mm³). Development of Heberden nodes D (at DIP) and Bouchard nodes E (at PIP), and 1st CMC; not MCP.	Erosions, juxta-articular osteopenia, soft tissue swelling, subchondral cysts, joint space narrowing (symmetric). Deformities: cervical subluxation, ulnar finger deviation, swan neck F, boutonniere G. Involves MCP, PIP, wrist; not DIP or 1st CMC.
TREATMENT	Activity modification, acetaminophen, NSAIDs, intra-articular glucocorticoids.	NSAIDs, glucocorticoids, disease-modifying agents (eg, methotrexate, sulfasalazine), biologic agents (eg, TNF-α inhibitors).

*Extraarticular manifestations include rheumatoid nodules (fibrinoid necrosis with palisading histiocytes) in subcutaneous tissue and lung (+ pneumoconiosis → Caplan syndrome), interstitial lung disease, pleuritis, pericarditis, anemia of chronic disease, neutropenia + splenomegaly (Felty syndrome), AA amyloidosis, Sjögren syndrome, scleritis, carpal tunnel syndrome.

19-All are cardinal signs for inflammation as described by Celsius except:

a- Color

b- Rubor

c- Tumor

d- Dolor

e- Loss of function

An inflammatory reaction will be provoked when infection occurs in an otherwise healthy patient. Inflammation can be recognized clinically by 5 cardinal signs: rubor (redness), calor (warmth), tumor (swelling), dolor (pain), and functio laesa (loss of function).

20-Which Is incorrect about osteoid osteoma:

a- Can cause scoliosis

b- Causes pain worse at night and relieved by antidepressants

c- Can result in limb length discrepancy

Primary bone tumors Metastatic disease is more common than 1° bone tumors. Benign bone tumors that start with o are more common in boys.

TUMOR TYPE	EPIDEMIOLOGY	LOCATION	CHARACTERISTICS
Benign tumors			
Osteochondroma	Most common benign bone tumor Males < 25 years old	Metaphysis of long bones	Lateral bony projection of growth plate (continuous with marrow space) covered by cartilaginous cap A Rarely transforms to chondrosarcoma
Osteoma	Middle age	Surface of facial bones	Associated with Gardner syndrome
Osteoid osteoma	Adults < 25 years old Males > females	Cortex of long bones	Presents as bone pain (worse at night) that is relieved by NSAIDs Bony mass (< 2 cm) with radiolucent osteoid core B
Osteoblastoma	Males > females	Vertebrae	Similar histology to osteoid osteoma Larger size (> 2 cm), pain unresponsive to NSAIDs
Chondroma		Medulla of small bones of hand and feet	Benign tumor of cartilage
Giant cell tumor	20–40 years old	Epiphysis of long bones (often in knee region)	Locally aggressive benign tumor Neoplastic mononuclear cells that express RANKL and reactive multinucleated giant (osteoclastlike) cells. "Osteoclastoma" "Soap bubble" appearance on x-ray C

Primary bone tumors *(continued)*

TUMOR TYPE	EPIDEMIOLOGY	LOCATION	CHARACTERISTICS
Malignant tumors			
Osteosarcoma (osteogenic sarcoma)	Accounts for 20% of 1° bone cancers. Peak incidence of 1° tumor in males < 20 years. Less common in older adults; usually 2° to predisposing factors, such as Paget disease of bone, bone infarcts, radiation, familial retinoblastoma, Li-Fraumeni syndrome.	Metaphysis of long bones (often in knee region).	Pleomorphic osteoid-producing cells (malignant osteoblasts). Presents as painful enlarging mass or pathologic fractures. Codman triangle D (from elevation of periosteum) or sunburst pattern on x-ray D (think of an osteocool (bone fish) swimming in the sun). Aggressive. 1° usually responsive to treatment (surgery, chemotherapy); poor prognosis for 2°.
Chondrosarcoma	Most common in adults > 50 years old.	Medulla of pelvis, proximal femur and humerus.	Tumor of malignant chondrocytes. Lytic (> 50%) cases with intralesional calcifications, endosteal erosion, cortex breach.
Ewing sarcoma	Most common in White patients, generally males < 15 years old.	Diaphysis of long bones (especially femur), pelvic flat bones.	Anaplastic small blue cells of neuroectodermal (mesenchymal) origin (resemble lymphocytes) E. Differentiate from conditions with similar morphology (eg, lymphoma, chronic osteomyelitis) by testing for t(11;22) (fusion protein EWS-FLI1). "Onion skin" periosteal reaction. Aggressive with early metastases, but responsive to chemotherapy. 11 + 22 = 33 (Patrick Ewing's jersey number).

21- All are supplied by ulnar nerve except:

a- Hypothenar

b- Adductor pollicis

c- All interossei

d- Ulner 2 lumbricals

e- Superficial head of flexor pollicis brevis

Upper extremity nerves *(continued)*

NERVE	CAUSES OF INJURY	PRESENTATION
Median (C5-T1)	Supracondylar fracture of humerus → proximal lesion of the nerve Carpal tunnel syndrome and wrist laceration → distal lesion of the nerve	"Ape hand" and "Hand of benediction" Loss of wrist flexion and function of the lateral two Lumbricals, Opponens pollicis, Abductor pollicis brevis, Flexor pollicis brevis (LOAF) Loss of sensation over thenar eminence and dorsal and palmar aspects of lateral 3 1/2 fingers with proximal lesion
Ulnar (C8-T1)	Fracture of medial epicondyle of humerus (proximal lesion) Fractured hook of hamate (distal lesion) from fall on outstretched hand Compression of nerve against hamate as the wrist rests on handlebar during cycling	"Ulnar claw" on digit extension Radial deviation of wrist upon flexion (proximal lesion) ↓ flexion of ulnar fingers, abduction and adduction of fingers (interossei), thumb adduction, actions of ulnar 2 lumbrical muscles Loss of sensation over ulnar 1 1/2 fingers including hypothenar eminence
Recurrent branch of median nerve (C5-T1)	Superficial laceration of palm	"Ape hand" Loss of thenar muscle group: opposition, abduction, and flexion of thumb No loss of sensation

Humerus fractures, proximally to distally, follow the ABM (Axillary → Radial → Median) nerves

22- Sprain for anterior talofibular ligament is due to:

a- Inversion

b- Eversion

Inversion (lateral) ankle sprain

- The most common type of ankle sprain occurs when the foot is inverted too much, affecting the lateral side of the foot. When this type of ankle sprain happens, the outer, or lateral, ligaments are stretched too much. The anterior talofibular ligament is one of the most commonly involved ligaments in this type of sprain. Approximately 70-85% of ankle sprains are inversion injuries.
- When the ankle becomes inverted, the anterior talofibular and calcaneofibular ligaments are damaged. This is the most common ankle sprain.

c- Planter flexion and inversion

d- Dorsiflexion and eversion

e- Dosriflexion and eversion and pronation

23- All are true about osteochondritis dissecans except:

a- More common in young adults

b- Trauma is the cause

c- Most common site is the lateral part of medial femoral condyle

d- More in convex surfaces

e- Trochlea of elbow can be involved

The condition usually occurs in adolescents and young adults and the classic example is **osteochondritis dissecans** of the lateral part of the medial femoral condyle at the knee. Similar lesions are seen at the anteromedial corner of the talus, the superomedial part of the femoral head, the humeral capitellum (Panner's disease), the head of the second metatarsal (Freiberg's disease) and the carpal lunate (Kienböck's disease).
The patient usually complains of intermittent pain; swelling and a small effusion in the joint. If the necrotic fragment becomes completely detached (not uncommon in osteochondritis dissecans) it may cause locking of joint or episodes of 'giving way' in the knee or ankle.
These conditions nearly all present with an insidious onset of pain referred to the location of the bony damage. Some, notably Kienbock's disease of the wrist, may involve considerable swelling, and Legg-Calvé-Perthes disease of the hip → limp. The spinal form, Scheuermann's disease, may cause bending, or kyphosis of the upper spine, giving a "hunch-back" appearance

Imaging

- Early changes → best shown by MRI
- Late → X-ray changes come later. The ischaemic or dissecting fragment is defined by a radiolucent line of demarcation. When it separates, the resulting 'crater' may be obvious

Treatment

Treatment in the early stage consists of load reduction and restriction of activity.
In young people complete healing may occur, though it can take up to 2 years. For a large joint like the knee, it is generally recommended that partially detached fragments be pinned back in position after roughening of the base, while completely detached fragments should be pinned back only if they are completely preserved.

24- Which Is not true about osteochondritis dissecans:

a- The most common cause for loose bodies in young adults

b- Calcaneal apophysis could be Involved

c- Anteromedial comer of talus can be involved

d- When it occurs this is crtain that the cancer returned

25- All are true about subtrochanteric fracture except:

a- Extracapsular

b- More in young adults

c- Commonly comminuted

d- Can be cause by malignancy

Differential diagnosis of hip pain in adult

1-Spine:
- Mechanical back pain → buttock or groin pain.
- Radiculopathy, shooting pains extending below the knee.

2-Knee: knee pathology → thigh pain or limping.
3-Tumor: bony metastases are very common!
4-Stress fracture: NOF in runners, subtrochanteric fractures occur in elderly patients on bisphosphonates due to inhibition of bone remodeling.
5-Greater trochanteric bursitis

26- All are true about supracondylar humeral fracture except:

a- Distal fragment is displaced anteriorly

b- Can result in nerve injuries

c- Compartment syndrome is common

Supracondylar fractures These are among the commonest fractures in children. The distal fragment may be displaced and/ or tilted either posteriorly or anteriorly, medially or laterally; sometimes it is also rotated. Posterior displacement and tilt is the commonest (95% of all cases), suggesting a hyperextension injury, usually due to a fall on the outstretched hand.

- Vascular injury → brachial artery, compartment syndrome
- Nerve injury → median nerve
- Malunion → common → Cubitus varus or cubitus valgus

27- All are true about metatarsus adductus (→ in-Toeing) except:

a- Metatarsal are medially rotated over cuneiforms

b- Presents in the first year of life

c- Found in congenital vertical talus

d- The most common congenital foot deformity

Metatarsus adductus:

- Varies from a slightly curved forefoot to something resembling a mild clubfoot. In contrast to clubfoot, the deformity here is limited to the forefoot.
- The majority (90%) either improve spontaneously or can be managed non-operatively using serial corrective casts followed by straight-last shoes.

28- All are true about Perthes disease except:

a- Rare in blacks

b- Bilateral in males 7:1 females

c- Present mostly at 4-8 years

11. Legg-Calvé-Perthes Disease (LCPD).

1. Definition: non-inflammatory idiopathic AVN of the femoral head in a growing child, caused by temporary cessation of the blood flow to the femoral head resulting in venous occlusion and necrosis of the femoral head.

2. Epidemiology
a. The disease more commonly affects boys than girls (5:1).
b. The hips are involved **bilaterally in 10%** to 12% of cases.

3. Patho-anatomy
1. Etiology: The exact cause of LCPD is not known
a. Disruption of the vascularity of the capital femoral epiphysis.
b. Hydrostatic pressure theory.
Reactive synovitis → capsular distension → compression on retinacular vessels
c. Thrombophilia(protein C and S def.)
d. Microtrauma or passive smoking (affects fibrinolysis)

2. Risk factors (Susceptible child)
* Boys (80%). * Poor Social class.
* Short stature with delayed bone age (usually by two years). (90%)
* The child is often thin, and very active. * Smaller than his age group.

4. Pathology.
The capital epiphysis and physis are abnormal histologically, with disorganized cartilaginous areas of hypercellularity and fibrillation.

5. Evaluation
1. Clinical presentation
a. Age 4-9 years.
b. Commonly have a limp and pain in the groin, hip, commonly thigh, or knee regions (referrol pain).

2. Physical examination
a. Abnormal gait (antalgic). b. Decreased abduction and internal rotation.
c. Late Limb-length inequality, is mild due to femoral head collapse.

3. Diagnostic tests
a. Plain Radiographs.
Standard AP and frog-leg lateral views of the pelvis are critical in making the initial diagnosis and assessing the subsequent clinical course. (best)

Radiographic Feature (according to the stage)
• Widening of the joint space and minor subluxation
• Sclerosis
• Caffey's sign (Salter), a subchondral # (Crescent sign) on lateral X-ray, (an anterolateral aspect of the femoral capital epiphysis).
• Fragmentation and focal resorption of the epiphysis.
• Loss of epiphyseal height.

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• Widening of the femoral neck & head (coxa magna).
• Lateral uncovering of the femoral head.
• Metaphyseal cyst formation.
• Sagging rope sign in adults.

Radiographic stages (Waldenstrom)
a-Necrosis. (Ischemia stage).
b-Fragmentation stage (Revascularization)
c-Re ossification stage (healing)
d-Final stage (Remodeling).
N.B: In general, necrotic and fragmentation stages last approximately six months each, the re-ossification stage 18 months, and the remodeling stage 3 years.

Late Stage
= Coxa magna = High-riding trochanter
=Flattened femoral head =Irregular articular surface

Other imaging studies:
Bone scans, MRIs, and arthrography are not routinely necessary.

29- All can cause back pain in children except:

a- Spondylolisthesis

b- Idiopathic scoliosis

c- Spinal cord tumors

d- Discitis

e- Eosinophilic granuloma

Structural Scoliosis

Causes: (idiopathic ,congenital , neuromuscular)
Idiopathic (infantile, juvenile , adolescent)
It is a non-correctable 3D deformity.
A True leg length discrepancy is present, and gets worse upon flexion.
Rotation of the spinous processes and the transverse processes.
#It is an asymptomatic diseases, incidental finding, most common type is idiopathic adolescent scoliosis .
If painful scoliosis present, think of underlying etiology like osteoid osteoma
Scoliosis is a progressive disease .

30- One is true about normal gait cycle:

a- Swing phase is longer than stance Dr. Ziad

b- 20% double support

c- Hamsring is the most important for midstance

31- All are correct about use of ice packs in soft tissue injury except:

a- Applied for 20-30 min

b- Freq Q 2-4 hours

c- Total period of 5-7 days

d- Not applied directly on skin

e- Needs also compression

c. Principles
i. Ice should never be applied for longer than 20-30 minutes
ii. Ice packs administration : For 15- 20 min. Every 1-1.5 hour.
iii. Ice massage : 7 -10 min each time .
iv. Cold water used in temp. of (4- 8 C)
v. Ice therapy used in the first 48- 72 h (acute phase)
vi. Used for distal injuries, soft tissue injuries in hands and feet .
vii. Cold Spray used for rapid relief of pain but you have to r/o significant trauma

32- The most important step in rehabilitation after THR is:

a- Muscle stretching

b- Muscle strengthening

c- Muscle reeducation

d- Sensory reeducation

33- All are true about meniscal injury except:

a- Diagnosis can be made even in absence of clinical signs

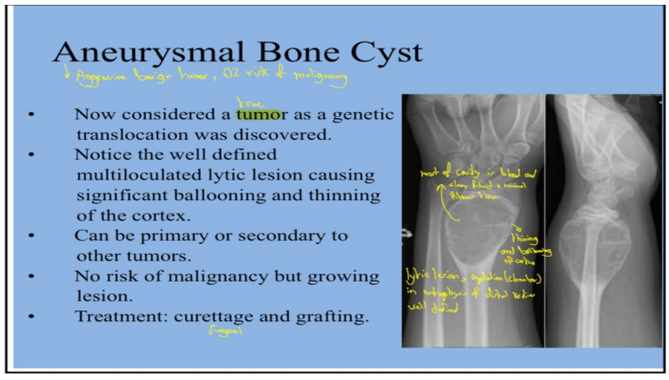
b- Medial meniscus is the most commonly injured

34- All are true about aneurysmal bone cyst except:

a- Cortical thinning

b- Metastasis

c- Air fluid level



35- All can cause frozen shoulder except:

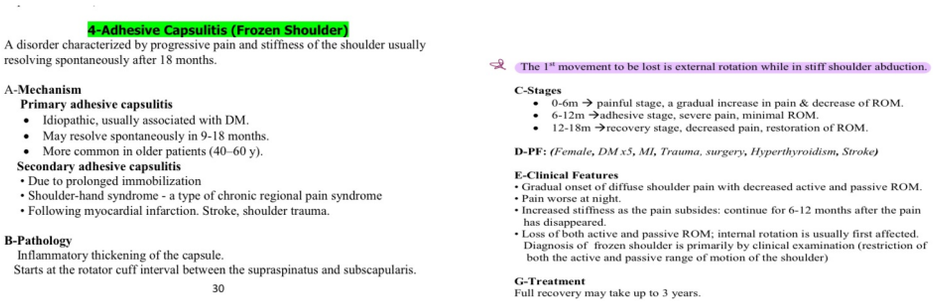
a- DM

b- Antiepileptica

c- Dupuytren's disease

d- Hyperlipidemia

e- Repeated shoulder dislocations



36- All can be found in late diagnosed DDH

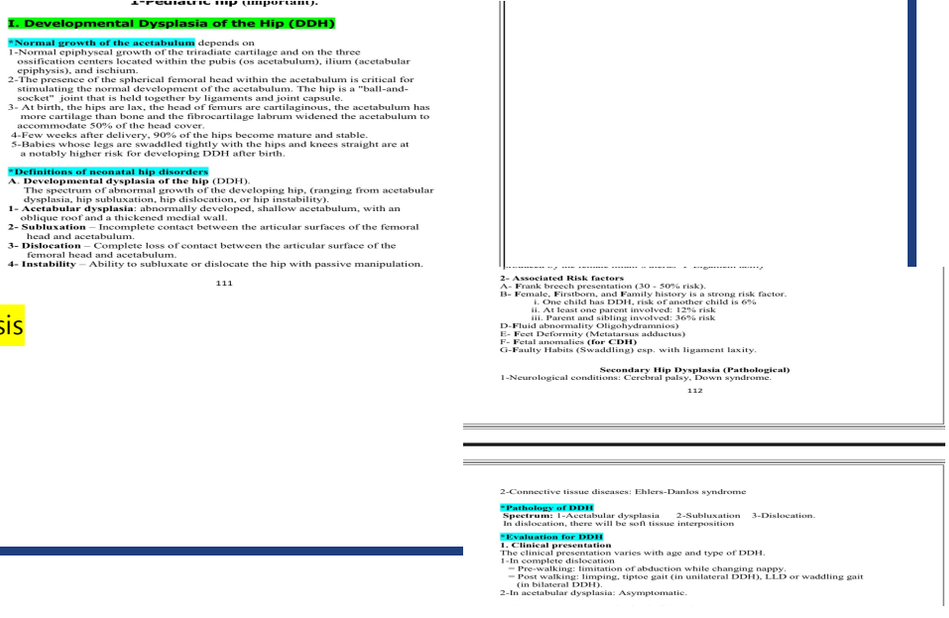
a- Femoral anteversion

b- Femoral head and neck in vulgus

c- Dysplastic acetabulum

d- Delayed ossification of femoral head epiphysis

e- Fibro Fatty substance in hip joint



37- All are true about shoulder dislocation except:

a- Post dislocation is the most common

b- Avulsion of greater tuberosity can result

c- Results from fall on outstretched hand

Shoulder dislocation has 3 types:

1. Anterior dislocation (95% of cases)
   a. Mechanism
      i. Indirect: fall on abducted extended and externally rotated shoulder
      ii. Over-head throwing e.g. Hand Ball
      iii. Direct blow from behind
   b. Sub-coracoid dislocation(most common)
2. Posterior dislocation (5% of cases) → in electric shock or convulsion
3. Inferior dislocation (less than 1%, very very rare)
4. Multidirectional (habitual): due to ligament laxity, painless

Presentation :

- Severe pain due to disruption of the capsule which will irritate the nerves
- Decreased range of motion (the patient can't move his arm)

38- Which is not true about tibial shaft fracture:

a- Ankle stiffness is uncommon

b- Foot lies outwards

c- Compartment syndrome is common

d- Common in young

Fractures of the tibia and fibula

- A twisting force causes a spiral fracture of both leg bones at different levels;
- an angulatory force produces short oblique fractures, usually with a separate triangular 'butterfly' fragment.
- Because of its subcutaneous position, the tibia is more commonly fractured, and more commonly sustains an open fracture, than any other long bone.
- alert for signs of an impending compartment syndrome
- Management
  - limit soft-tissue damage
  - obtain and hold fracture alignment
  - recognize a compartment syndrome.
  - start early weightbearing (loading promotes healing).and start joint movements as soon as possible
- Tx
  - undisplaced or minimally displaced → full-length cast from upper thigh to metatarsal necks is applied with the knee slightly flexed and the ankle at a right angle.
  - displaced fracture needs reduction
  - Locked intramedullary nailing: this is the method of choice for diaphyseal (shaft) fractures
    - Internal fixation "Closed intramedullary nailing" for unstable tibial fractures.
  - Active movements and partial weightbearing should be started soon after operation
  - External fixation can be used
- Compartment syndrome
  - Tibial fractures – both open and closed – and intramedullary nailing are the commonest causes of compartment syndrome in the leg
  - increasing pain and a feeling of tightness,Numbness,absent pulses
  - Once the diagnosis is made, decompression by open fasciotomy should be carried out with the minimum delay
  - Tibial compartment decompression requires two incisions, one medial and one lateral, to reach all compartments in the leg

39- The most common site for volar ganglion at the wrist is:

a- Between flexor carpi radialis and abductor pollicis longus at scaphotrapezoid joint

40- Which is incorrect about compartment syndrome:

a- Weakness in muscles of compartment

b- Tight skin

c- Present pulses doesn't rule it out

d- More in closed fractures

e- No compartment syndrome in arm fracture as a rule

41-A child victim of RTA with femoral shaft fracture and shortening what's the best treatment:

↳ ORIF

a- Skeletal traction

b- Skin traction

c- ORIF (open reduction and internal fixation)

d- External fixation

42- All true about cubitus valgus except:

Cubitus valgus (carrying angle > 15°) → ulnar abduction → wrist adduction

a- This ugly deformity worsens when the elbow is flexed

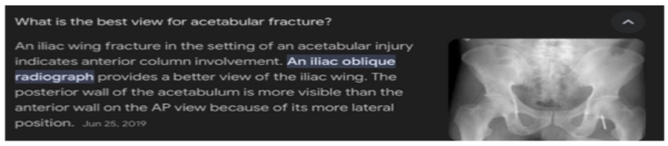
↳ Extension

43- The best x-ray view for anterior column acetabular fracture is:

a- AP view

b- Obturator oblique view

c- Inlet view



44- Which Is incorrect about myelomeningocele:

a- M>F

b- Mostly lumbar

c- Due to environmental and genetic factors

d- Associated with Arnold-Chiari malformation type II in 100% of cases

e- Can occur due to carbamazepine treatment during pregnancy

Open spinal dysraphism

Meningocele	• Meninges (without neural tissue) herniate through vertebral bone defect.	• Most commonly affects the lower lumbar and/or sacral region • Neurological symptoms vary depending on the location and extent of neuronal damage. ◦ Motor loss, flaccid paralysis (rare) ◦ Sensory deficits ◦ Bladder and bowel dysfunction	• ↑ AFP
Myelomeningocele	• Meninges and parts of the spinal cord herniate through the vertebral bone defect. • Characteristic feature of Chiari II malformation • Associated with maternal diabetes and folate deficiency		• ↑ AFP
Myeloschisis (rachischisis)	• Portions of the neural tube completely fail to fuse, leading to bare, exposed neural tissue without coverage of meninges, bones, or skin. • Most severe subtype	• Additional symptoms ◦ Hydrocephalus (common) ◦ Associated skeletal malformations, especially of the spine and lower extremities (e.g., club foot, sacral dimpling), joint contractures, back pain ◦ Developmental delays, cognitive impairment, progressive neurological symptoms	• ↑ AFP
Myelocele	• Parts of the spinal cord (without meningeal coverage) herniate through the vertebral bone defect.		• ↑ AFP

45- All can be associated with lumbar canal stenosis except:

a- Old age

b- Restricted spinal flexion

c- Spinal claudications

d- Back pain radiating to LL

Clinical features:
- Backache
- numbness and paraesthesia in the thighs, legs or feet
- spinal claudication → after standing upright or walking for 5–10 minutes and are consistently relieved by sitting or squatting with the spine somewhat flexed
- The pain is relieved when the patient flexes the spine by, for example, leaning on shopping carts or sitting. Flexion increases canal size by stretching the protruding ligamentum flavum, reduction of the overriding laminae and facets, and enlargement of the foramina. This relieves the pressure on the exiting nerve roots and, thus, decreases the pain.
- Symptoms are sometimes unilateral, suggesting an asymmetrical stenosis or intervertebral root canal stenosis.

Imaging → CT or MRI

46- All are indicators for surgery for disc prolapsed except:

a- Urinary retention

b- Neurological signs

c- Failure of medical treatment

d- Intermittent claudications

e- Severe scoliosis

Treatment is conservative unless surgery is indicated in cases of:
1. not responding to conservative treatment (pain can't be tolerated anymore)
2. developing weakness, paresthesia or urinary or stool incontinence.
3. cauda equina

The surgery is done to protect the nerve NOT to cure back pain (because the fissure is already there, it will not go away).
If conservative measures fail, then discectomy is the treatment of choice
Before surgery patient should rest for 2 days (inflammatory phase). Rest of more than 1 week will make the condition worse.

47- One is false about chronic osteomyelitis:

a- Bacterial usually found

b- May cause amyloidosis

c- Usually hypodense with thin cortex

IV-Chronic Osteomyelitis (>3 weeks)

Causative organism; Staphylococcus Aureus

Pathology
- **Sequestrum: an** avascular piece of bone surrounded by granulation tissue (it is pathognomic of chronic osteomyelitis).
- **Involucrum:** is dense sclerotic new bone surrounding the sequestrum
  At least 2/3rd the surface of sequestrum should be surrounded by involucrum before carrying out sequestrectomy.
- **Cloaca (sinus).**

Treatment
- Remove the sequestrum (Sequestrectomy)
- Identify the organism and control the infection (most important step)
- Fill the gap (Bone graft /Bone cement)
- Provide good soft tissue coverage.

d- Surgery is required

48- One is false about understanding infection in children:

a- Intercostals artery supplying two vertebra

b- Some bones are intracapsular

c- Thick periosteum

d- Persistence of metaphyseal vessels for 5 years

49- One is false about clubfoot:

a- Vertical talus

b- Inversion of hind foot

*Above

c- Supination

d- Adduction

e- Tight tendo Achilles

50- One is false about flat foot:

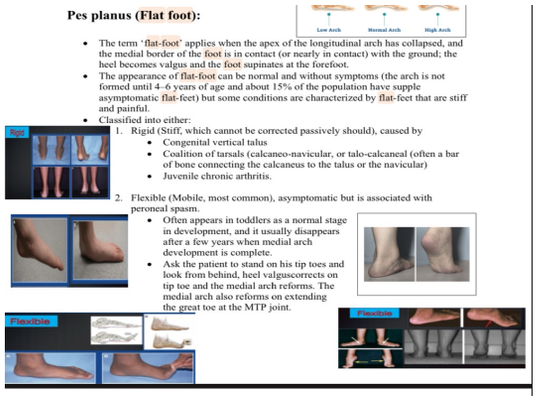
a- May occur in rickets

b- Causes severe pain after walking

c- There is 5 arches

d- May required correction

e- Associated with vertical talus



Pes planus (Flat foot):

- The term 'flat-foot' applies when the apex of the longitudinal arch has collapsed, and the medial border of the foot is in contact (or nearly in contact) with the ground; the heel becomes valgus and the foot supinates at the forefoot.
- The appearance of flat-foot can be normal and without symptoms (the arch is not formed until 4–6 years of age and about 15% of the population have supple asymptomatic flat-feet) but some conditions are characterized by flat-feet that are stiff and painful.
- Classified into either:

1. Rigid (Stiff, which cannot be corrected passively should), caused by
   - Congenital vertical talus
   - Coalition of tarsals (calcaneo-navicular, or talo-calcaneal (often a bar of bone connecting the calcaneus to the talus or the navicular)
   - Juvenile chronic arthritis.
2. Flexible (Mobile, most common), asymptomatic but is associated with peroneal spasm.
   - Often appears in toddlers as a normal stage in development, and it usually disappears after a few years when medial arch development is complete.
   - Ask the patient to stand on his tip toes and look from behind, heel valguscorrects on tip toe and the medial arch reforms. The medial arch also reforms on extending the great toe at the MTP joint.

Flexible

Flexible

- Clinical assessment:
  - In the common flexible flat feet, there are usually no symptoms, but the parents notice that the feet are flat or that the shoes wear badly.
  - The deformity becomes noticeable when the youngster stands. The first test is to ask him or her to go up on their toes: if the heels invert and the medial arches forms up, it is a flexible (or mobile) deformity. This can also be checked by performing the jack test (also called the great toe extension test (toe raise)): with the child seated, feet planted firmly on the floor, the examiner firmly dorsiflexes the great toe; the medial arch should re-appear while the heel adopts a more neutral position and the tibia rotates externally.
  - A tight Achilles tendon may induce a compensatory flat-foot deformity.
- X-rays are unnecessary for asymptomatic, flexible flat feet.
  - If painful or stiff flat feet → use x-ray
  - If tarsal coalitions → CT
- Treatment:
  - Physiologic "flexible" flat foot: reassurance "deformity' will probably correct itself out if young enough". (Medial arch support only if there was genuine medial foot pain, but this doesn't get rid of the flat foot deformity.) remember 15-25% of adults have flexible flat feet.
  - Rigid type might need surgery if symptomatic enough however we always start conservatively

51- Most important feature for prosthesis is:

a- Cosmetic

b- Functions well

c- Cost

52- One is false about rotator cuff syndrome:

a- Mostly infraspinatus is involved

↳ supra-spinatus

53- Drop arm affect in:

a- Complete rotator cuff tear

b- Calcified supraspinatus tendon

c- Fracture of coracoid process

Drop arm sign

1. Support pt arms from below then suddenly un-support it
2. positive → if dropped immediately without delay
3. Negative → if dropped after a period of time
4. if +ve → full tendon rupture
5. if -ve → no rupture, possible partial/ full thickness tear

54- One is false about Perthes disease:

a- Age usually 4-8 years

b- Severe and continuous pain

c- Increase density is an early feature on X-ray

d- Lateral subluxation is bad prognosis

11. Legg-Calvé-Perthes Disease (LCPD).

1. Definition: non-inflammatory idiopathic AVN of the femoral head in a growing child, caused by temporary cessation of the blood flow to the femoral head resulting in venous occlusion and necrosis of the femoral head.

2. Epidemiology
a. The disease more commonly affects boys than girls (5:1).
b. The hips are involved **bilaterally in 10%** to 12% of cases.

3. Patho-anatomy
1. Etiology: The exact cause of LCPD is not known
a. Disruption of the vascularity of the capital femoral epiphysis.
b. Hydrostatic pressure theory.
Reactive synovitis → capsular distension → compression on retinacular vessels
c. Thrombophilia(protein C and S def.)
d. Microtrauma or passive smoking (affects fibrinolysis)

2. Risk factors (Susceptible child)
* Boys (80%). * Poor Social class.
* Short stature with delayed bone age (usually by two years). (90%)
* The child is often thin, and very active. * Smaller than his age group.

4. Pathology.
The capital epiphysis and physis are abnormal histologically, with disorganized cartilaginous areas of hypercellularity and fibrillation.

5. Evaluation
1. Clinical presentation
a. Age 4-9 years.
b. Commonly have a limp and pain in the groin, hip, commonly thigh, or knee regions (referred pain).

2. Physical examination
a. Abnormal gait (antalgic). b. Decreased abduction and internal rotation.
c. Late Limb-length inequality, is mild due to femoral head collapse.

3. Diagnostic tests
a. Plain Radiographs.
Standard AP and frog-leg lateral views of the pelvis are critical in making the initial diagnosis and assessing the subsequent clinical course. (best)

The 1st movement to be lost is external rotation while in stiff shoulder abduction.

C-Stages
- 0-6m → painful stage, a gradual increase in pain & decrease of ROM.
- 6-12m →adhesive stage, severe pain, minimal ROM.
- 12-18m →recovery stage, decreased pain, restoration of ROM.

D-PF: *(Female, DM x5, MI, Trauma, surgery, Hyperthyroidism, Stroke)*

E-Clinical Features
- Gradual onset of diffuse shoulder pain with decreased active and passive ROM.
- Pain worse at night.
- Increased stiffness as the pain subsides: continue for 6-12 months after the pain has disappeared.
- Loss of both active and passive ROM; internal rotation is usually first affected. Diagnosis of frozen shoulder is primarily by clinical examination (restriction of both the active and passive range of motion of the shoulder)

G-Treatment
Full recovery may take up to 3 years.

55- Bilateral intermittent claudication is caused by all except:

a- Low spinal tumors

b- Vascular injury

c- Vertebral osteoma

d- Central disc prolapses

Bilateral intermittent claudication is typically associated with vascular issues, such as peripheral artery disease (PAD) or atherosclerosis affecting the lower extremities, rather than vertebral osteoma. While spinal tumors and central disc prolapses can potentially cause compression of spinal nerves leading to claudication, vertebral osteoma specifically is less likely to cause this symptom. Therefore, option c is false.

A vertebral osteoma is a benign bone tumor that typically arises from the cortical bone of the vertebrae. It is composed of mature bone tissue and usually does not cause symptoms. Vertebral osteomas are often incidental findings on imaging studies performed for other reasons.

In rare cases, if a vertebral osteoma grows large enough or if it compresses nearby structures such as nerves or the spinal cord, it may cause symptoms such as pain or neurological deficits. However, these instances are uncommon, and vertebral osteomas are generally considered benign and asymptomatic.

(Not sure about it)

56- One will differentiate minor from major causes:

a- Bending test

b- X-ray

ممكن عارفة شو يرد السؤال .

57- One is not differential diagnosis for cystic bone lesion (small bone):

a- TB

b- Sarcoidosis

c- Prostatic neoplasm

d- Hyperparathyroidism

e- Sickle cell anemia

مفروغ

58- The nerve to be injured in cubitus valgus:

a- Ulnar nerve

b- Median nerve

c- Radial nerve

Ulnar somatic dysfunctions

- **Ulnar abduction dysfunction**
  - Lateral deviation of the forearm at the elbow: medial deviation of the olecranon, lateral deviation of the distal ulna
  - Adduction of the wrist
- **Ulnar adduction dysfunction**
  - Cubitus varus: decreased carrying angle < 3°
  - Medial deviation of the forearm at the elbow: lateral deviation of the olecranon, medial deviation of the distal ulna
  - Abduction of the wrist
- **Ulnar deviation dysfunction**
  - Radial deviation restriction
  - Ulnar deviation freedom of motion

The ulna and the wrist move in opposite directions.

Cubitus valgus (carrying angle > 15°) → ulnar abduction → wrist adduction

Cubitus varus (carrying angle < 3°) → ulnar adduction → wrist abduction

59- The view used to diagnose anterior acetabular fracture:

a- Tangential

b- Oblique

c- Lateral view

d- Inlet view

60- One is not assign of osteosarcoma:

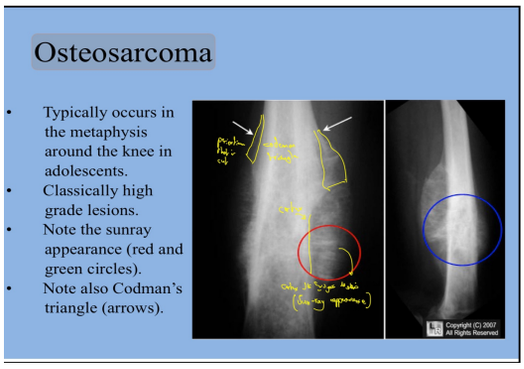
a- Sun rays appearance

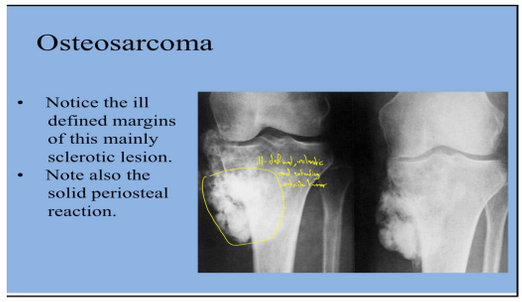
b- Egg shell appearance

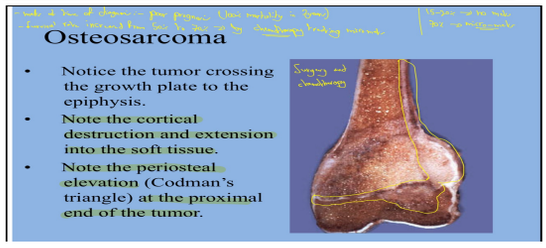
c- Calcification

d- Codman's triangle

e- Honeycomb







61-Regarding clavicle what's false:

a- Union between medial end and the rest ossification center occurs between 13-25 years old

At what age does the clavicle ossify?

Furthermore, it is estimated that 80% of the longitudinal growth of the clavicle occurs from the medial physis [16, 24] and that the medial epiphysis does not complete ossification until about **20 years of age** and does not fully fuse until 23 to 25 years of age [9, 16, 18]. Apr 26, 2020

62- On pelvic fracture what's wrong:

a- Injuries of the pelvis ..... are more dangerous than the associated soft tissue injury

63- In pelvic fracture the most dangerous immediate complication is:

a- Hemorrhage

The most dangerous immediate complication of pelvic fracture is typically pelvic hemorrhage, specifically from injury to the major pelvic blood vessels. Pelvic fractures can disrupt the pelvic ring, leading to injury to large blood vessels such as the iliac vessels, the superior gluteal artery, or the internal iliac artery and its branches. This can result in significant bleeding, leading to hypovolemic shock and potentially life-threatening hemorrhage if not promptly addressed. Therefore, pelvic hemorrhage is considered the most dangerous immediate complication of pelvic fractures.

64- Most common site of osteochondritis dissecans:

a- Medial Femoral condyle

Osteochondritis Dissecans (OCD)

Definition:
A small segment of bone and the cartilage begins to separate from its surrounding region in the joint, due to a lack of blood supply.

Epidemiology
- Juvenile form aged 5-15 years.
- Older adolescents and adults from the disease.
- Occurs in the knee 75%, the elbow 6%, and the ankle 4%.
- In the knee, OCD occurs in the medial femoral condyle 75% of the time.
- In the ankle, OCD occurs in the posteromedial aspect of the talus 56% of the time and in the anterolateral aspect of the talus 44% of the time.

Etiology
- *Multifactorial elements.*
- *Trauma*
  - Indirect trauma in case of knee OCD
  - In the ankle, traumatic insult is 90%.
  - In elbow OCD repetitive microtrauma

Symptoms
Pain and swelling of a joint, often brought on by sports or physical activity, in late cases of OCD may cause joint catching or locking.

65- False about osteochondritis dissecans:

a- More common in elderly

66- Best treatment for osteoporosis is:

a- Bisphosphonate

B- **Pharmacologic Agents**

1-Calcium and Vitamin D (for all patients)

Decreases bone resorption but does not increase bone mass or density

Evidence to suggest modest protective effect – more effective for type II osteoporosis.

2-Bisphosphonates (1st line therapy)

Decrease osteoclastic bone resorption, and increased osteoclast apoptosis

- ***Denosumab (Prolia),*** 60 mg given subcutaneously every 6m for 2-3 years.

Decrease bone loss	Halt bone loss	Bone gain
Bisphosphonates	Ca, Vit D Alendronates (Fosamax) Mild exercise Zoledronic acid Risedronate (Actonel) Denosumab (Prolia)	Fluoride + Ca, Vit.D Extensive exercise

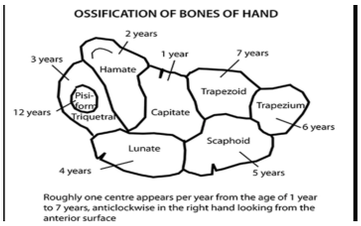
67- Best treatment for femoral shaft fracture:

a- Internal fixation

- Treatment
  - stabilization of the fracture by traction and limb splinting
  - Traction and bracing → fractures in children ,contraindications to anaesthesia
  - mostly surgery (Open reduction & internal fixation or closed reduction by intramedullary nailing). In most cases it needs from 4-6 months to be completely healed.
  - Intramedullary nailing is the method of choice for most femoral shaft fractures
  - External fixation indications→ severe open injuries,multiple injuries,sever bone loss "bone transport"

68- The first bone to ossify in the carpal bones is the:

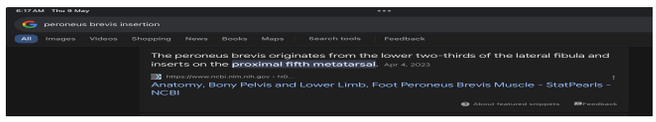
a- Capitates



Bone	Age of ossification
She – Scaphoid	5years
Looks - Lunate	4 years
Too - Triquetrum	3 years
Pretty - Pisiform	12 years
Try - Trapezium	5 years
To - Trapezoid	5 years
Catch - Capitate	1 year
Her - Hamate	1 year

69- The muscle inserted in tn the bone of the 5th metatarsal bone is:

a- Peroneus brevis



70-Most common tumor in hand is:

a- Enchondroma

1- Enchondroma

- Small bones in the hands and feet can be painful after a fracture. 50% in hands (most common bone tumor in hand).
- In the medullary cavity of long bones, noted incidentally (If painful suspect low-grade ch. sarcoma). The incidence of malignancy is <1%.

Imaging appearance,

A well-defined, Lucent, central medullary lesion.

The classic radiographic appearance involves rings and stippled calcifications within the lesion: popcorn appearance or salt and pepper appearance.

The cortices in hand enchondromas may be thinned and expanded.

A periosteal chondroma: a surface lesion that creates a defect in the cortex.

Cortical thickening or destruction suggests chondrosarcoma.

Treatment: Asymptomatic → no treatment, otherwise curettage, and bone graft

Related conditions:

I-Ollier disease: Multiple enchondromas

II-Maffucci syndrome: Multiple enchondromas and soft-tissue hemangiomas.

71- False about humeral supracondylar fracture:

a- Rarely associated with nerve and vascular injury

5- Supracondylar Fractures of the Humerus

Types: Extension 95% (distal fragment is displaced posteriorly)
Flexion 5% (distal fragment is displaced anteriorly).

Clinical Features

• Pain, swelling, point tenderness.

• Neurovascular Injury- assess median and radial nerve, radial artery

Investigations: X-rays: AP, lateral of the elbow; assess for fat pad sign

Specific Complications

• Brachial A. injury, Ant. interosseous N, compartment syndrome (leads to Volkmann's ischemic contracture), Cubitus Varus (distal fragment tilted into Varus)

3. Supracondylar Fractures

- More common in children.
- The brachial artery runs just above the condyles of the humerus.
- Also, the median nerve might be injured in the case of a supracondylar fracture.
- The elbow is second only to the distal forearm for frequency of fractures in children. Most of these injuries are supracondylar fractures, the remainder being divided between condylar, epicondylar and proximal radial and ulnar fractures.
- Boys are injured more often than girls and more than one half of the patients are under 10 years old.
- The usual accident is a fall directly on the point of the elbow or onto the outstretched hand with the elbow forced into valgus or varus. Pain and swelling are often marked
- Supracondylar fractures These are among the commonest fractures in children. The distal fragment may be displaced and/ or tilted either posteriorly or anteriorly, medially or laterally; sometimes it is also rotated. Posterior displacement and tilt is the commonest (95% of all cases), suggesting a hyperextension injury, usually due to a fall on the outstretched hand.
- If there is even a suspicion of a fracture, the elbow is gently splinted in 30 degrees of flexion to prevent movement and possible neurovascular injury during the x-ray examination
- Posteriorly displaced fractures tx "associated with severe swelling" → reduction under general anaesthesia → the arm is held in a collar and cuff.
- Complications

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- Vascular injury → brachial artery, compartment syndrome
- Nerve injury →median nerve.
- Malunion → common → Cubitus varus or cubitus valgus

72- True about shoulder dislocation:

a- Axillary nerve injury

73- False about ankle injuries:

a- Most common in 3rd degree-complete tear of the lateral collateral ligament

2-Ankle fractures (important)

Radiographic Evaluation

AP, Lateral, and mortise views (15-20° internal rotation) of the ankle.

If widening ≥ 4 mm talar shift, this indicates the significant syndesmotic injury is likely.

Danis-Weber classification

Classifies ankle fractures according to the level of the fibula component of an ankle fracture, concerning the "syndesmosis."

Type A: below syndesmosis

Type B: at the level of the syndesmosis

Type C: above the level of the syndesmosis

Type C1, C2: Other fracture variants include **Maisonneuve fracture** (ankle injury with fracture of the fibula proximal third).

In a mortise view of the ankle, if the distance between the medial malleolus and the medial border of the talus is >4 mm, open reduction is indicated to correct the lateral talar shift.

Remember:

= Avulsion #'s are usually transverse = Shear #'s are usually oblique.

Treatment

ORIF

N.B: If the operation is not done within a few hours, severe swelling forms, thus surgery needs to be postponed for a few days.

Postoperative course

Non–weight-bearing in a splint/cast/removable boot for 4-6 weeks until fracture healing is appreciated radiographically.

Ankle ROM exercises should be started early to prevent postoperative stiffness.

74- False about meniscal injury: → Above

a- Best treatment is total meniscectomy

75- Inorder to prevent the most important complication that results in the majority of deaths in spinal injury, you should order:

a- Respiratory therapy

76- Regarding effusions, what is false?

a- Gout doesn't cause significant effusion

Gout can indeed cause significant effusion in the affected joint. Effusion, or the accumulation of fluid within the joint space, is a common manifestation of acute gouty arthritis. The inflammation triggered by the deposition of urate crystals in the joint can lead to synovitis, characterized by swelling, warmth, and tenderness. This inflammatory response often results in the accumulation of fluid, contributing to the joint effusion observed in gout.

While the degree of effusion may vary depending on factors such as the severity of the gout attack and individual patient characteristics, significant effusion can occur and is considered a characteristic feature of acute gouty arthritis. Therefore, effusion can indeed be a notable symptom of gout.

77- All are indication; for fasciotomy, except:

a- Nerve impairment

b- Arterial / venous ligation

c- Prolonged ischemia (> 6hours)

Fasciotomy is a surgical procedure performed to relieve compartment syndrome, a serious condition characterized by increased pressure within a closed anatomical compartment, leading to compromised blood flow and tissue damage. The indications for fasciotomy include:

1. Compartment syndrome: Fasciotomy is primarily performed to treat acute compartment syndrome, which can occur following traumatic injuries, such as fractures or crush injuries, or in other conditions where increased pressure within a compartment compromises tissue perfusion.
2. Diagnosis of compartment syndrome: In cases where compartment syndrome is suspected but not yet confirmed, fasciotomy may be performed as a diagnostic procedure to assess intra-compartmental pressures and relieve any potential pressure buildup.
3. Prevention of tissue necrosis: Fasciotomy is performed to prevent irreversible tissue damage and necrosis that can occur when compartment syndrome leads to compromised blood flow to the affected tissues.
4. Treatment of acute limb ischemia: In some cases of acute limb ischemia where vascular compromise results in severe tissue ischemia and compartment syndrome, fasciotomy may be indicated to restore blood flow and prevent tissue loss.

Overall, fasciotomy is indicated in cases where compartment syndrome threatens tissue viability and function, and conservative measures such as limb elevation and analgesia are insufficient to relieve pressure within the affected compartment.

78- False about compartment syndrome:

a- Damage is not caused by ischemia of muscle * Above

79- Most common fracture in elderly women is in the:

↳ osteoporosis

a- Vertebra

80- Fractures in children, what is true?

a- The closer to the growth plate, the better the healing

b-The closer to the growth plate , the smaller is the callus

c- Those with heel injury have better healing

The long bone has 2 growth plates, do they contribute for same growth potential? No.

- In lower limbs the highest growth potential is in the proximal tibia (71%) and distal femur (71%) [around the knee]
- In upper limbs : proximal humerus (80%) and distal radius (80%) [Away from elbow]
- The higher the growth potential, the better the prognosis
- In bone cancer → The higher the growth potential, the greater the risk of tumor

Treatment is better when you are more smooth, do not do multiple manipulations for growth plate, do not enter growth plate by k-wire multiple times and do not enter growth plate by screws at all.

81- Giant cell tumor all except:

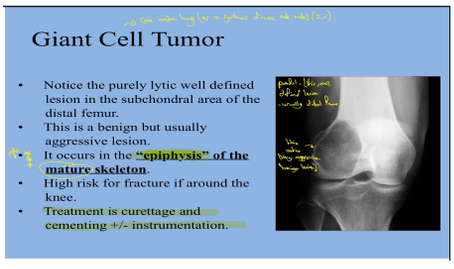
a- More common in females

b- Occur in epiphyseal metaphyseal junction

c- Rare mets. To lung

d- X-ray usually increase bone density

e- Recurrence is common after curettage



Giant Cell Tumor (Osteoclastoma)

- A lesion of uncertain origin that appears after the end of bone growth. "after physeal growth plate closure". → only in adults
- Most commonly occurs in the distal femur, proximal tibia, proximal humerus, and distal radius. (End of bone : articular surfaces)
- The tumor has a reddish fleshy appearance. It comes away in pieces quite easily when curetted but it is difficult to remove completely from the surrounding bone.
- The patient is usually a young adult who complains of pain at the end of a long bone; sometimes there is slight swelling.
- Pathological fracture occurs in 10-15% of cases
- Treatment:
  - Well-confined, slow-growing lesions with benign histology → thorough curettage
  - More aggressive tumors (can go outside cortex), and recurrent lesions, should be treated by excision, followed, if necessary, by bone-grafting or prosthetic replacement

82- All should be present in prosthesis except:

a- Safe ✓

b- Affordable ✓

c- Very light ✓

d- Cosmetically accepted

e- Functional ✓

83- The point that lead the surgeon to be not very concerned about level of amputation:

a- Development of prosthesis

b- Education of patient

c- Better diagnosis of disease

84- Osteosarcoma all except:

a- Sunburst appearance

b- Sub-periosteal new bone formation

c- Tumor cells may be perforate the cortex

d- Lung mets. Via hematological pathway

e- Usually invade the growth plate

- **Osteosarcoma:**
  - bone forming tumor
  - Most common primary malignant bone tumor
  - third most common malignant bone tumor (after metastasis and multiple myeloma)
  - A tumor of adolescence
  - It affect most commonly long bone **metaphyses** especially around the **knee** .
  - The top three affected areas are:
    - 1- the distal femur
    - 2- the proximal tibia
    - 3- the proximal humerus
  - Also can occur in elderly who have predisposing condition – Paget disease, bone infarct, prior irradiation
  - Males> females
  - presentation → Localized pain and swelling , Sometimes lump
  - While both the sunburst appearance and Codman's triangle are typical of osteosarcoma, they can also be seen in other rapidly growing tumours
  - Radio-isotope scans may reveal skip lesions, but a negative scan does not exclude them. CT and MRI reliably show the extent of the tumour. Chest x-rays are done routinely, but pulmonary CT is a much more sensitive detector of lung metastases. About 10% of patients have pulmonary metastases by the time they are first seen.
  - biopsy should always be performed before commencing treatment

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- Treatment:
  - Neoadjuvant chemotherapy followed by surgery.
- survival rate → 60-70 %
  - improved because of the use of chemotherapy; which destroys micro and macro mets.

(All are correct .. They answered it E , Not sure about it)

85- Chondrosarcoma except:

a- Grows very rapidly → slow Grow

b- Radio- resistant

- **Chondrosarcoma**
  - Malignant tumor of chondroblasts cells
  - highest incidence in the fourth and fifth decades, and men are affected more often than women.
  - Central/primary (2/3 of cases)
    - There is popcorn calcification → painful, slow growing, scalloping (thin cortex without swelling
    - Previous normal bone ,patient over 40, expand into cortex to give pain , pathological fracture , calcification .
    - DDx → it Looks like enchondroma, in which there is popcorn calcification → but its painless, no growing, does not involve the cortex.
  - Peripheral/secondary (1/3 of cases)
    - Secondary to osteochondroma
    - Malignant degeneration of preexisting cartilage tumor such as osteochondroma.
    - usually arises in the cartilage cap of an osteochondroma
    - Younger age group and better prognosis than primary chondrosarcoma

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    - characterized with irregular cartilage cap in addition to popcorn calcification.
    - osteochondroma → regular cartilage cap
  - Chondrosarcoma sub classified according to
    - Site
      - Central (intramedullary)
      - Peripheral (juxtacortical and surface)
  - Conventional central tumors constitute about 90% of chondrosarcoma
  - enchondroma never transform into chondrosarcoma
  - primary chondrosarcoma is chondrosarcoma from the beginning

In both: a tumor in adults (>40 years), around pelvis and knee mainly.
Pain, slowly growing in length and width ending up in what so called: enclosed scalloping.

Treatment: it's a very slow growing tumor i.e. slow mitotic activity →it won't respond to chemotherapy!
What to do then? Treatment is surgical.

86- One increase bone healing:

a- Tensile force

b- Compression

c- Shearing force

87- All are found in the histology of growth plate except:

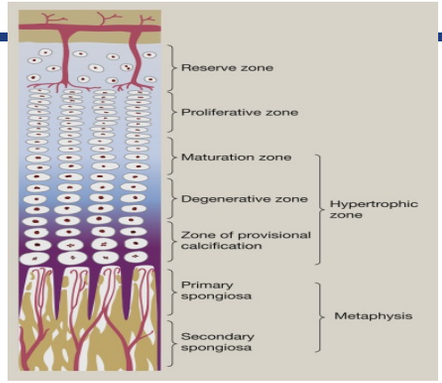
a- Resting chondrocytes

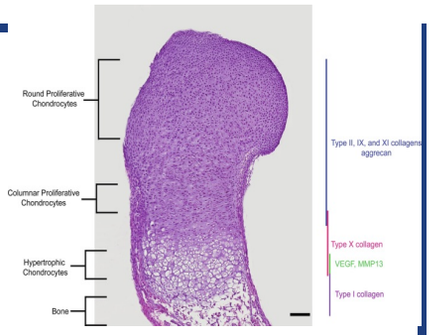
b- Proliferating

c- Maturing

d- Calcified

e- Superficial and tangential layer of chondrocyte





88- All are cause for delayed and nonunion except :

a- Extensive gap

b- Infection

c- Metabolic

d- Abnormal biomechanics

e- Sufficient immobilization

Causes of non-union
(1) Distraction and separation of the fragments, e.g. interposition of soft tissues between the fragments.
(2) Excessive movement at the fracture line.
(3) Severe injury that renders the local tissues nonviable or nearly so
(4) Poor local blood supply
(5) Infection.

89- Transient synovitis of the hip characterized by all except:

a- Self Limiting acute disease of the hip

b- Lab Ix: increase ESR, CRP with increased titer of staph aureus in blood → septic Arthritis

90- One is false about loose bodies:

What causes loose bodies?

Loose body is the term applied to small fragments of articular cartilage that break off in the knee joint as a result of a knee injury or degeneration. Loose bodies float around within the knee joint and cause pain, catching, locking, or swelling depending upon where the fragments migrate.

What causes intra-articular loose body?

A solitary intra-articular loose body usually results from injury of the articular cartilage (chondral or osteochondral fracture, osteochondritis dissecans), the menisci or cruciate ligaments.

a- Hx of locking

b- Almost always symptomatic

c- Usually seen in x-ray

d- May be caused by osteochondritis dissecans

91- Osteomyelitis one is false:

a- Usually due to strept infection ★ above

92- Most common disability in poliomyelitis in Jordan:

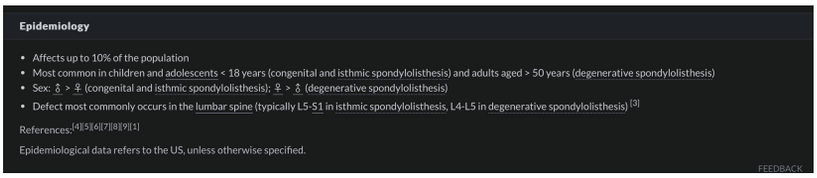
a- Hip disability

b- Drop foot

c- Affect thoracic muscles

d- Thoracic kyphoscoliosis

93- Spondylolisthesis all except:

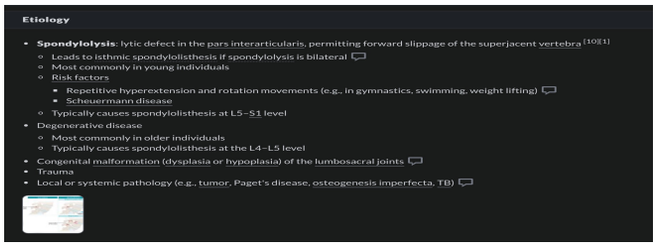


a- More in males

b- Degenerative type usually more than 30 years

c- Degenerative type most commonly in L5 S1

d- Lytic / isthmic rtype is due to fracture on pars interarticularis



(Not sure about it)

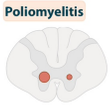
94- Most common cause of kyphosis in0-10 years:

a- Hemivertebra

b- Juvenile TB

c- Apophysitis

95- Most common disability in poliomyelitis in Jordan:



Caused by poliovirus (fecal-oral transmission). Replicates in lymphoid tissue of oropharynx and small intestine before spreading via bloodstream to CNS. Infection causes destruction of cells in anterior horn of spinal cord (LMN death).
Signs of LMN lesion: asymmetric weakness (vs symmetric weakness in spinal muscular atrophy), hypotonia, flaccid paralysis, fasciculations, hyporeflexia, muscle atrophy. Respiratory muscle involvement leads to respiratory failure. Signs of infection: malaise, headache, fever, nausea, etc. CSF shows ↑ WBCs (lymphocytic pleocytosis) and slight ↑ of protein (with no change in CSF glucose). Virus recovered from stool or throat.

a- Hip disability

b- Drop foot

c- Affect thoracic muscles

d- Thoracic kyphoscoliosis

96- Osteoarthritis all true except:

Osteoarthritis Management (AAOS recommendation)
- **NSAIDs (strong evidence)**
- Weight loss (moderate evidence)
- Exercise/physical therapy (strong evidence)
- Total joint arthroplasty

The general approach to OA
1- Diminish joint pain, and enhance functional capacity.
2- Treatment depends on functional impairment and severity of symptoms but not on radiographic findings.
3- Modify treatment according to responses to therapy.
4- Begin with PT, OT, and weight loss.

Aims of knee OA treatment
- **R**elieve pain
- **R**estore function
- **R**educe disability if any by **R**ehabilitation.

A-Nonpharmacologic treatments.
1-Patient education 2-Weight loss (if overweight)
3-Aerobic exercise programs 4-Physical therapy.
5-Range-of-motion exercises, Muscle-strengthening exercises.
6-Assistive devices for ambulation, e.g., Cane
7-Occupational therapy 8-Topical Ice and heat therapy

B-Pharmaceutical options If the above efforts did not improve the function
1-Paracetamol Caution in advanced hepatic disease
2-NSAIDS given in moderate-severe pain, **e.g: Cox-2 inhibitors**
It has fewer GI side effects.

3- Opioid analgesics: e.g., Tramadol.
4- Intraarticular Depomedrol Injections, If pain persists despite oral analgesics
5- Hyaluronans if pain persists despite other agents

a- Increased bone formation

b- Loss of cartilage

c- Capsule usually NL

d- Treatment should be relieve pain, increase motility and decrease load

Pathoanatomy
1- Articular cartilage
- Increased water content
- A decrease in the amount of proteoglycans
- Loss of collagen organization and orientation

2- Synovium and capsule
Early OA → mild inflammatory changes in the synovium
Late OA → Synovium becomes increasingly thick and vascular

3- Bone
- Sub-chondral bone remodeling → lytic lesion with sclerotic edges
- Bone cysts form in late stages

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- Osteophytes form through the pathologic activation of endochondral ossification

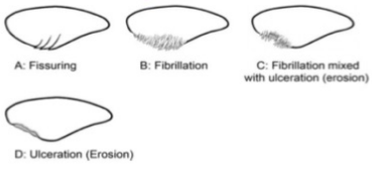
Cardinal pathological features of OA
1-Progressive thinning of the articular cartilage → narrow joint
2-Subchondral sclerosis and cyst formation 3-Osteophytes 4-Synovitis
5-Capsular thickening and fibrosis.

Symptoms
1- Pain
Activity-related or mechanical.
Exacerbated by use and alleviated by rest.
Usually insidious in onset; nocturnal in advanced disease.
2- Morning stiffness of brief duration.
3- Reduced range of motion and crepitus.

97- Chondromalacia patella all true except:

a- Hemarthrosis

b- Locking



Symptom

Physical

diffuse pain in the peripatellar or retropatellar area of the knee (major symptom)

insidious onset

vague in nature

aggravated by
- climbing or descending stairs
- prolonged sitting with knee bent (known as theatre pain)
- squatting or kneeling

quadricep muscle atrophy

palpable crepitus

pain with compression of patella with knee range of motion or resisted knee extension

c- Anterior knee pain

98- Meniscus tear all except:

a- Best diagnosed by arthrography

b- Some time present with knee swelling

c-· Peripheral tear has better prognosis

99- Flat foot all except:

a- Short tendo achilles

b- Hallux valgus later on

100- The muscle that contracts intermittently during standing is:

a- Quadriceps

b- Hamistring

c- Solicus

d- Anterior tibialis

e- Posterior tibialis

101- All are characteristic for scaphoid fracture except:

a- Occur due to hyperextension with radial deviation

b- May only be seen in oblique view

c- Usually arms looks NL

d- The proximal segment may undergo necrosis

e- Usually in children

Scaphoid fractures

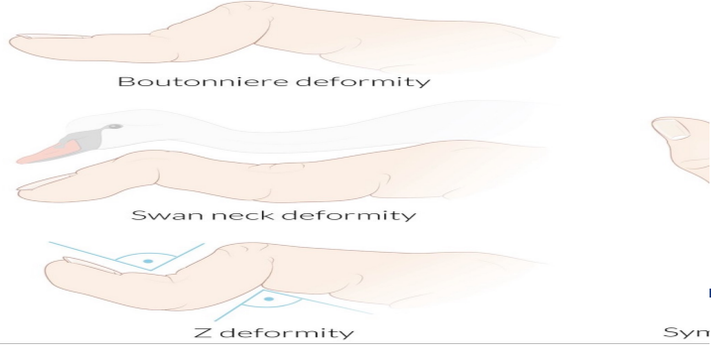
- The scaphoid bone is the most commonly fractured wrist bone. X-rays are indicated if there is post-traumatic wrist pain with 'anatomical snuff box' tenderness.
- Fractures are often quite obvious, but sometimes multiple views – and examination on multiple occasions – are needed to detect an undisplaced crack
- Scaphoid fractures account for almost 75% of all carpal fractures.
- The usual mechanism is a fall on the hand with wrist extended.
- The blood supply of the scaphoid diminishes proximally. This accounts for the fact that 1% of distal-third fractures, 20% of middle-third fractures and 40% of proximal fractures result in non-union or avascular necrosis of the proximal fragment.
- There may be slight fullness in the anatomical snuffbox; precisely localized tenderness in the same place is an important diagnostic sign.
- The fracture may not be seen in the first few days after the injury. Two weeks later, the break is usually much clearer, due to bone resorption at the fracture site and slight displacement of fragments.
- If the x-ray looks normal but the clinical features are suggestive of a fracture, the patient must not be discharged. The diagnosis has to be confirmed one way or another. The usual advice is to return for a second x-ray 2 weeks later. Meanwhile, the wrist is immobilized in a cast extending from the upper forearm to just short of the metacarpophalangeal joints of the fingers, but incorporating the proximal phalanx of the thumb; the wrist is held dorsiflexed and the thumb forwards in the 'glassholding' position (the so-called scaphoid plaster).

102- Swan neck deformity all except:

a- MCP joint is hyperextended

b- DIP joint is flexed

c- Can occur due to intrinsic muscle disease



- **Joint deformities**
  - **Rheumatoid hand** is characteristic and typically manifests with one or more of the following deformities:
    - Deepening of the interosseous spaces of the dorsum of hand
    - **Swan neck deformity**: PIP hyperextension and DIP flexion
    - **Boutonniere deformity**: PIP flexion and DIP hyperextension.
    - **Hitchhiker thumb deformity** (Z deformity of the thumb): hyperextension of the interphalangeal joint with fixed flexion of the MCP joint [13]
    - **Ulnar deviation** of the fingers
    - **Piano key sign**: dorsal subluxation of the ulna

d- Can occur due to flexor sublimis

e- Can occur due to central slip of extensor digitorum

103- Most important in bone healing is:

a- Clot organization

b- Immobilization

c- Good alignment

Factors that affect bone healing.

A- Internal factors

1- Blood supply (most important)
2- Head injury may increase osteogenic response
3- Mechanical factors
- Mechanical stability/strain
- Location of injury
- Degree of bone loss
- Pattern (segmental or fractures with butterfly fragments)

B -Patient factors

1- Vitamin D and calcium
2- Protein malnourishment decreases fracture callus strength
3- Diabetes mellitus
4- Nicotine
5- Medications affecting healing

104- A 7 year old child with 6 months old fracture of femur that healed with 30° rotation management should be:

a- Surgery

* Fracture of femur → surgery

b- Hip spica

c- Plaster of paris

The power of remodeling
- Children have a tremendous power of remodeling
- Can accept more angulation and displacement
- Rotational mal-alignment especially diaphyseal does not remodel

Factors affecting remodeling potential.
- Years of remaining growth – the most important factor
- Position in the bone – the nearer to physis the better remodeling (worst) for diaphyseal rotation deformity.
- Plane of motion – Greatest in sagittal, the frontal, and least for transverse plane
- Physeal status – if damaged, less potential for a correction
- The growth potential of adjacent physis e.g., the upper humerus is better than the lower humerus

Injuries of the proximal humerus and close to the wrist remodel much faster than injuries of the elbow and proximal forearm.
Remodeling is fastest at the knee (distal femur and proximal tibia) than in the proximal femur and distal tibia.
Because of the **relative contributions of the growth plates to the longitudinal growth of the upper and lower limb.**

3-Relationship to joints
Remodeling is *maximal* in proximity to, in the plane of action of, the nearest joint.
The shoulder moves in three planes and remodels in three planes.
e.g., 30° of angulation is acceptable in a child with > 2years of growth remaining.
The elbow is a hinge joint. The cubitus Varus deformity after supracondylar fracture must be prevented because it will not remodel.

Complications of children's fractures
- Mal-union is not usually a problem (except cubitus- varus)
- Non-union is hardly seen (except in the lateral condyle)
- Growth disturbance – epiphyseal damage
- Vascular – Volkmann's ischemia

105- All fractures in children has ability of remodeling except:

a- Neck of femur

b- Epiphyseal separation (through growth plate of tibia)

c- Fracture of mid ulna

d- Fracture of mid of femur

Factors affecting remodeling potential of ALL Pediatric #

- **Years of remaining growth – most important factor**
- **Position in the bone** – the nearer to physis the better the remodelling
- **Plane of motion** – greatest in sagittal, the frontal, and least for transverse plane
- **Physeal status** – if damaged, less potential for correction
- **Growth potential of adjacent physis** e.g. proximal humerus better than distal humerus & distal radius better than proximal radius

106- One would undergo avascular necrosis if not treated properly:

a- Capitellum fracture

* Lateral condyle الأكثر من بسبب الـ Poor circulation

b- Olecranon fracture

c- Lateral condyle fracture

d- Supracondylar fracture

C= Lateral condyle fractures

2nd most common elbow fracture after supracondylar fracture.
The most common are Salter-Harris IV fracture patterns.

Physical exam
Lateral side swelling and tenderness, lateral ecchymosis implies a tear in the aponeurosis of the brachioradialis and signals an unstable fracture.
Commonly missed fracture.

Radiograph
AP, lateral, and oblique views of the elbow. The internal oblique view most accurately shows fracture displacement because the fracture is posterolateral.

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Complications
1-Stiffness: most common complication, by 24 wks., 90% returns normal ROM.
2-Nonunion.
Higher rate of nonunion in non- surgical management due to pulling of the wrist extensors and intra-articular fracture and poor metaphyseal circulation to distal fragment. ***Treatment:*** ORIF with a screw, may require a bone graft.

6- Elbow Dislocation.
- Posterior dislocations are most common at 90%
- CR is needed followed by placement in a posterior splint for 1 week only
- *Elbow dislocation with radial head and coronoid process fractures are known as the "**Terrible Triad**," due to associated instability.*

7- Olecranon Fractures.
Olecranon fractures are most often caused by:
- Falling directly on the elbow.
- A direct blow to the elbow from something hard, or a dashboard or car door during a vehicle collision.

Non-displaced fractures → Long-arm splint or cast with the elbow flexed from 45-90° for 3 wks. Then physiotherapy to prevent stiffness.
Displaced fractures → Fixation.
Complications
1-Prominent implants that require removal after healing has occurred.
2-Elbow stiffness and loss of fixation.

5- Supracondylar Fractures of the Humerus

Types: Extension 95% (distal fragment is displaced posteriorly)
Flexion 5% (distal fragment is displaced anteriorly).

Clinical Features
• Pain, swelling, point tenderness.
• Neurovascular Injury- assess median and radial nerve, radial artery

Investigations: X-rays: AP, lateral of the elbow; assess for fat pad sign

Specific Complications
• Brachial A. injury, Ant. interosseous N, compartment syndrome (leads to Volkmann's ischemic contracture), Cubitus Varus (distal fragment tilted into Varus)

107- One true about management of cerebral palsy (most effective):

a- Tenotomy

b- Muscle shortening

c- Close observation in hospitals

Treatment

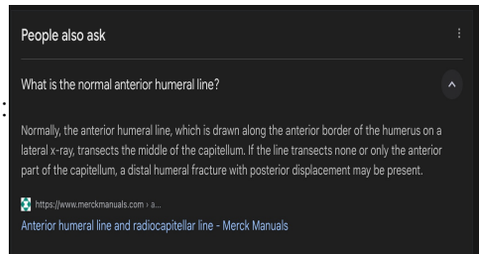
There is no curative therapy for cerebral palsy. Management is dependent on the severity and nature of symptoms. A multidisciplinary approach is employed in management to improve function and quality of life.

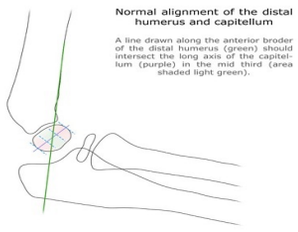
- **Nonpharmacological management**
  - Physical therapy: prevents muscle contractures
  - Occupational therapy: motor skill development
  - Speech therapy: communication skills and dysphagia
  - Orthotic devices (e.g., braces, splints, and casts) and assistive devices (e.g., wheelchairs, walkers)
  - Educational support for intellectual disability
  - Nutritional support for dysphagia
  - Social and psychological support
- **Pharmacological management**
  - Antispasmodics (e.g., botulinum toxin, baclofen, dantrolene, benzodiazepines)
  - Anticonvulsants
  - Anticholinergics for rigidity and sialorrhea
- **Surgery**
  - Orthopedic surgery to treat scoliosis and relieve contractures
  - Selective dorsal rhizotomy to relieve spasticity

FEEDBACK

d- Home physiotherapy

108- Anterior humeral line should pass through:





a- Middle third of capitulum

109- One will lead to avascular necrosis of humeral head:

a- Surgical neck fracture

b- Anatomical fracture

c- Surgical neck fracture + avulsion of grater tuberosity

110- Poliomyelitis can lead to one deformity:

a- Knee flexion

b- Equines

c- Structural scoliosis

111- Scoliosis undergo rapid deterioration during:

a- After menopause

b- Infantile scoliosis

c- Juvenile scoliosis

d- At puberty between budding of breast and menarche

112- Acute supra spinator calcification except:

a- Joint movement is NL during acute phase

b- Usually improve in few days

c- Due to decrease blood supply (ischemia)

113- Osteochondritis dissecans all except:

a- Due trauma

b- Usually lateral condyle is affected

c- Usually affect young males

114- Perthes disease except:

a- Bone scan is useless

b- Usually no pain

c- Lateral subluxation is poor prognosis

115- Slipped upper epiphysis except:

a- Females> males

b- 70% gradual onset

c- Lateral view is important in diagnosis

d- Limbs is extemally rotated

116- Most common cause of kyphosis in 0-10 years:

a- Hemivertebra

b- Juvenile TB

c- Apophysitis

Orthopedics:

1- A 30-year female patient presented with 1 week history of mechanical low back pain, without radicular symptoms or red flags. On examination the pain becomes worse with flexion and extension although the patient can do full range of motion. The best course of management is :

a. Oral steroids
b. Analgesia, and bed rest
c. Lumbar spine MRI
d. Facet joint injection
e. Lumbosacral spine X-ray

Answer: B

2-Conditioning exercises aim to:

a. Lower the resting blood pressure
b. Increase the submaximal heart rate
c. Increase the resting heart rate
d. Decrease cardiac output during exercise
e. Decrease the stroke volume

Answer: A

3-Iliopsoas undergoes concentric contraction during:

a. Mid stance
b. Pre-swing
c. Mid-swing
d. Terminal stance
e. Terminal swing

Answer: B

4-A child is brought to the pediatrician due to abnormal foot shape and discomfort when bearing weight. Physical examination reveals midfoot dorsiflexion, abduction and dorsiflexion of the forefoot, and valgus heel, what is the most likely diagnosis?

a. Clubfoot

b. Congenital talipes equinovarus
c. Congenital vertical talus
d. Metatarsus adductus
e. Tarsal coalition

Answer: C

5-Which of the following is abnormal?

a. Heart rate 80 in athletes
b. Respiratory rate of 16 breaths per minute in a 50-year-old male recovering from knee replacement surgery
c. Blood pressure 140/90 in a 60-year-old female undergoing shoulder rotator cuff repair surgery

Answer: A

6-Which of the following is used in primary bone healing ?

a. Intramedullary Nailing with Elastic Nails
b. Lag screws
c. Functional bracing
d. External fixation
e. Casting

Answer: B

7-Pes planus, how to differentiate between flexible and rigid types ?

a. MRI
b. CT scan of the foot
c. Xray of the foot
d. Simple bedside physical exam
e. Ultrasound of the foot

Answer: D

8-Which of the following is true about flat foot?

a. No need for treatment if there's no pain
b. Medial arch support will help get rid of the deformity if used continuously
c. The heel becomes varus and the foot pronates at the midfoot.
d. Rigid form is the most common

e. Most noticeable when the patient is sitting with feet elevated off the ground

Answer: A

9-What is the diagnosis?

a. Chondrosarcoma
b. Giant cell tumour
c. Osteoid osteoma
d. Enchondroma
e. Ewing sarcoma

Answer: E

10-A 25-year-old male presents to the emergency department after sustaining a traumatic injury to his right knee during a sports activity. He describes a sudden twisting motion of the knee followed by severe pain and inability to bear weight. On examination, there is obvious swelling and deformity of the knee joint. The patella is laterally displaced, and there is tenderness and palpable crepitus over the lateral aspect of the knee. X-rays of the knee reveal joint effusion and multiple loose bodies within the joint space. What is the most likely cause of his findings?

a. ACL injury
b. Lateral condyle fracture with traumatic patellar dislocation
c. Tibial compound fracture
d. Septic arthritis

Answer: B

11-Compartment syndrome affecting the leg, loss of dorsiflexion, which nerve is mostly affected?

a. Sural nerve
b. Sciatic nerve
c. Tibial nerve
d. Deep peroneal nerve
e. Saphenous nerve

Answer: D

12-Which is true about osteoporosis?

a. Causes bone pain
b. Considered a risk factor for osteoarthritis
c. Defined as bone density <2.0 SD than a young woman
d. Obesity is a risk factor
e. Predominantly causes axial fractures

Answer: E

13-The structure that determines the stability in ankle fracture is :

a. Syndesmosis
b. Articular surface
c. Anterior talofibular ligament
d. Calcaneofibular ligament
e. Posterior talofibular ligament

Answer: A

14-Which of the following movements is firstly affected in frozen shoulder?

a. Abduction
b. Internal rotation
c. External rotation
d. Extension
e. All movements

Answer: C

15-A case of child abuse, which of the following is associated with non-accidental injury ?

a. Isolated rib fracture
b. Metaphyseal fracture

Answer: B

16-Most important in preventing infection of an open fracture :

a. Time from wound to irrigation and debridement
b. Time from wound to emergency room
c. Time from wound to antibiotics

d. Time from wound to surgery
e. Time from wound to ambulance

Answer: C

17-Which of the following is true about scoliosis ?

a. Menarche is an indicator of progression risk of scoliosis
b. Observation only is the management for 35° degrees scoliosis

Answer: A

18-Which fracture pattern is slowest to heal?

a. Transverse
b. Segmented
c. Oblique
d. Spiral
e. Greenstick

Answer: A or B

19-Which of the following is a complication of untreated bilateral DDH in toddlers?

a. Limping
b. Pain
c. Lumbar lordosis
d. High perineum

Answer: C

20-Elderly with previous herniated disc years ago, presented to the ER with leg pain, no motor weakness, what's the most likely diagnosis ?

a. Arterial insufficiency
b. Disc prolapse

Note: on history and physical exam it was a picture of arterial insufficiency, but we don't know why this question is among the Ortho questions XD

21-Patient with total knee replacement, presented with infection after three months, the most likely causative organism is :

a. Streptococcus pyogenes
b. Ecoli
c. Staphylococcus aureus
d. Staphylococcus epidermidis
e. Candida albicans

Answer: D

22-In a 20-year-old male patient who had a shoulder dislocation, what is the most common complication ?

a. Greater tuberosity fracture
b. Rotator cuff tear
c. Bankart lesion
d. Axillary nerve injury
e. Chondrolysis

Answer: C

23-A picture similar to this one, which of the following is true ?

Answer: an inherently unstable fracture

24-Which of the following fractures is the best to heal ?

Answer: proximal humerus fracture with varus deformity

25-A case of meniscal tear, how would you confirm the diagnosis on physical exam ?

Answer: Knee flexion + external or internal rotation

26-Patient with carpal tunnel syndrome, what would you find on physical exam ?

Answer: Pain upon compression of the wrist

27-Young male with road traffic accident, elbow fracture with injury to the nerve, what's the best management ?

Answer: observe

Note: the question stem had more information about the extent of the injury, ya3ni not all radial nerve injuries are treated conservatively, it depends on the extent of damage

28-Most important prognostic factor in Perthes :

Answer: age of presentation + femoral head position

29-A case of disc herniation at L2-L3, what is expected to be found on physical exam ?

Answer: positive straight leg raising test

30-Which of the following is an avulsion fracture ?

Answer: Avulsion fracture of the ischial tuberosity

31-Salter-Harris 5 fracture, which is worst in healing ?

Answer: distal femur

32-An X-ray of a femur showed a small, well-circumscribed radiolucent lesion surrounded by a dense sclerotic rim within the cortex. The lesion measures less than 1.5 cm in diameter and is associated with intense nocturnal pain that is relieved by nonsteroidal anti-inflammatory drugs (NSAIDs). What is the most likely diagnosis based on these findings?

Answer: Osteoid osteoma

33-Nonunion risk

Note: No idea what the question was, but this was the answer, may be about femoral head vs intertrochanteric fracture?

1-Which of the following is most important for stability of ankle fractures?

A. Atfl
B. Syndesmosis
C. Deltoid ligament
D. Ptfl

Answer: B

2- which of the following considered a pitfall in clinical examination of comminuted radial head fracture?

A. AP and lateral elbow X-ray
B. CT
C. MRI
D. Ulner nerve evaluation
E. Examining the distal radioulnar joint DRUJ

Answer: E

3-RTA and the pt skin has contacted the soil, penicillin was added, which organism is covered by penicillin in open fx contaminated by soil?

A. Staph. Aureus
B. Strep
C. Pseudomonas
D. Clostridium
E. Mycobacterium

Answer: D

4- A patient falls in his hand and xray showed transverse fracture of the head of humerus and treated with compression plate, what do you expect to see after 3 months on xray?

A. Non united with callus
B. United with callus
C. Healed without callus
D. Atrophy of edges

Answer: C

5- ligament injured if varus stress present at 0° and 30°?

A. Acl
B. Lcl
C. Acl+ lcl
D. Mcl

Answer: B

6- picture of tumor sclerotic with nidus relieved by nsaids?

A. Osteoid osteoma

7- which test is related to complete external rotators tear?

A. Hawkins
B. Horn blower
C. Arm drop
D. Napleon
E. Empty can test

Answer: B

8- 14 year old child with knee pain , xray of the hip showed moderate severity SCFE, what is the best next step in management ?

A. Reassurance and walking crutches
B. Screw fixation without reduction
C. ORIF
D. Discharge with analgesia

Answer: B

9- sclerotic fracture male 75 , what is the most likely origin of the primery cancer?

A. Prostate cancer
B. Lung cancer
C. Bladder cancer

Answer: A

10- what supplies deltoid?

A. Radial
B. Ulnar
C. Long thoracic
D. Axillary

Answer: D

11- best imaging modality to diagnose osteoporosis?

A. X-ray
B. CT
C. DEXA

Answer: C

12- which of the following mimics shoulder septic arthritis ?

A. Acute rotator cuff tear
B. Acute calcific tendinitis
C. Subacromial bursitis
D. Impingement syndrome

Feature	Calcific tendinitis	Frozen shoulder
Pathology	Tendon calcium deposit	Capsular fibrosis
Pain onset	Sudden, severe	Gradual
ROM restriction	Mainly active	Active + passive
External rotation	Usually preserved	Markedly reduced
Imaging	Calcification on X-ray	Normal X-ray or capsular thickening

E. Biceps tendinits

Answer: B

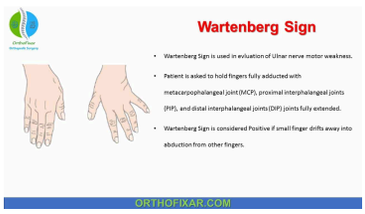
13- rehab ques (2 weeks after no muscle movement?)

A. Spasticity
B. Rigidity
C. Mechanical
D. Flaccid paralysis
E. Inflammation

Ans ?

14- Which one is the correct match?

A. Ok sign- ulner nerve
B. Ulnar-hypothenar atrophy



Answer: B

15- carpenter complain of pain in flexion of the knee and medial joint line tenderness, knee xray showed joint space narrowing?

A. Weight reduction+ paracetamol

16- Bilateral ddh at the age of 3, will show ?
Wide perineum

17- sign of severe CTS:

A. parasthesia
B. Can't handle her bag
C. Can't tie button of the shirt

Answer: C

18- Gastrocnemius and soleus muscles are most eccentrically contracted in what phase ?

A. Initial stance
B. Loading response
C. Mid-stance
D. Terminal stance
E. Pre-swing

Answer:

19- most common cause of LBP that is more severe at extension?

A. Muscular pain
B. Lumbar canal stenosis
C. Disc herniating
D. Facet joint arthropathy

Answer: B

20- ulnar nerve injury, unable to do:

A. Finger abduction
B. Wrist extension
C. Wrist flexion
D. Thumb abduction

Answer: A

21- Picture of rocker bottom feet
Which of the following is true about this deformity?

A. talonavicular dislocation
B. better prognosis than club foot
C. treatment is primarily surgical
D. usually unilateral

Answer: A

22- Which of the following is true about club foot?

A. It is detected in utero as early as 8 weeks
B. Surgical treatment is usually indicated or needed
C. True clubfoot is flexible and stretching is enough
D. Recurrence is the rule should bracing be ignored*

Answer: D

23- A 50 year old man with hyperparathyroidism had pain after minor fall on a step, that resulted in limitation in knee extension which of the following extensor mechanism was affected:

A. Quadriceps muscle
B. Quadriceps tendon
C. Patella
D. Patellar tendon

Answer: B

24- 4 year old child with image for scoliosis:

A. Infantile idiopathic scoliosis
B. Congenital scoliosis
C. Treatment is always surgical
D. Always resolves spontaneously

Answer: B

Type	Age range	Key features
Infantile	0–3 years	More common in boys; left thoracic curves; many resolve spontaneously
Juvenile	4–9 years	Higher risk of progression than infantile; female predominance begins
Adolescent ↑ MC	**10–18 years**	Most common type (80% of idiopathic scoliosis); female > male; progression linked to growth velocity

R+ Thoracic MC

25- The worst remodelling in 3 year old child:

A. Distal humerus
B. Distal metaphyseal femoral recurvatum
C. Distal metaphyseal femoral procurvatum
D. Proximal humerus in varus
E. Distal tibia procurvatum

Answer: A

26- A 3 month old girl has been treated for DDH ever since she was 2 months old. She returned to the clinic after 4 weeks of pavlic harness with reduced hip but acetabular dysplasia persists, which of the following is the next step:

A. Continue using pavlic harness
B. Use of triple diapers
C. Internal fixation with sth
D. Surgical/ open fracture

Answer: A

27- A 75 year old woman came to the clinic because of sudden interscapular pain that happened when she works in her house and lasted for 12 days, and it didn't limit her daily activities and there were no red flags, she reported pain during flexion and extension, what is the next step:

A. Dorsal spinal MRI
B. Analgesia, limited bed rest, and return to work
C. Dorsolumbar X ray

Answer: B

28- True about Idiopathic adolescent scoliosis:

A. Always there is no pain
B. Uneven shoulder is always present
C. Rotational deformity is present on Adam forward bending test

Answer: C

29- Intertrochanteric area to femur neck which of the following is true:

A. Has high risk of avascular necrosis
B. Has poor blood supply
C. Has low bone osteogenic activity
D. Has higher rate of malunion

Answer: D

30- True about flexion distraction injury:

A. Injury to base of skull
B. Injury to C7
C. Injury to calcaneus bone

D. Small intestine injury

Answer: D

31- Which of the following is false about pediatric skeleton:
A. Soft tissue stronger than bone
B. Cancellous cortical ratio is high
C. Thin periostium
D. Incomplete fractures can occur

Answer: C

32- pain in osteomyelitis- increase periosteal pressure

33- flat feet- no need for treatment if no pain

اذكرونا بدعوة

SubSurgery Final – 019 – Total of 100 Questions
27th of May, 2024

Orthopedics – 33 Questions

1. which of these tests will be positive with a Segond's fracture

a. Anterior drawer test

2. a lady fell on the ground and broke her T12, which of these fractures isn't consistent with these types of fractures

b. Lateral femoral epicondyle
c. Tibial shaft
d. Ankle joint
e. Intertrochanteric
f. الإجابة مختلف عليها – a or b

3. Extreme flexibility of hip and knee during swing phase occurs in which of these types of gait

a. high steppage gait
b. circumduction gait
c. hiking
d. Trendelenburg Gait

4. 6 months girl presented to the clinic with 24 angles on acetabular index of her right leg, 29 angles on the left, what would you tell her parents

a. No need for treatment
b. Pavlik harness
c. Spica

الإجابة مختلف عليها – either b or c (spica is not used anymore, mostly b)

5. A young boy presented with pain in his knee for the past 6 months, imaging revealed a metaphyseal mass, with codmans triangle. What is you diagnosis.

a. Osteosarcoma
b. Osteochondroma
c. Chondrosarcoma

6. One of these statements regarding lateral patellar dislocation is incorrect Lateral

a. Internal tibial rotation
b. Anterversion of the femur
c. Increased Q angle
d. Something correct about vastus medialis

SubSurgery Final – 019 – Total of 100 Questions
27th of May, 2024

7. an old lady fell and broke her hip, she presented with inability to bear weight and severe pain, her X-ray showed nothing, but you had suspicions for a fracture clinically, what is your next step.

a. CT
b. MRI
c. Discharge on painkillers.

الإجابة مختلف عليها – a or b

8. 25 (OH) vitamin D alpha hydroxylase gene defect occurs in which of the following

a. Vitamin D resistant Rickets
b. Vitamin D dependent Rickets type 1
c. Vitamin D dependent Rickets type 2

9. an image for rocker bottom feet (bilateral), which of these statements is correct

a. Always treated surgically
b. Associated with a tarsonavicular dislocation
c. It carries a better prognosis when compared to a clubfoot

10. Which of the following peripheral nerve structures functions to cushion the nerve against external pressure

a. Endoneurium
b. Fibronectin
c. N-cadherin
d. Epineurium
e. Perineurium

11. Which of these combinations is correct

a. Ulnar - hypothenar atrophy
b. Medial – wrest drop
c. Radial – Froment's sign
d. Femoral – foot drop

12. Which of the following statement about flat foot is correct

a. No need for treatment if there's no pain

SubSurgery Final – 019 – Total of 100 Questions
27th of May, 2024

13. what is the first movement that is lost in a frozen shoulder

a. external rotation
b. internal rotation
c. abduction
d. adduction

14. Which of these statements about bone fractures in children is incorrect

a. fractures in children tend to be more comminuted fractures.

15. The most common mechanism that will cause hand infection is

a. Lymphatic spread from the forearm and arm
b. Hematogenous spread
c. Direct spread
d. Direct inoculation
e. Infected thrombi

16. a 14 year old girl with Scoliosis, which of these statements will you tell her parents when it comes to the management

a. Most rotational deformity are apparent in the thoracic region
b. Menarche isn't a prognostic factor for the progression of scoliosis
c. It usually starts to progress around the age of 5 years.
d. The main reason for surgery in her case is cosmetic

الإجابة مختلف عليها – either a or d

17. A 50-year-old female patient presented with history of low back pain for 3 months. without radicular symptoms or red flags. on examination the pain becomes worse with flexion although the patient can do full range of motion. the best course of management

a. Oral steroids
b. Lumbo-sacral spine x-ray
c. Analgesia, limited bed rest, and return to work as pain allowed
d. Intra-muscular steroid injection
e. Lumber MRI

18. a young boy presented to the clinic with pain in his knee for the past 6 months, and shortened leg (leg length discrepancy), which of these do you suspect

a. Perthe's
b. The rest of the options were all types of tumors so you'll exclude most of them immediately

SubSurgery Final – 019 – Total of 100 Questions
27th of May, 2024

19. a man presented to the ER with a shoulder dislocation after a hypo-calcemic seizure, what type of shoulder dislocation is this (image showing light bulb sign)

a. Posterior shoulder dislocation
b. Anterior shoulder dislocation
c. Inferior shoulder dislocation
d. Greater tuberosity fracture
e. Lesser tuberosity fracture

20. select the patient with the best remodeling potential

a. 4 year old - proximal humerus
b. 10 year old – distal tibia
c. Old people bla bla

21. In acute osteomyelitis, the pain is caused by

a. Increased intraosseous pressure
b. Abscess formation
c. Periosteal reaction
d. Avascular necrosis
e. Fracture

22. distal radius X-ray, what is the type of fracture (it appears this was copied from an Orthopedics website), this is the image →

a. SH1
b. SH2
c. SH3
d. SH4
e. Wrist dislocation

23. what is the most common organism in a human bite

a. Polymicrobial
b. Eikenella corrodens

الإجابة مختلف عليها – either a or b (mostly a, based on Dr Shaher's Lecture)

24. a man had an lawnmower accident and lost his 2nd, 3rd and 4th toes, he somehow got in the soil. You give him Penicillin to cover for what organism

a. Clostridium
b. Staph aureus

SubSurgery Final – 019 – Total of 100 Questions
27th of May, 2024

25. an image showing hemiverterba, which of the statements is true

a. Congenital scoliosis
b. Idiopathic infantile scoliosis
c. Usually resolves on its own
d. Late-onset presentation usually has better prognosis than early-onset in this case

26. which of these options isn't a risk factor for OA?

a. Osteoporosis
b. RA

27. an image showing a fractured femur

a. Unstable intertrochanteric fracture
b. Stable intertrochanteric fracture
c. Subcapital femur neck fracture
d. transcervical femur neck fracture
e. basicervical femur neck fracture

28. a lady presented with back pain, SLR <30, weakness in the extensor hallucis longus and 1st web space, what is the most probable diagnosis

a. L4/L5 prolapse
b. L4/L5 spondylosis
c. L4/L5 spondylolisthesis

29. a women injuried her hand with a sharp object, and you suspected an injurty to the nerve found inside the carpal tunnel, what would you find on the PEx

a. Weakness and numbness in radial 3 and half fingers
b. Weakness and numbness in ulnar 3 and half fingers
c. Weakness and numbness in ulnar 1 and half fingers

30. you won't see a callus formation in this fracture when this instrument is used

a. Compression plates
b. K wire
c. IM nail
d. Bla bla other wrong options

SubSurgery Final – 019 – Total of 100 Questions
27th of May, 2024

31. a patient presented to your clinic with a knee pain, upon investigation and bone scintigraphy, you found multiple lytic lesions, what is the most probable locations of the primary tumor that caused these mets

a. Lung
b. Prostate
c. Thyroid
d. Kidney

32. Which of these conditions is least likely associated with heterotopic ossification in an immobilized patient?

a. Ankylosing spondylitis
b. Traumatic brain injury
c. Spinal cord injury
d. Severe burns
e. THR

33. in the triad of reduction, immobilization, and rehabilitation, which of these statements is true

a. intraarticular fractures require anatomical reduction
b. long bone fracture are always treated with internal fixation (or sth like that)