



Regional orthopedic

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The shoulder

Disorders of the rotator cuff

The rotator cuff syndrome

- ❓ The rotator cuff is a sheet of conjoined tendons closely applied over the shoulder capsule and inserting mainly into the greater tuberosity of the humerus (subscapularis is inserted into the lesser tuberosity). The cuff is made up of subscapularis in front, supraspinatus above and infraspinatus and teres minor behind (the 'rotator' muscles) which have an important function in stabilizing the head of the humerus by pulling it firmly into the glenoid whenever the deltoid lifts the arm forwards or sideways.

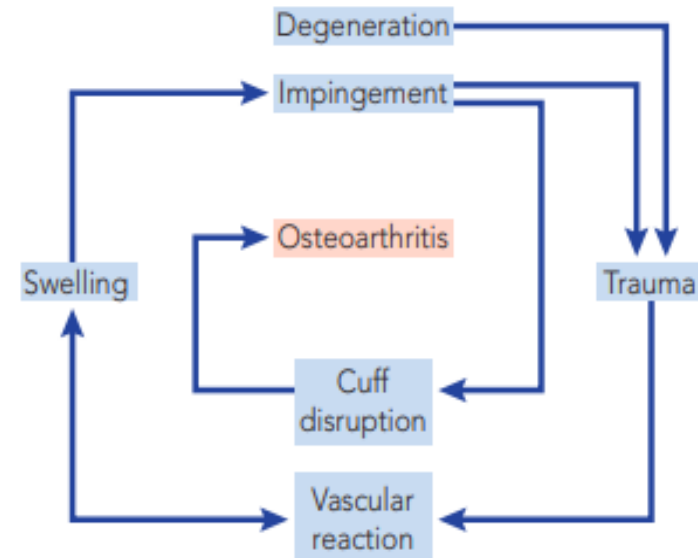
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- ❓ The commonest cause of pain around the shoulder is a disorder of the rotator cuff – the so-called rotator cuff syndrome – which comprises several conditions with distinct clinical features and natural history: subacute tendinitis (painful arc syndrome); chronic tendinitis (impingement syndrome); and rotator cuff tears.

Pathology

- ❓ Degeneration: degenerates; minute tears develop, scarring, fibrosis near its insertion fibrocartilaginous metaplasia or calcium deposition.
- ❓ Trauma and impingement: this may occur when lifting a weight, or when using the arm to save oneself from falling.
- ❓ Vascular reaction: revascularize a degenerate area, this vascular reaction causes congestion and pain

‘wear’, ‘tear’ and ‘repair’

- ? Degeneration:
- ? Trauma and impingement:
- ? Vascular reaction:



13.5 Pathological progression of rotator cuff lesions

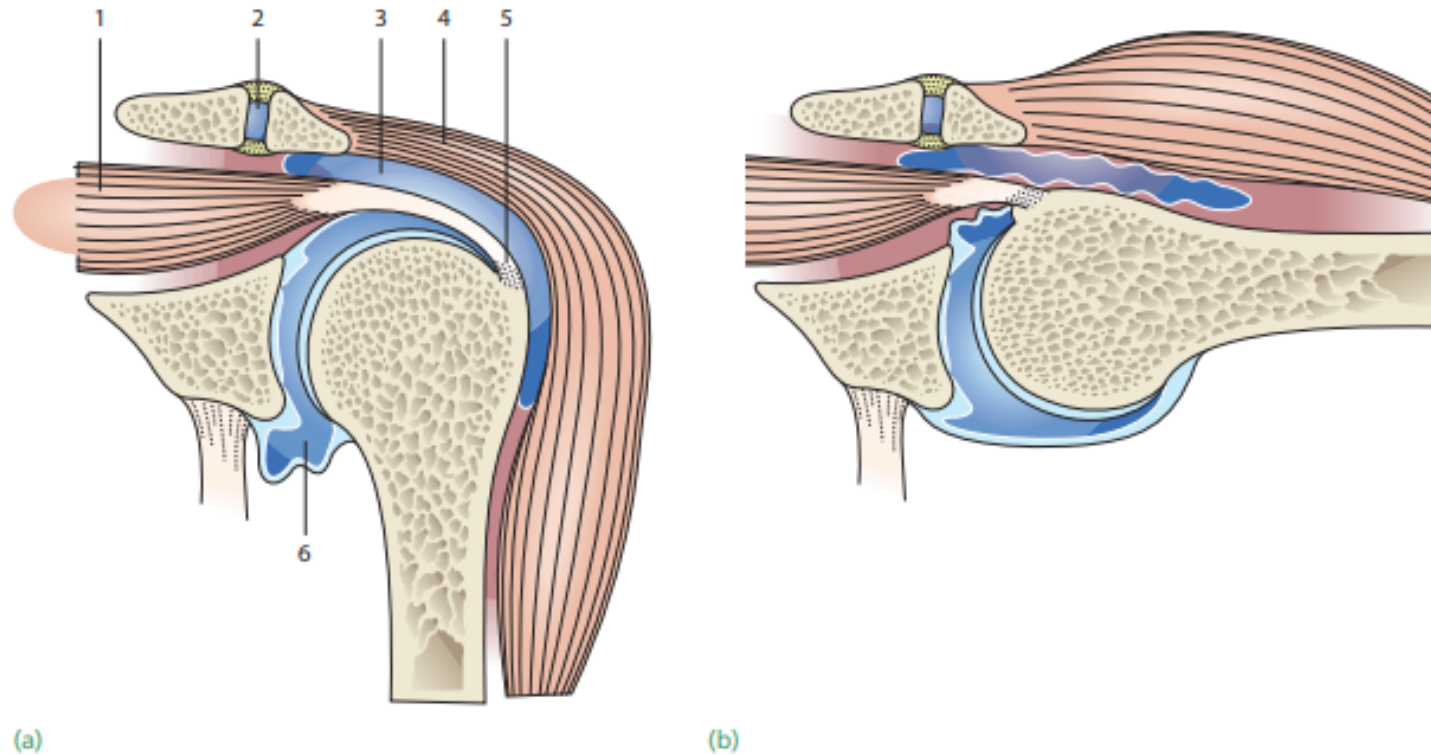
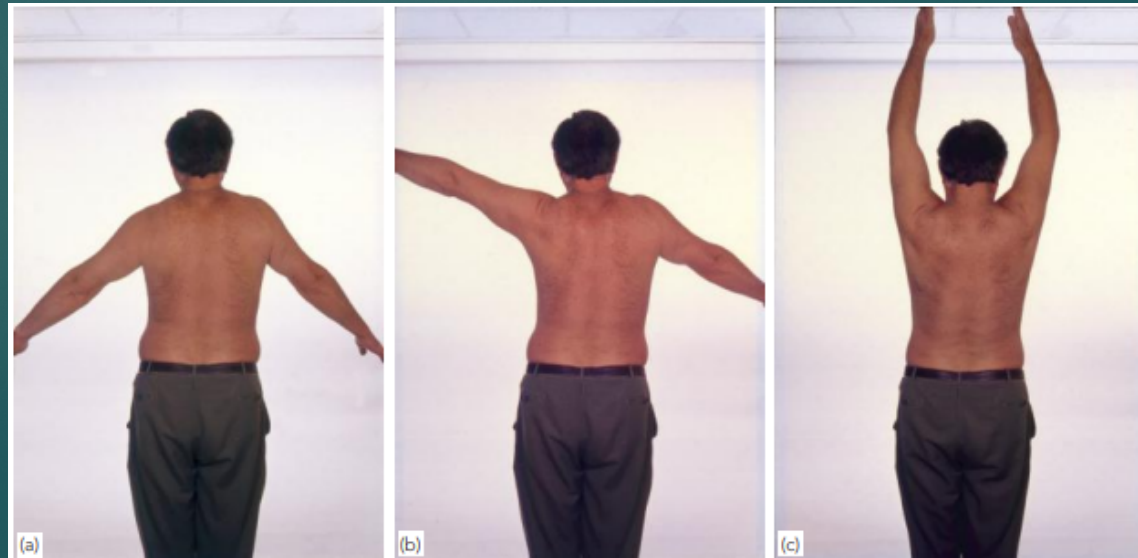


Figure 13.6 Rotator cuff impingement Coronal sections through the shoulder to illustrate show how the subdeltoid bursa and supraspinatus tendon can be irritated by repeated impingement under the coracoacromial arch or a rough acromioclavicular joint during abduction. (a) Joint at rest. (b) In abduction. Key: 1 Supraspinatus muscle; 2 acromioclavicular joint; 3 subdeltoid bursa; 4 deltoid muscle; 5 supraspinatus tendon; 6 synovial joint.

Symptoms and signs

- ? pain and/or weakness during certain movements of the shoulder.
- ? Tenderness is felt at the anterior edge of the acromion.
- ? **The painful arc**: on active abduction 60-120° but pain less if done with arm external rotated.



- 
- ❓ Neer's impingement sign: the scapula is stabilized with one hand while with the other hand the examiner raises the affected arm to the full extent in passive flexion, abduction and internal rotation, thus bringing the greater tuberosity directly under the coracoacromial arch. The test is positive when pain, located to the subacromial space or anterior edge of acromion, is elicited by this manoeuvre.
 - ❓ Can be repeated with the use of lidocaine.

Subacute tendinitis (painful arc syndrome)

- ? anterior shoulder pain after vigorous or unaccustomed activity, with pain more prominent while the arm in extension and decrease with arm in flexion

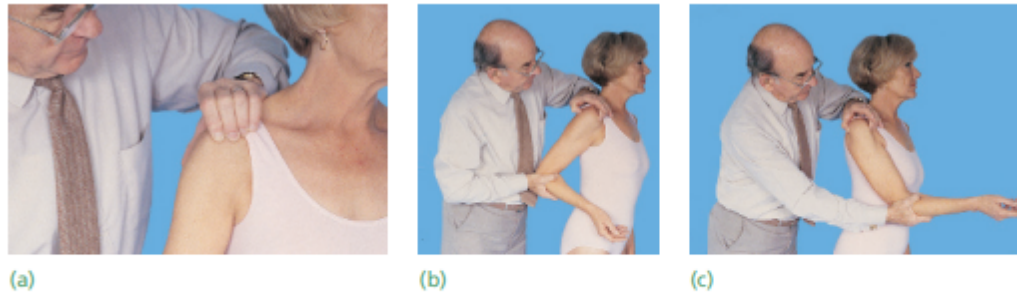


Figure 13.7 Supraspinatus tenderness (a) The tender spot is at the anterior edge of the acromion process. When the shoulder is extended (b), tenderness is more marked; with the shoulder slightly flexed (c) the painful tendon disappears under the acromion process and tenderness disappears.



Chronic tendinitis.

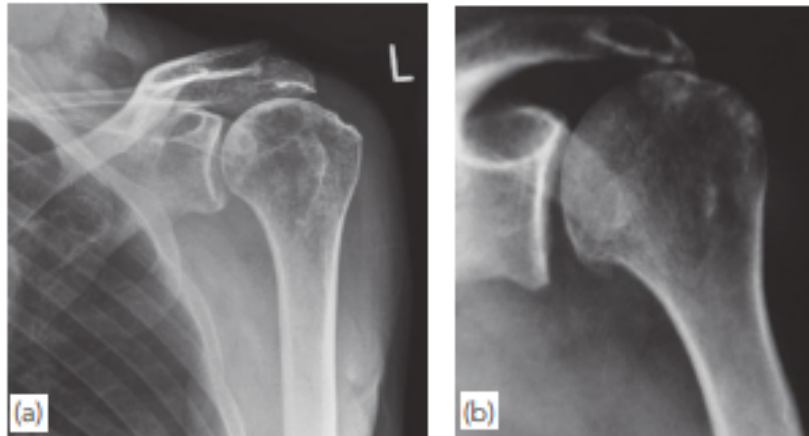
- ❑ 40 and 50 years.
- ❑ a history of recurrent attacks of subacute tendinitis,
- ❑ worse at night.
- ❑ slight stiffness.
- ❑ coarse crepitation or palpable snapping over the rotator cuff while passive rotation.

Rotator cuff tears

- ❑ a partial or full thickness tear.
- ❑ over 45 years.
- ❑ shoulder pain with increasing stiffness and weakness.
- ❑ A full thickness tear--There is sudden pain and the patient is unable to abduct the arm. (the 'drop arm sign').
- ❑ Secondary osteoarthritis may develop in long standing case.

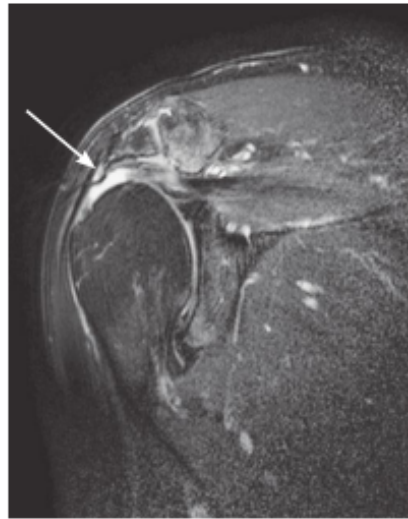
Imaging

- ❑ **X-rays** are usually normal in the early stages of the cuff dysfunction,
- ❑ erosion, sclerosis or cyst formation at the greater tuberosity.



13.7 Acute calcification of supraspinatus The dense mass in the tendon (a) is gradually resorbed or dispersed into the subdeltoid bursa (b).

- ❓ **MRI** can effectively show cuff pathology.
- ❓ Changes on MRI always need to be correlated with the clinical examination



13.8 Rotator cuff tear –
MRI High signal on MRI, indicating a full-thickness tear of the rotator cuff.

Treatment

Conservative treatment

- ❑ avoiding the 'impingement position'.
- ❑ Physiotherapy, including ultrasound and active exercises in the 'position of freedom'.
- ❑ non-steroidal anti-inflammatory.
- ❑ Local injection of corticosteroids

Surgical treatment

- ❑ No response to conservative treatment after 3 months.
 - ❑ (acromioplasty).
 - ❑ open surgery or arthroscopy.
 - ❑ Repair of rotator cuff tears.
1. Young.
 2. Active.
 3. Chronic pain .
 4. Loss of function.



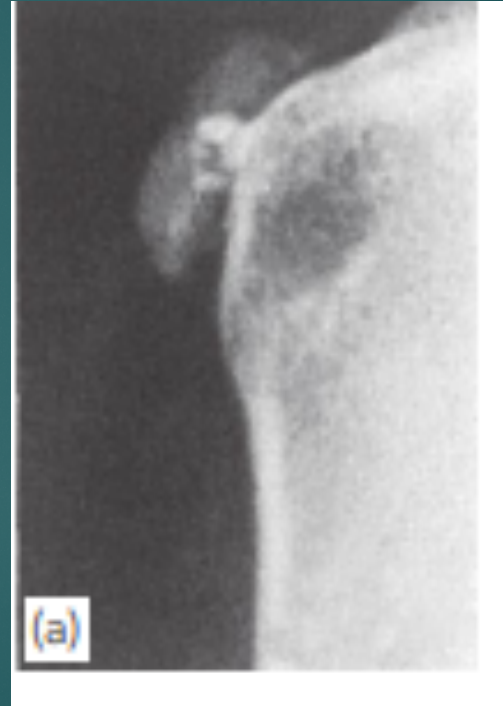
13.9 Impingement syndrome – surgical treatment The coracoacromial ligament and underside of the anterior third of the acromion are removed to enlarge the space for the rotator cuff. This can be performed by open surgery or arthroscopically.

Calcific tendinitis

- ❑ Calcium hydroxyapatite crystals are deposited in the supraspinatus tendon.
- ❑ fibrocartilaginous metaplasia from local ischaemia.
- ❑ disappear entirely within a few weeks.
- ❑ Calcification alone is probably not painful

Clinical features

- 30–50 year olds.
- Pain which is progressive within hrs to sever.
- Within few days it reduce and disappears.
- X-rays Calcification just above the greater tuberosity



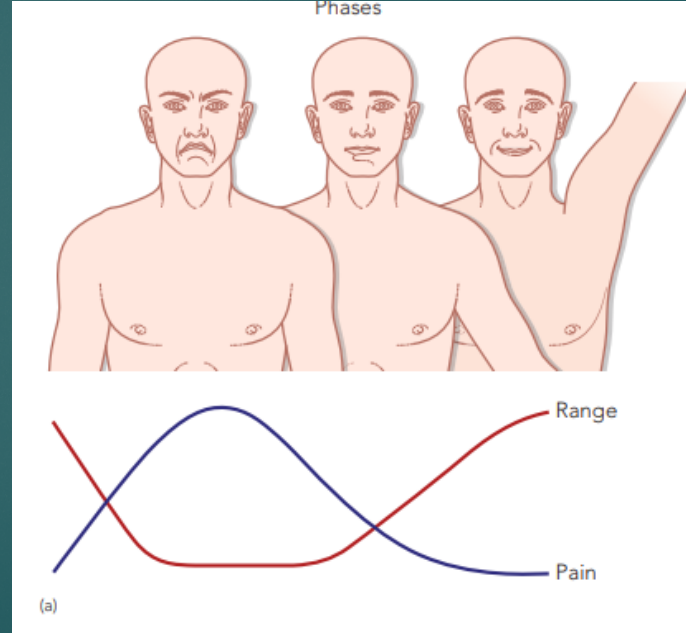
Treatment

- ? Rest in sling.
- ? NSAID.
- ? Local injection.
- ? Extracorporeal shockwave therapy.
- ? drain the pasty calcium deposit under ultrasound guidance ('barbotage')



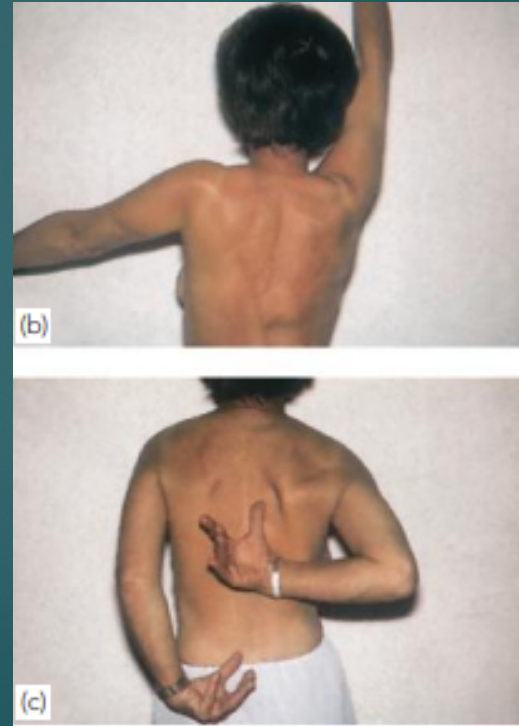
Adhesive capsulitis ('frozen shoulder')

- ? progressive pain and stiffness which usually resolves spontaneously, within 18 months.
- ? Unknown cause.



Clinical features

- ❑ 40–60 years, with history of trauma.
- ❑ muscle wasting.
- ❑ X-rays are normal.



Differential diagnosis

1. Post-traumatic stiffness.
2. Disuse stiffness.
3. Regional pain syndrome.
4. Arthritis.

Treatment

❓ Conservative treatment :-

1. NSAID.
2. Local heat and exercise
3. The role of physiotherapy and steroid injections is unproven.
4. manipulation under anaesthesia , distending the joint with saline until the capsule ruptures.

❓ Operative treatment:-

Arthroscopic division of the interval between supraspinatus and infraspinatus may dramatically improve the range of movement

Lesions of the biceps tendon

Tendinitis

- ? Not apart of the rotator cuff.
- ? May be involved in the rotator cuff pathology.
- ? Isolated lesion rare.
- ? after unaccustomed shoulder strain.
- ? Young adult.
- ? Pain and tenderness are sharply localized to the bicipital groove.
- ? (resisted elbow flexion and supination) will provoke the pain
- ? Rest, local heat and deep transverse frictions
- ? corticosteroid injection

Torn long head of biceps

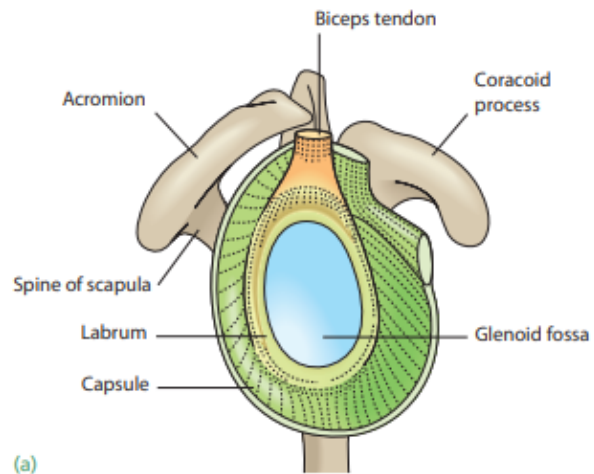
- ? common and is often associated with rotator cuff problems.
- ? middle-aged or elderly.
- ? While lifting a heavy object, he or she feels something snap.
- ? bruising appears over the front of the arm.
- ? Soon the ache subsides and good function returns,
- ? Lump may be first presentation



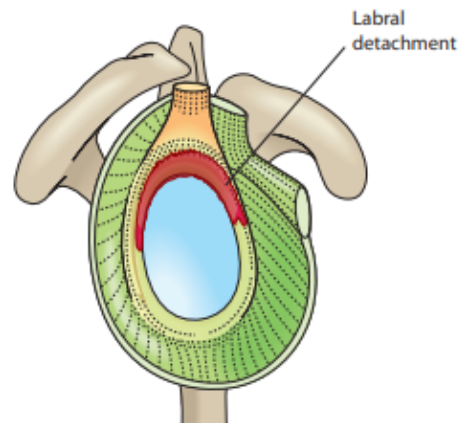
13.12 Ruptured long head of biceps The lump in the front of the arm becomes even more prominent when the patient contracts the biceps against resistance.

SLAP lesions

- ❑ A fall on the outstretched arm.
- ❑ superior part of the glenoid labrum anteriorly and posteriorly (SLAP).
- ❑ a painful 'click' on lifting the arm above shoulder height.
- ❑ MRI arthrography is the modality of choice,
- ❑ Surgically treated arthroscope



(a)



(b)

Figure 13.17 SLAP lesions (a) Diagram of the normal anatomy, looking into the glenoid fossa. Note that the biceps tendon takes its origin from the superior part of the labrum. (b) The labrum may tear or become detached from the glenoid. This illustration shows a partial tear. Other types are described in the text.

Chronic instability of the shoulder

- ❑ wide range of movement at the cost of stability.
- ❑ fibrocartilaginous glenoid labrum and the surrounding ligaments and muscles. Are the stabilization process.

Anterior dislocation (the most common)

- ❑ forced abduction, external rotation and extension .
- ❑ labrum and capsule are often detached from the anterior rim of the glenoid (the classic Bankart lesion).

Posterior dislocation is rare

- ❑ a violent jerk in an unusual position, epileptic fit or a severe electric shock.

Atraumatic instability

- ❑ capsular and ligamentous laxity.
- ❑ weakness of the shoulder muscles.
- ❑ No anatomical derangement.

Anterior instability

- ❑ 95% of cases.
- ❑ as sequel to acute anterior dislocation .
- ❑ In those over 50 years, dislocation is often associated with a rotator cuff tear.after acute dislocation.
- ❑ In young adult mostly associated with recurrent dislocation.
- ❑ detachment or stretching of the glenoid labrum and capsule .

Clinical features

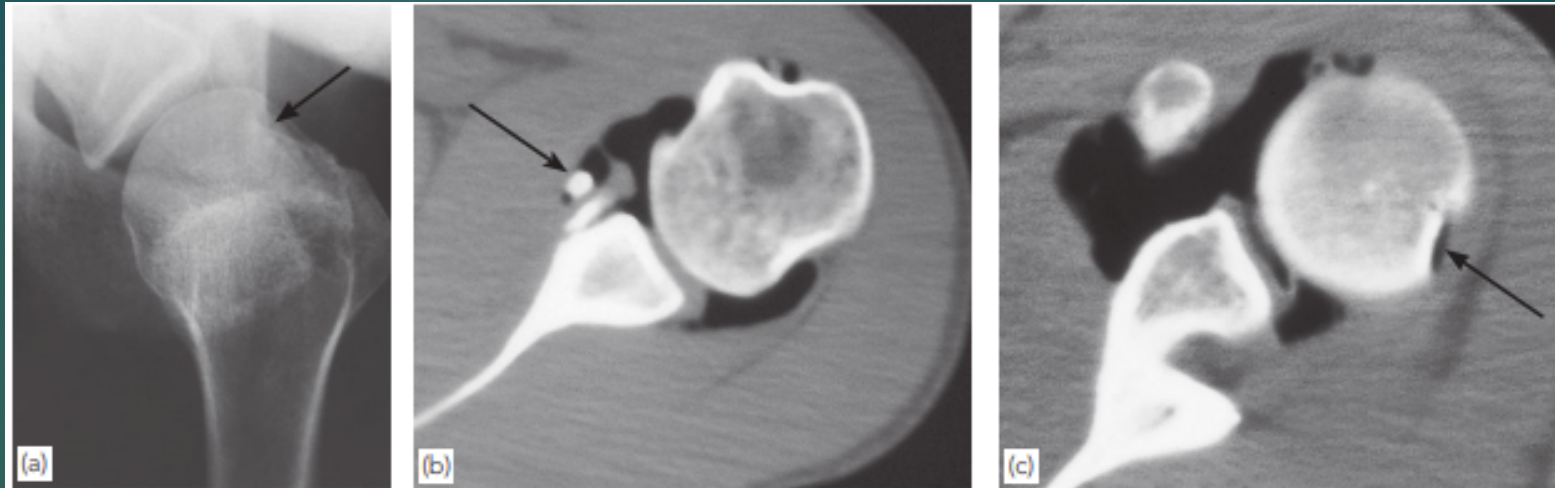
- ❓ the shoulder repeatedly 'coming out of joint' during over-arm movements (lifting the arm in abduction, extension and external rotation),
- ❓ **apprehension sign** With the patient seated, the examiner cautiously lifts the arm into abduction, external rotation and then extension; at the crucial moment the patient senses that the humeral head is about to slip out anteriorly and his body tautens in apprehension.



13.13 Shoulder instability – the apprehension test (a) This is the apprehension test for anterior subluxation or dislocation. Abduct, externally rotate and extend the patient's shoulder while pushing on the head of the humerus. If the patient feels that the joint is about to dislocate, she will forcibly resist the manoeuvre. (b) Posterior dislocation can be tested for in the same way by drawing the arm forward and across the patient's body (adduction and internal rotation).

Imaging

? x-ray



13.14 Anterior instability – imaging (a) The plain x-ray shows a large depression in the posteriosuperior part of the humeral head (the Hill-Sachs sign). (b,c) MRI shows both a Bankart lesion, with a flake of bone detached from the anterior edge of the glenoid, and the Hill-Sachs lesion (arrows).

Treatment

- ❑ Conservative.
- ❑ operative treatment
 1. frequent dislocations, especially if these are painful.
 2. Function lost.
- ❑ The glenoid labrum is re-attached, together with tightening of the anterior capsule.

Posterior instability

- ? Recurrent subluxation rather than dislocation.
- ? when the arm is held in flexion and internal rotation.
- ? Treatment is usually conservative – muscle strengthening exercises and voluntary control of the joint.
- ? Operative reconstruction is indicated only if disability is marked



Atraumatic instability

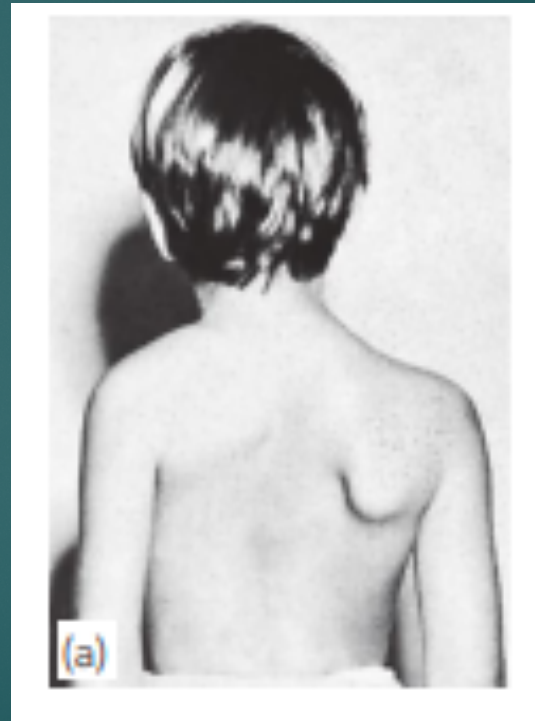
- ❑ shoulder going 'out of joint' with remarkable ease.
- ❑ swimmers and throwers.
- ❑ physiotherapy to strengthen the muscles and to restore proprioception.
Just occasionally surgery is needed to tighten the capsule

congenital elevation of the scapula
(sprengel's shoulder)



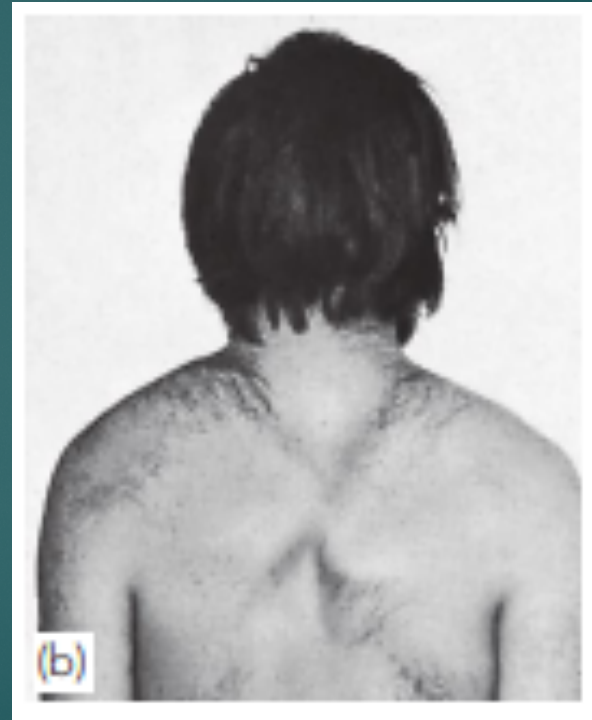
congenital elevation of the scapula (sprengel's shoulder)

- ? scapulae normally complete their descent from the neck by the third month of fetal life.
- ? the scapula looks and feels abnormally high, smaller than usual and somewhat prominent.
- ? painless, but abduction may be limited.
- ? kyphosis or scoliosis may be present.
- ? Surgery or conservative



Klippel–Feil syndrome

- ❑ rare congenital disorder.
- ❑ bilateral failure of scapular descent and fusion of several cervical vertebrae.
- ❑ Short webbed neck.
- ❑ cervical mobility is restricted.
- ❑ left untreated.



Winged scapula

- ? the scapula juts out under the skin,
- ? weakness of the serratus anterior, the muscle which stabilizes the scapula on the thoracic cage.
- ? (pushing hard against a wall).
- ? damage to the long thoracic nerve.
- ? fifth, sixth and seventh cervical nerve roots.
- ? neuralgic amyotrophy.
- ? muscular dystrophy.
- ? self-limiting and the condition gradually improves.or tendon transfer.





THE ELBOW

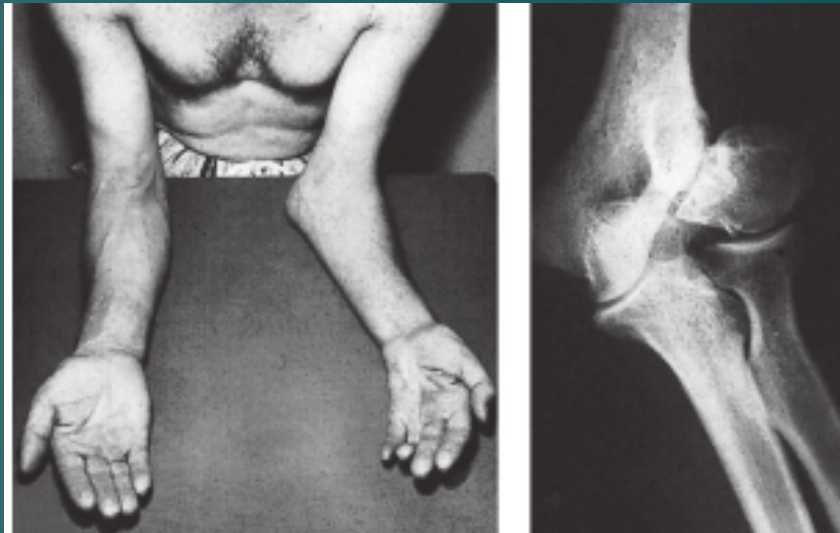
Cubitus varus

- ❑ ('gun-stock') deformity .
- ❑ Elbow extended and the arms are elevated.
- ❑ malunion of a supracondylar fracture.
- ❑ wedge osteotomy of the lower humerus.



Cubitus valgus

- ❑ non-union of a fractured lateral condyle.
- ❑ delayed ulnar palsy to develop; years after the causal injury.
- ❑ the deformity itself needs no treatment.
- ❑ Ulnar nerve transposition



14.2 Cubitus valgus This man's valgus deformity, the sequel to an ununited fracture of the lateral condyle, has resulted in an ulnar nerve palsy.

Stiff elbow

- ? Disabling condition.
- ? trauma,congenital,arthritis.
- ? physiotherapy.,surgery.



Olecranon bursitis

- ? as a result of pressure or friction.
- ? infection, gout or rheumatoid arthritis.
- ? Treat underline cause.
- ? Drain septic bursa.
- ? Excision .



14.5 Olecranon bursitis The enormous red lumps over the points of the elbows are due to swollen olecranon bursae; the patient's ruddy complexion completes the typical picture of gout.

Tennis elbow' and 'golfer's elbow'

- ❑ a natural degenerative process in the tendon aponeuroses attached to either the lateral or medial humeral epicondyle
- ❑ Unknown cause.
- ❑ Pain follow occupational stress or unaccustomed activity.
- ❑ wrist movements and forearm muscle contraction.

Clinical features

- ? **'tennis elbow'**, pain is felt over the outer side of the elbow, but in severe cases it may radiate widely
- ? flexion and extension are full and painless.
- ? Pain with forearm contraction in pronation.
- ? Tender just over lateral epicondyle.
- ? extend the wrist against resistance, or simply by passively flexing the wrist so as to stretch the common extensors.
- ? **'golfer's elbow'**, tenderness over medial epicondyle.
- ? pain is reproduced by passive extension of the wrist in supination.

Treatment

- ❑ Rest, or avoiding the precipitating activity.
- ❑ A splint and physiotherapy.
- ❑ Steroid injection.
- ❑ Surgery.(detaching the tendon from its origin)



14.6 Tennis elbow

(a) Tenderness over the lateral epicondyle. (b) Pain is provoked by resisted wrist extension. (c) Extensor carpi radialis brevis origin may have to be released.



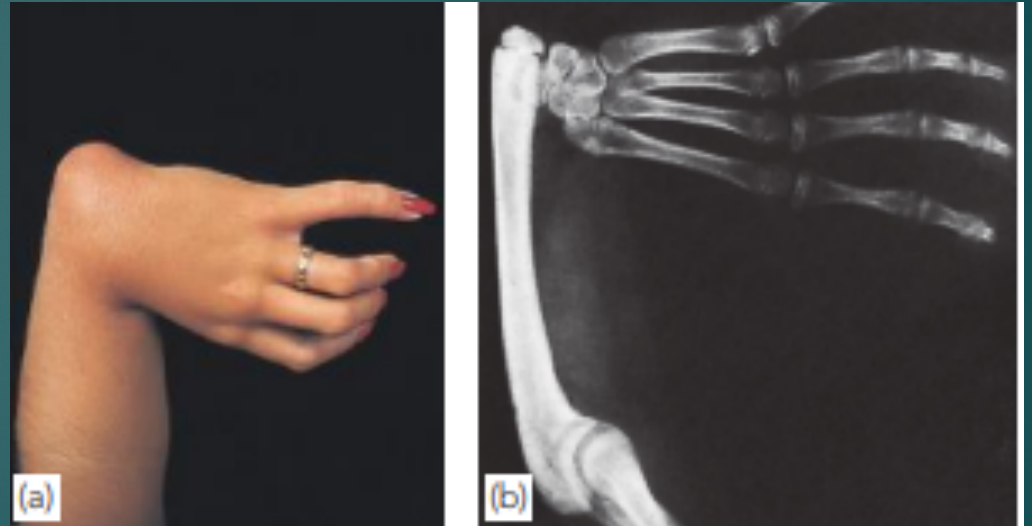
THE WRIST

Wrist deformities

- ❑ 1 in 600 live births.
- ❑ rare conditions.
- ❑ appear together in the forearm, wrist and hand.
- ❑ associated congenital abnormalities.

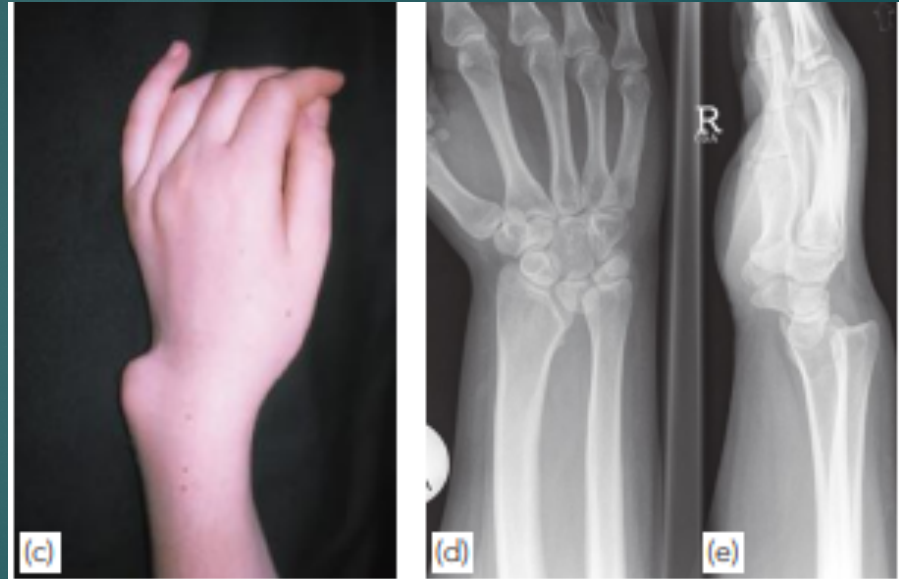
Radial dysplasia

- ? the wrist in marked radial deviation(radial club-hand).
- ? Bilateral in 50%.
- ? absence of the whole or part of the radius, and usually also the thumb.
- ? gentle stretching and splintage, in neonatal period.
- ? 'centralizing' the carpus, before the age of 3 years.
- ? recurrence of the deformity is high.
- ? Always examine the elbow: if the joint is stiff



Madelung's deformity

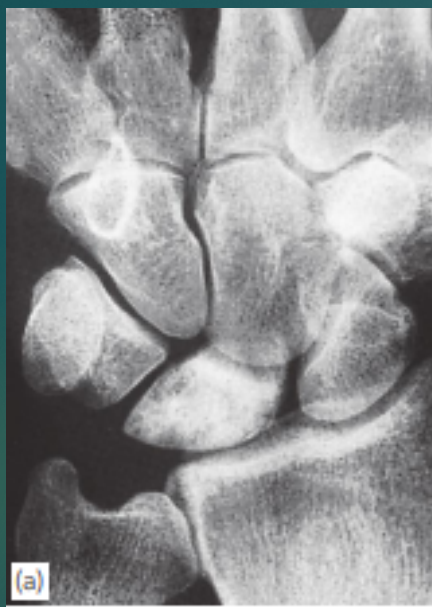
- ? the lower radius curves forwards (ventrally), carrying with it the carpus and hand.
- ? the distal end of the ulna projecting on the back of the wrist.
- ? At birth ,but present around age of 10 years,then increase till growth complete.
- ? Function well .
- ? Ulna shortening with or without radial lengthening.
- ? May be no treatment



Kienböck's disease

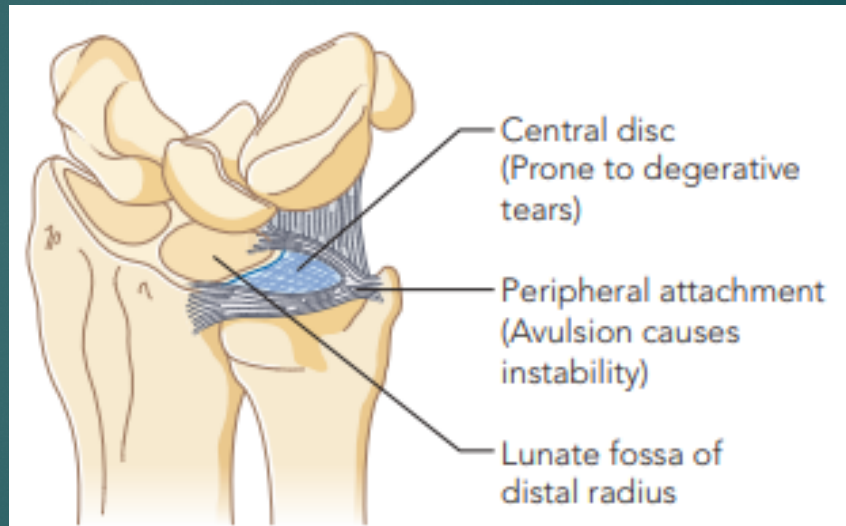
- ❑ avascular necrosis of lunate bone.
- ❑ (negative ulnar variance).
- ❑ result in excessive stress being applied to the lunate where it is squeezed between the distal surface of the (overlong) radius and the second row of carpal bones.
- ❑ a young adult, complains of ache and stiffness.
- ❑ Tenderness is localized to the centre of the wrist on the dorsum.
- ❑ wrist extension limited.

- 
- ❑ X-ray normal in early stage/
 - ❑ MRI is diagnostic in the early disease.
 - ❑ increased density in the lunate and, later, flattening and irregularity of the bone. osteoarthritis of the wrist.
 - ❑ Radial osteotomy shortening.
 - ❑ Microsurgical revascularization of the bone .
 - ❑ partial wrist arthrodesis or proximal row excision or even joint replacement are considered.

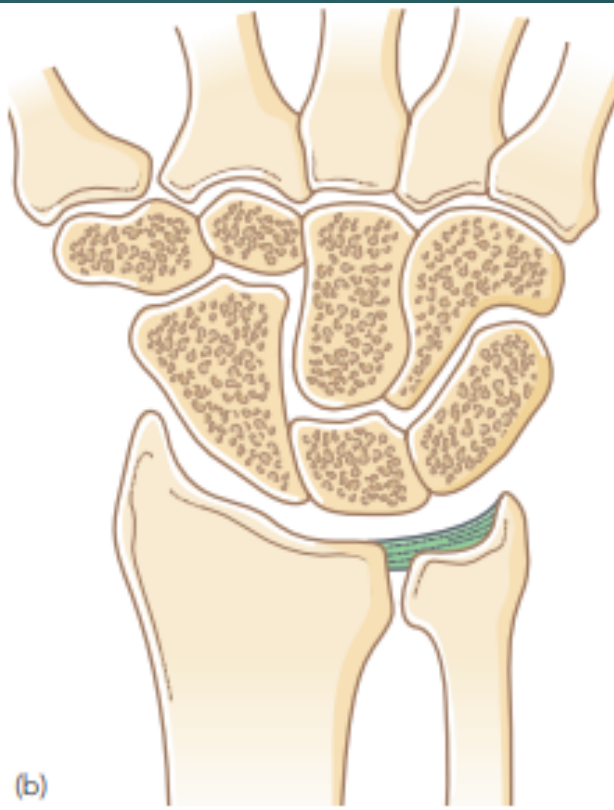


Tears of the triangular fibrocartilage TFCC

- ? from the base of the ulnar styloid process to the medial edge of the distal radius.
- ? like a meniscus in the wrist joint.
- ? Pain and loss of grip.
- ? clicking on supination of the forearm.
- ? MRI or arthroscopy.
- ? Repair or debridement.
- ? Open or arthroscopy.



15.10 Triangular fibrocartilage complex.



15.3 X-rays (a) Note the shape and position of the bones which make up the wrist:

(A) scaphoid, (B) lunate, (C) triquetrum overlain by pisiform, (D) trapezium, (E) trapezoid, (F) capitate, (G) hamate

(b) Schematic section showing the carpal articulations and the triangular fibrocartilaginous ligament (coloured green).

Ulnocarpal impaction

- ? impaction of the ulnar head against the ulnar side of the lunate and ulnocarpal arthritis (the ulnocarpal impaction syndrome)
- ? Long ulna.
- ? Post impacted distal radius fracture(short radius).
- ? X-ray ('positive ulnar variance').
- ? simple analgesics, splintage and steroid injections.
- ? arthroscopic excision of the distal dome of the ulnar head may be successful.
- ? Ulna shortening osteotomy.

De Quervain's disease

- ? Tenovaginitis of the first dorsal compartment.
- ? (abductor pollicis longus and extensor pollicis brevis)
- ? women between the ages of 30 and 50 years.
- ? Post repetitive microtrauma.
- ? Pain, and sometimes swelling, is localized to the radial side of the wrist.
- ? tendon sheath feels thick and hard.
- ? Tenderness is most acute at the very tip of the radial styloid.
- ? The pathognomonic sign is elicited by Finkelstein's test.
- ? ultrasound therapy or a corticosteroid injection .
- ? Surgery.



15.12 De Quervain's disease (a) There is point tenderness at the tip of the radial styloid process. (b,c) Finkelstein's test: ulnar deviation with the thumb left free is relatively painless (b), but if the movement is repeated with the thumb held close to the palm (c), the pull on the thumb tendons causes intense pain. (d) Injecting the tendon sheath.

Ganglion

- ? cystic degeneration in the joint capsule or tendon sheath. The distended cyst contains a glairy fluid.
- ? Typically at dorsum of the wrist.
- ? a young adult, with painless lump not tender .
- ? Disappear within months.
- ? Aspiration.
- ? Excision with recurrence rate 30%



15.13 Volar wrist ganglion

Carpal tunnel syndrome

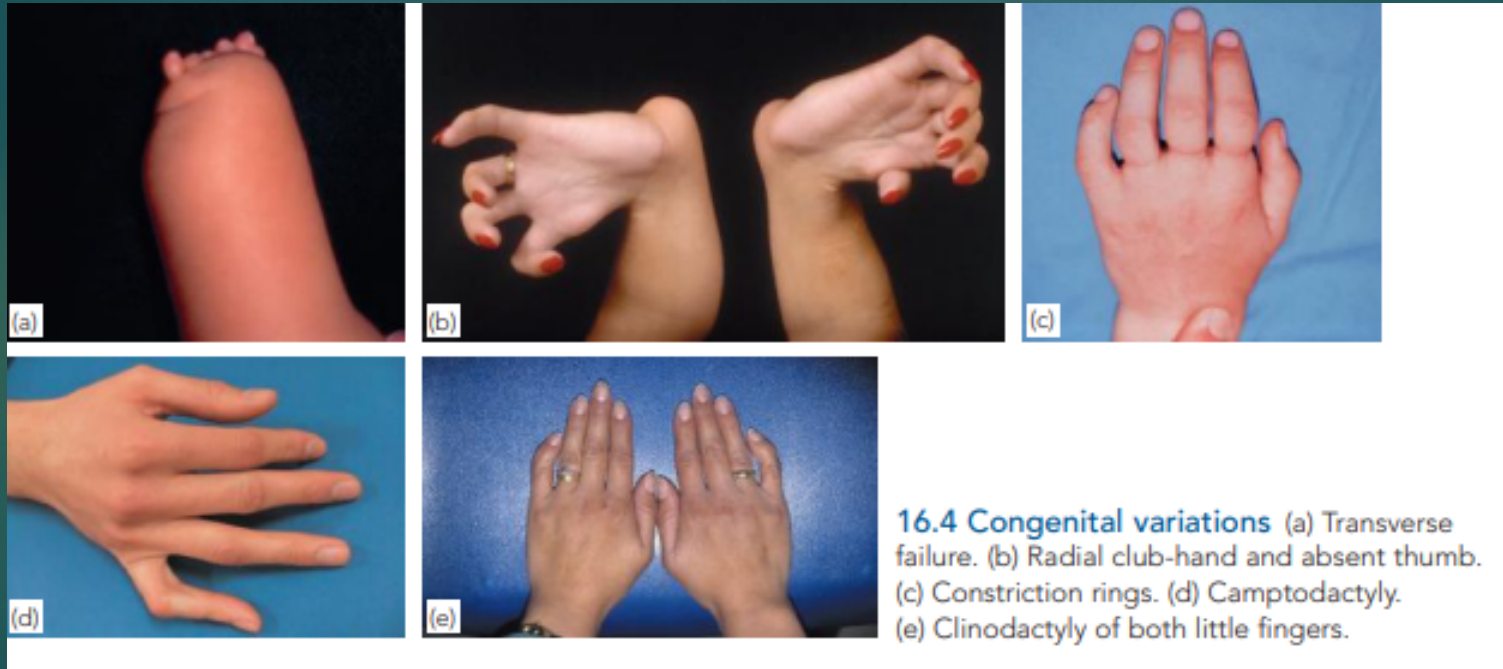
- ❑ Median nerve compression at wrist level.
- ❑ women at the menopause, rheumatoid arthritis, in pregnancy and in myxedema.
- ❑ 40–50 years.
- ❑ Pain and paraesthesia occur in the distribution of the median nerve in the hand.
- ❑ Patients tend to seek relief by hanging the arm over the side of the bed or shaking the arm.
- ❑ percussing over the median nerve (Tinel's sign) or by holding the wrist fully flexed for a minute (Phalen's test)

- 
- ? wasting of the thenar muscles, weakness of thumb abduction and sensory dulling in the median nerve territory.
 - ? Consider radicular symptom.
 - ? Diagnosis is clinical.
 - ? EMG & NCV.
 - ? Light splints that prevent wrist flexion.
 - ? Steroid injection into the carpal canal.
 - ? Open release.
 - ? Wait in pregnancy.



15.14 Median nerve compression (a) In the right hand there is wasting of the thenar eminence. (b) Testing for abductor power shows that it is weaker than that in the normal hand. (c) Area of diminished sensibility. (d) Tapping on the nerve may cause tingling in the hand (Tinel's sign), and holding the wrist flexed for 2 minutes may also produce tingling in the median nerve distribution (e).

THE HAND



Dupuytren's contracture

- ? a nodular hypertrophy and contracture of the palmar aponeurosis.
- ? Familial.
- ? Diabetes, (AIDS), epilepsy receiving phenytoin therapy, Smoking and heavy alcohol consumption are also risk factors.
- ? a middle-aged man – complains of a nodular thickening in the palm. involve the ring or little finger.
- ? Pain is unusual. The palm is puckered, nodular and thick.
- ? flexion deformities at the MCP and PIP joints.
- ? (Ledderhose's disease). similar nodules may be seen on the soles of the feet
- ? Peyronie's disease.

- ? If the deformity is static no treatment.
- ? Surgical release.
- ? injection of a drug, collagenase, to dissolve the cord



16.5 Dupuytren's disease Contractures at (a) the palmar crease and (b) the proximal interphalangeal joint. (c) Z-plasty shortly after operation and (d) 2 weeks later.

Ulnar 'claw-hand' (intrinsic-minus deformity)

- ? hyperextension at the MCP joints and flexion at the IP joints.
- ? paralysis of the intrinsic muscles which normally activate MCP flexion and IP extension.



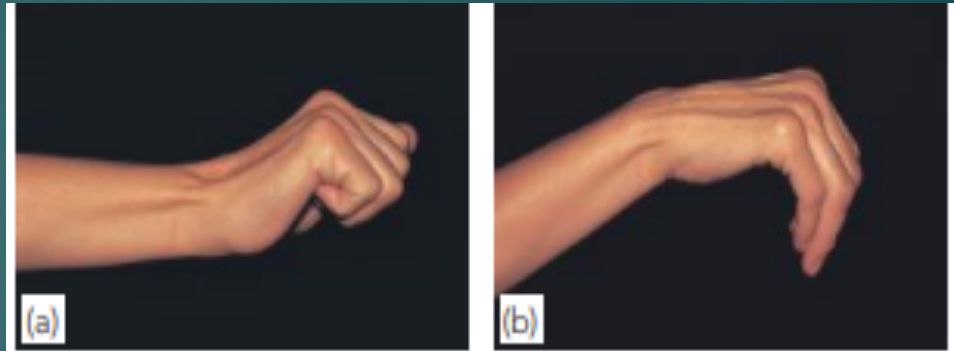
16.6 Ulnar 'claw-hand' (a) High ulnar nerve paralysis causing a *partial claw-hand* deformity: the paralysed intrinsic muscles cause the loss of flexion at the MCP joints and loss of extension at the IP joints, but because flexor digitorum profundus (FDP) is also partially paralysed the index and middle fingers are straight. (b) Low ulnar nerve paralysis (lower than the innervation of FDP), causing a *total claw-hand* deformity in which all the long flexors are still active.

Shortening of intrinsic muscles (intrinsic-plus deformity)

- ❑ flexion at the MCP joints with extension of the IP joints and adduction of the thumb – an intrinsic-plus deformity.
- ❑ muscle scarring or shortening after trauma or infection.
- ❑ releasing the intrinsic muscles

Ischaemic contracture of the forearm muscles

- ❓ shortening of the long flexors; the fingers are held in flexion and can be straightened only when the wrist is flexed.
- ❓ releasing the shortened muscles at their origin above the elbow,
- ❓ excising the dead muscles and restoring finger movement with tendon transfers.

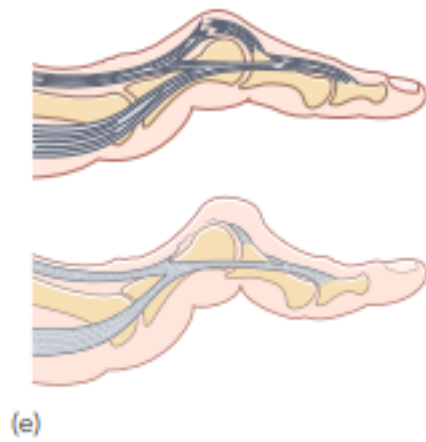


16.7 Contracture of the long flexors (a) When the wrist is extended, the fingers involuntarily curl into tight flexion. (b) When the wrist is flexed, tension on the long flexor muscles is relaxed and the fingers can uncurl to a certain extent.

'Mallet' finger

- ? The patient suddenly cannot straighten the terminal joint,
- ? passive movement is normal.
- ? injury at the attachment of the extensor tendon to the terminal phalanx.
- ? Acute injury treated by mallet splint.
- ? X-ray to rule out fracture.





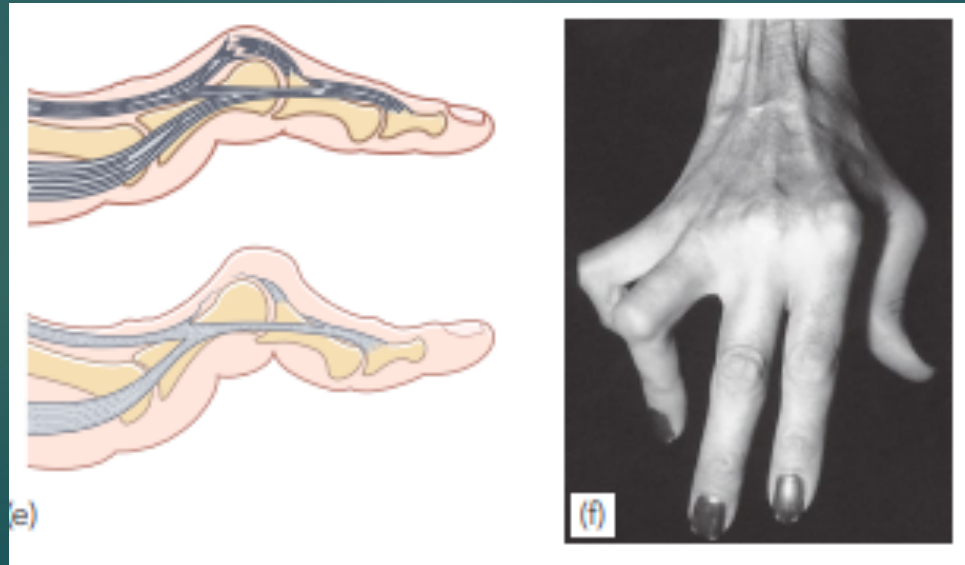
16.8 Deformities due to tendon lesions (a) Mallet finger. (b) Dropped fingers due to extensor tendon ruptures at the wrist. (c) Swan-neck deformities. (d) Rupture of extensor pollicis brevis. (e,f) Boutonnière deformities.

Ruptured extensor pollicis longus

- ❓ Post distal radius fracture, or rheumatoid arthritis.
- ❓ Direct repair is unsatisfactory and a tendon transfer, using the extensor indicis.

Boutonnière

- ? a flexion deformity of the PIP joint,
- ? Injury of central slip of the extensor tendon.
- ? trauma or in rheumatoid disease.



Swan-neck deformity

- ❑ reverse of boutonnière:
- ❑ the PIP joint is hyperextended and the DIP joint flexed.
- ❑ imbalance of extensor versus flexor action in the finger,
- ❑ rheumatoid arthritis



'trigger finger

- ❓ when the hand is clenched and then opened, the finger (or thumb) gets stuck in flexion; with a little more effort, it suddenly snaps into full extension.
- ❓ thickening of the fibrous tendon sheath:
- ❓ A tender nodule or thickened tendon can usually be felt at the distal palmar crease.
- ❓ DM.
- ❓ an injection of corticosteroid carefully placed at the entrance of the tendon sheath.surgical release.
- ❓ Infantile trigger thumb treated at age of 3years



Acute infections of the hand

- 1- Acute paronychia — infection under the nailfold.
- 2- Apical abscess — a small collection of pus under the end of a nail.
- 3- Intradermal abscess — a collection of pus on the palmar surface of the finger or hand, lying between the deep and superficial layers of the dermis, it may communicate with a second collection in the deep tissues — collar stud abscess .
- 4- Pulp space infection — the pulp space of the finger is divided by septa and becomes very tense and painful if sepsis occurs. The phalanx (usually terminal) may become secondarily infected and an X - ray is essential if infection is well – established.
- 5- Web space infections — infection occurs between the fingers and pus may point in the web.

- ? 6 Deep palmar space infection —
suppuration may be localized to one or
other of the anatomical palmar spaces

BOX 16.2 KANAVEL'S SIGNS OF FLEXOR SHEATH INFECTION

Flexed posture of digit
Tenderness along the course of the tendon
Pain on passive finger extension
Pain on active flexion



16.11 Types of hand infection (a) Acute nailfold infection (paronychia). (b) Chronic paronychia. (c) Flexor tenosynovitis of the middle finger following a cortisone injection. (d) Septic human bite resulting in acute infection of the fourth metacarpophalangeal joint.

Principles of treatment

Superficial hand infections are common; if their treatment is delayed or inadequate, infection may rapidly extend, with serious consequences. The essentials of treatment are:

- antibiotics
- rest, splintage and elevation
- drainage
- rehabilitation.



(a)



(b)

Figure 16.26 The position of safe immobilization The knuckle joints are 90° flexed, the finger joints extended and the thumb abducted. This is the position in which the ligaments are at their longest and splintage is least likely to result in stiffness.

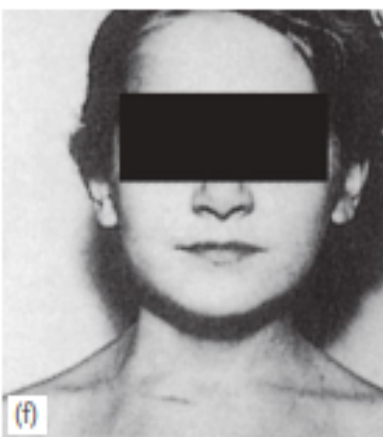
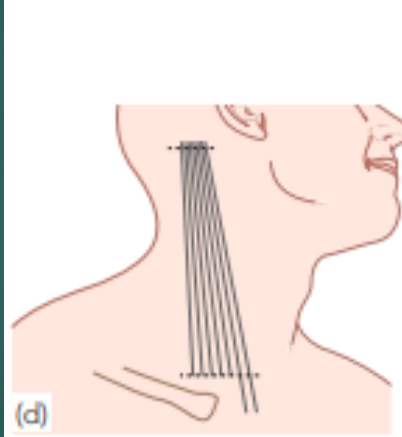
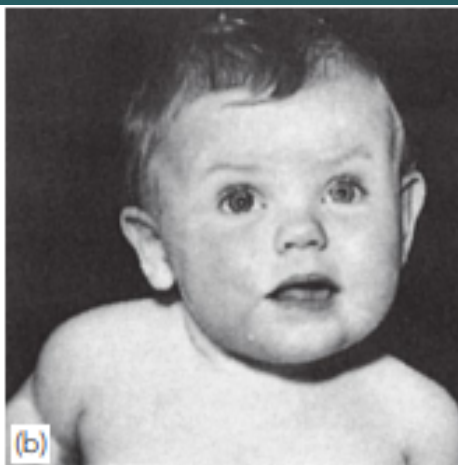
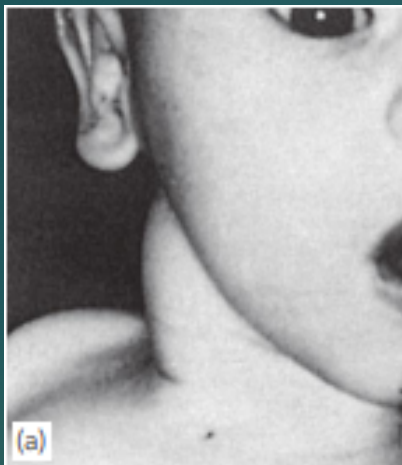


The neck

Torticollis ('wry neck', 'skew neck')

Infantile (congenital) torticollis

- ? The sternomastoid muscle on one side is fibrous and fails to elongate as the child grows.
- ? a well-defined lump is felt in the muscle.
- ? twisting the chin towards the opposite side.
- ? Secondary facial deformities may occur.
- ? gentle, daily manipulation of the neck.
- ? Surgical release.
- ? Post surgery orthosis and physiotherapy.
- ? Exclude DDH.



Secondary torticollis

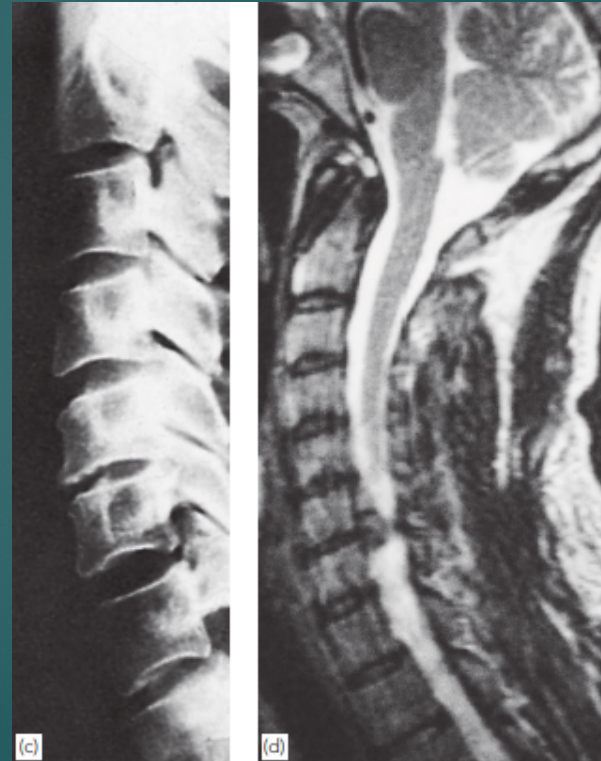
- ❑ due to muscle spasm
- ❑ acute disc prolapse
- ❑ inflamed neck glands
- ❑ vertebral infection,
- ❑ injuries of the cervical spine or ocular disorders.
- ❑ Gastro oesophageal reflux

Acute Cervical disc prolapse

- ❑ local strain or injury, especially sudden unguarded flexion and rotation.
- ❑ a predisposing abnormality of the disc with increased nuclear tension.
- ❑ The disc protrusion may press on the posterior longitudinal ligament, causing neck pain .
- ❑ Radiculopathy to the scapular region , occiput.

Imaging

- ? X-rays may show narrowing of the disc space.
- ? MRI, which will show whether the disc protrusion is pressing on the adjacent nerve root



Differential diagnosis

- ❑ Acute soft-tissue strain:
- ❑ Neuralgic amyotrophy.
- ❑ Cervical spine infections.
- ❑ Cervical tumours.

Treatment

- ❑ Rest: a collar will prevent unguarded movement
- ❑ Reduce: traction may enlarge the disc space,
- ❑ Surgery by anterior approach.





THE BACK

Scoliosis

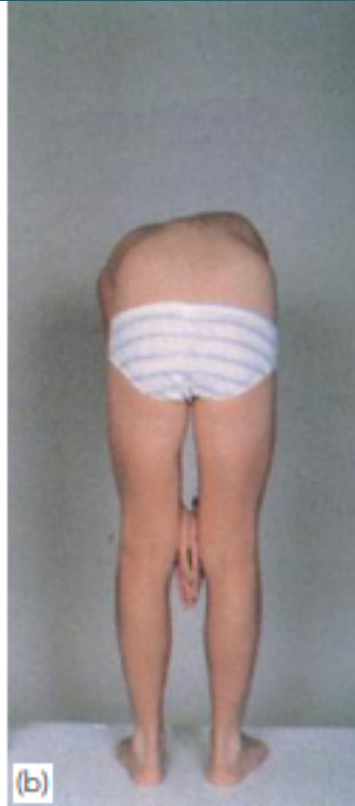
- ❓ an apparent lateral (sideways) curvature of the spine with rotation deformity with or without anterior posterior deformity.
- ❓ no obvious cause.
- ❓ congenital or osteopathic (due to bony anomalies), neuropathic, myopathic (associated with some muscle dystrophies) and a miscellaneous group of connective-tissue disorders.
- ❓ **Postural scoliosis**:-compensatory to some condition outside the spine, such as a short leg or a pelvic tilt due to contracture of the hip.disappears on sitting

Structural scoliosis

- ❓ a non-correctable deformity of the affected spinal segment, an essential component of which is vertebral rotation.
- ❓ The spinous processes swing round towards the concavity of the curve and the transverse processes on the convexity rotate posteriorly.
- ❓ In the thoracic region the ribs on the convex side stand out prominently, producing the rib hump.
- ❓ Secondary (compensatory) curves nearly always develop to counterbalance the primary deformity;
- ❓ the deformity is liable to increase throughout the growth period

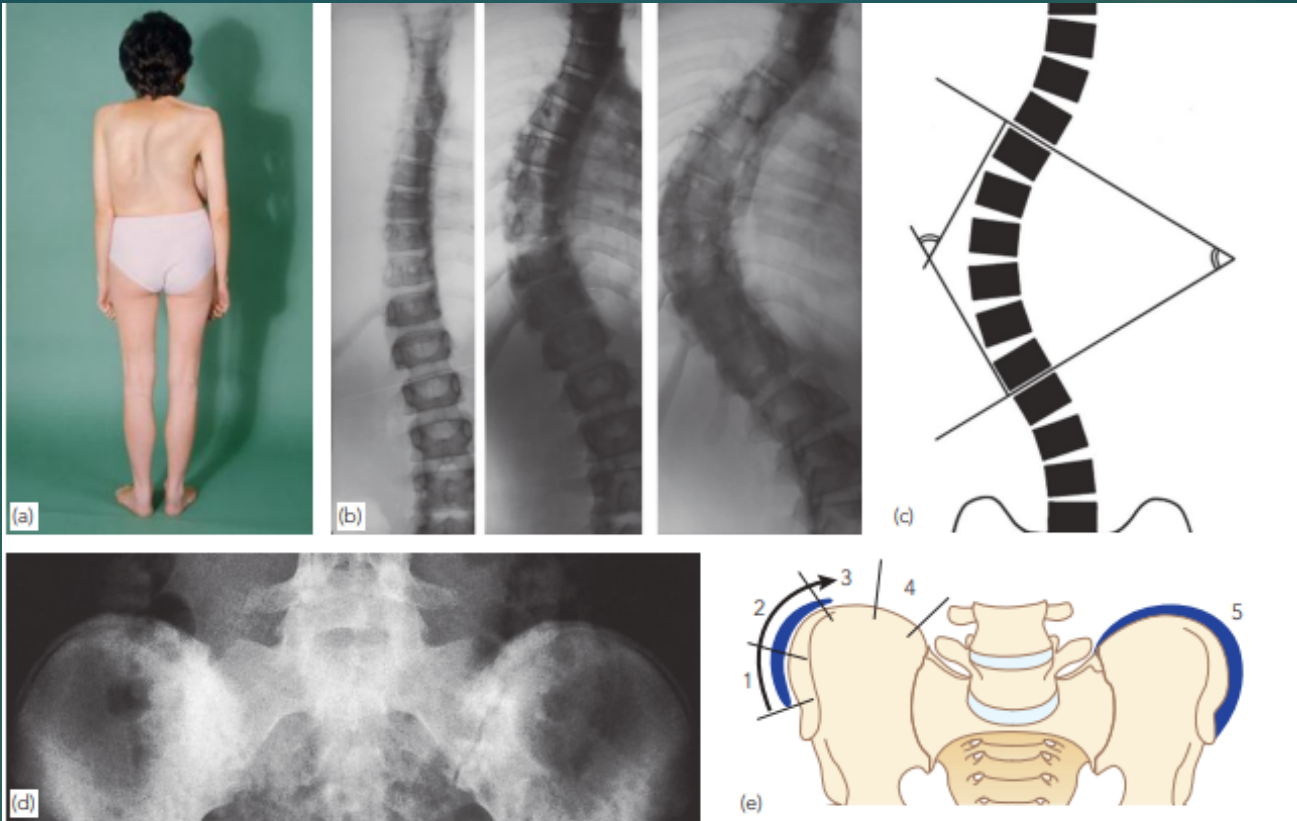
Clinical features

- ❑ Deformity a rib hump in thoracic curves, and asymmetrical prominence of one hip in thoracolumbar curves.
- ❑ . Pain is a rare complaint and should alert the clinician to the possibility of a neural tumour .
- ❑ A family history of scoliosis .
- ❑ Spinal mobility should be assessed and the effect of lateral bending.
- ❑ Neurological examination.
- ❑ assessment of cardiopulmonary function.
- ❑ Skin pigmentation and congenital anomalies such as sacral dimples or hair tufts are sought



Imaging

- ❑ Full-length posteroanterior (PA) and lateral x-rays of the spine and iliac crests must be taken standing.
- ❑ Lateral bending views are taken to assess the degree of curve correctability.
- ❑ (Cobb's angle)
- ❑ Right thoracic curves are the commonest
- ❑ girls in adolescent
- ❑ (Risser's sign of skeletal maturity).
- ❑ CT and MRI may be necessary to define a vertebral abnormality or cord compression.



18.8 Adolescent idiopathic scoliosis (a) Typical thoracic deformity. (b) Serial x-rays show how this curve increased over a period of 4 years. (c) The angle of curvature is measured on the x-ray by Cobb's method: lines projected from the top of the uppermost and the bottom of the lowermost vertebral bodies in the primary curve define Cobb's angle. An AP view of the pelvis is needed to assess Risser's sign (d,e). The iliac apophyses normally ossify progressively from lateral to medial; when fusion is complete, we know that spinal maturity has been reached and further increase in the angle of curvature is negligible.

Idiopathic scoliosis

- ❑ 80% of all cases of scoliosis.
- ❑ Familial.
- ❑ 3 per 1000.more than 30degree.
- ❑ adolescent, juvenile and infantile.
- ❑ Early onset (before puberty) and late-onset scoliosis (after puberty).

Late-onset (adolescent) idiopathic scoliosis (aged 10 years or over)

- ❑ 90%.
- ❑ Girls.
- ❑ Primary thoracic right and secondary lumbar left.
- ❑ most curves of less than 20 degrees either resolve spontaneously or remain unchanged.

predictors of progression are.

- (1) a very young age;
- (2) marked curvature;
- (3) an incomplete Risser sign at presentation

Treatment

- (1) to prevent a mild deformity from becoming severe.
- (2) to correct an existing deformity that is unacceptable to the patient.
- (3) Follow up every 6 months.

Non-operative treatment

- ❑ less than 30 degrees and well balanced.
- ❑ Near maturity.
- ❑ No progression on follow up

no treatment.

1. Exercises have no effect on the curve but they do maintain muscle tone.
2. Bracing has been used for many years in treating progressive curves of 20–30 degrees

Operative treatment

- (1) curves of more than 30 degrees that are cosmetically unacceptable.
- (2) milder deformity that is deteriorating rapidly.
- (3) Balanced, double primary curves require operation only if they are greater than 40 degrees and progressing.

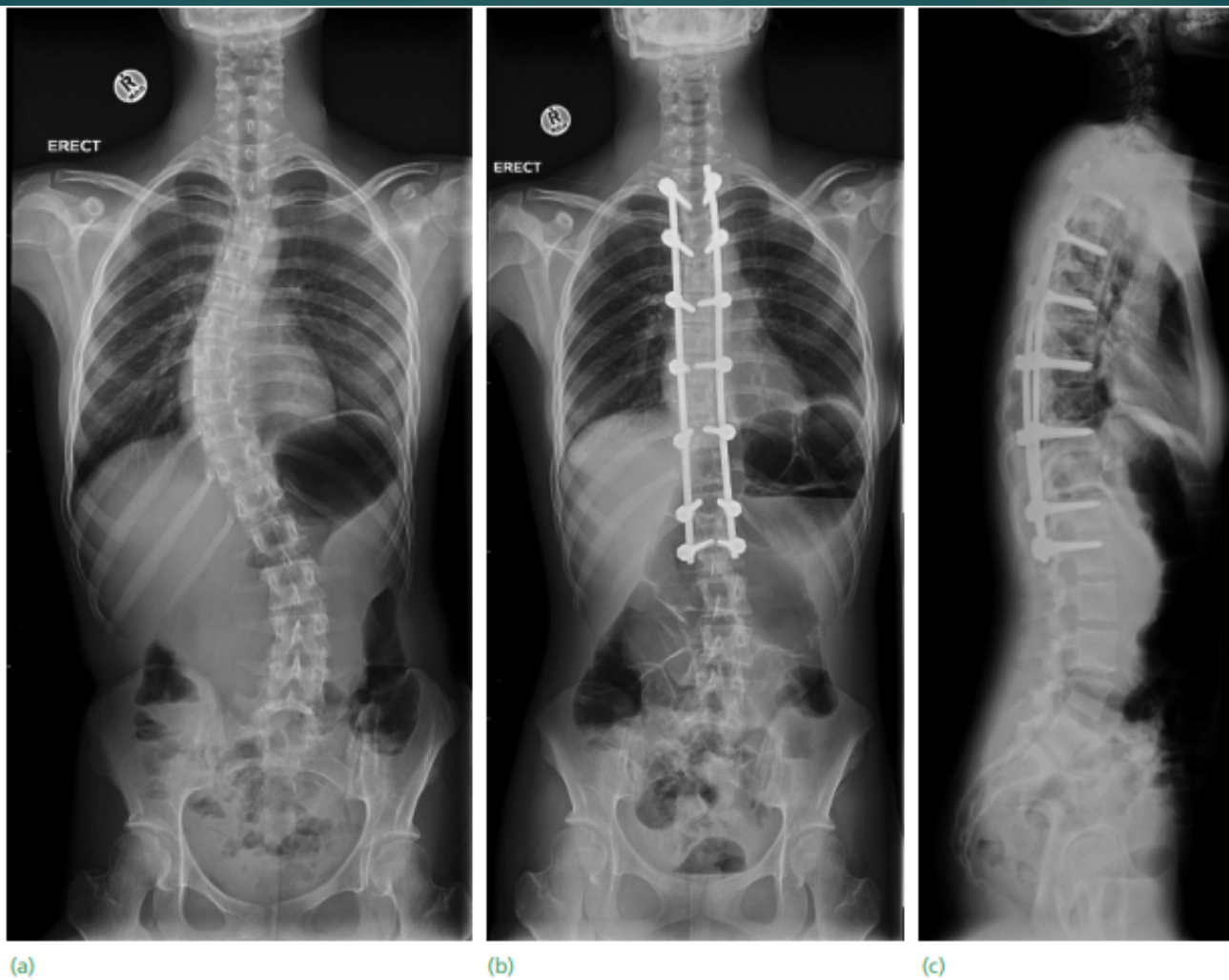


Figure 18.13 Scoliosis – posterior instrumentation (a) Preoperative anteroposterior X-ray; (b) postoperative anteroposterior X-ray; (c) postoperative lateral X-ray.

Infantile thoracic



60% male.
90% convex to left.
Associated with ipsilateral
plagiocephaly.
May be resolving or progressive.
Progressive variety becomes severe.

Adolescent thoracic



90% female.
90% convex to right.
Rib rotation exaggerates the
deformity.
50% develop curves of greater than
70 degrees.

Thoracolumbar



Slightly more common in females.
Slightly more common to right.
Features midway between adolescent
thoracic and lumbar.

Lumbar



More common in females.
80% convex to left.
One hip is prominent but no ribs to
accentuate deformity.
Therefore not noticed early, but
backache in adult life.

Combined



Two primary curves, one in each
direction.
Even when radiologically severe,
clinical deformity is relatively slight
because always well balanced.

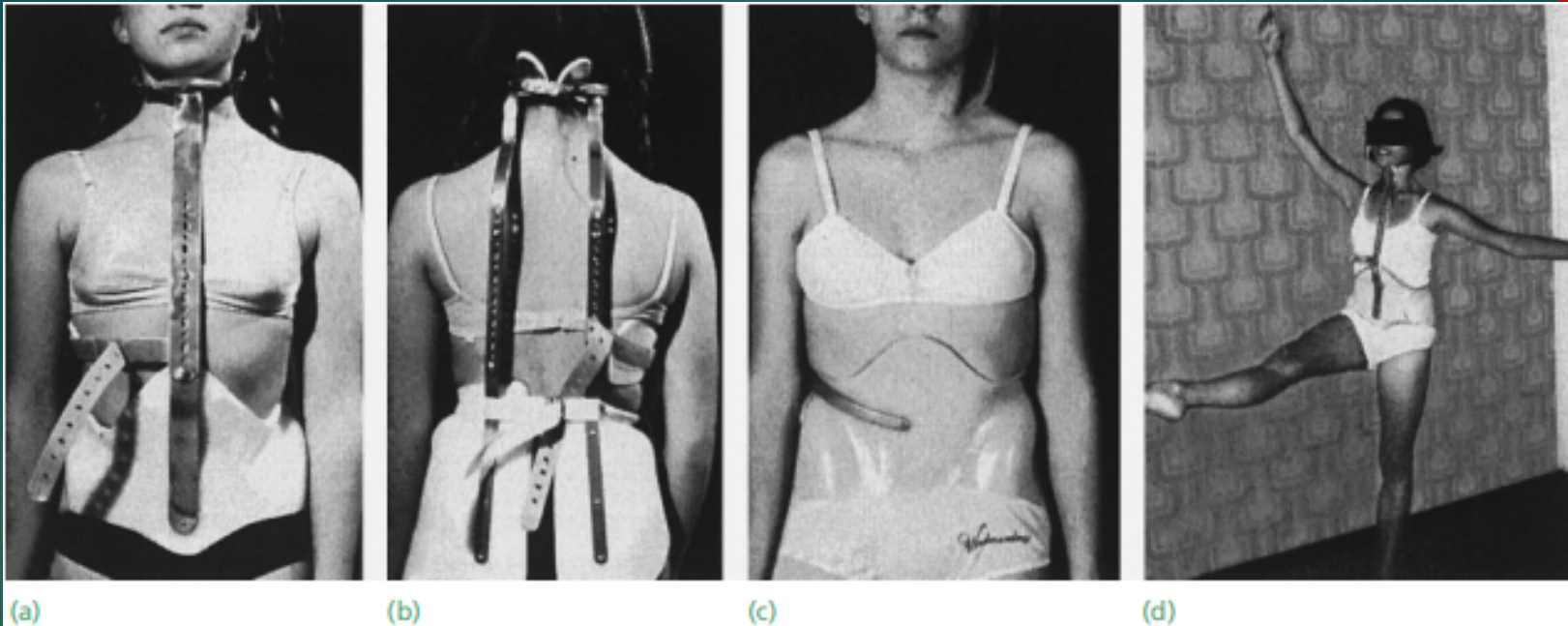


Figure 18.12 Structural scoliosis – bracing (a,b) The Milwaukee brace fits snugly over the pelvis below; chin and head pads promote active postural correction and a thoracic pad presses on the ribs at the apex of the curve. (c) The Boston brace is used for low curves. All braces are cumbersome, but (d) if well-made they need not interfere much with activity. Nowadays bracing is used far less often than before because of doubts about its ability to alter the natural progress of structural scoliosis.

Early-onset (juvenile) idiopathic scoliosis (aged 4–9 years)

- ❑ Uncommon.
- ❑ prognosis is worse and surgical correction may be necessary before puberty.
- ❑ a brace may hold the curve stationary until the age of 10 years, when fusion is more likely to succeed.

Early-onset (infantile) idiopathic scoliosis (aged 3 years or under)

- ❑ This is rare.
- ❑ 90% of infantile curves resolve spontaneously.
- ❑ If progress may lead to cardiopulmonary dysfunction.
- ❑ serial elongation— derotation—flexion (EDF) plaster casts under general anaesthesia.till the child can tolerate brace.

osteopathic (congenital) scoliosis

- ❑ vertebral anomaly .
- ❑ hemivertebra, wedged vertebra.(formation defect).
- ❑ fused vertebrae – sometimes combined with absent or fused ribs.
- ❑ visceral abnormalities (e.g. in the patient with spina bifida).
- ❑ mild, some cases progress to severe deformity, particularly those with unilateral fusion of vertebrae.
- ❑ Treatment is more difficult and specialized than that of idiopathic infantile scoliosis.
- ❑ will not respond to bracing alone, and surgical correction carries a significant risk of cord injury.

Kyphosis

- ❓ confusingly, the term 'kyphosis' is used to describe both the normal (the gentle rounding of the dorsal spine) and the abnormal (excessive dorsal curvature). hyperkyphosis.
- ❓ **Postural kyphosis** is common ('round back' or 'drooping shoulders') and may be associated with other postural defects such as flat-feet. If treatment is needed, this consists of postural exercises.
- ❓ **Structural kyphosis** is fixed and associated with changes in the shape of the vertebrae. It may occur in osteoporosis of the spine (the common round back of elderly people), in ankylosing spondylitis and in Scheuermann's disease (adolescent kyphosis).
- ❓ **A kyphos (or gibbus)** is a sharp posterior angulation due to localized collapse or wedging of one or more vertebrae.

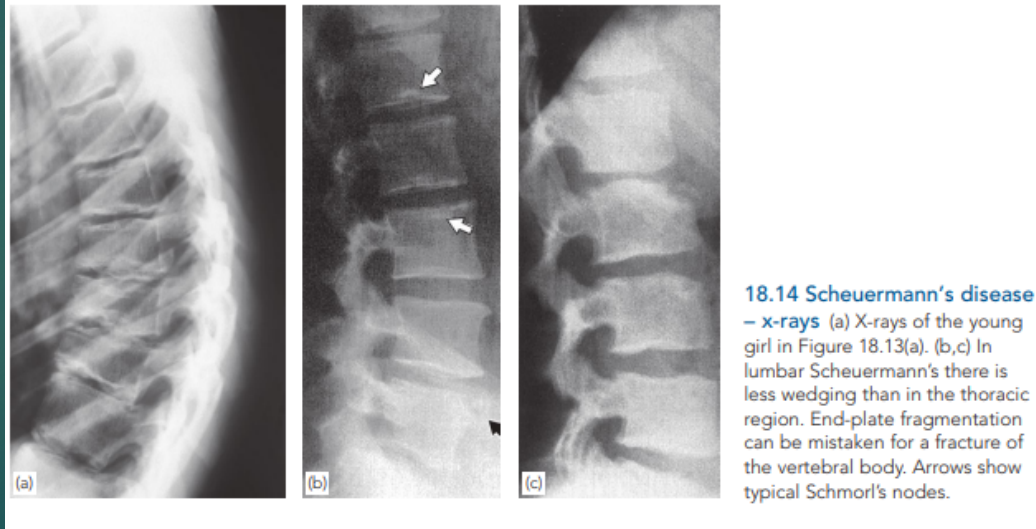
Adolescent kyphosis (Scheuermann's disease)

- ❑ 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 herniations of disc material into the vertebral body; **Schmorl's nodes**

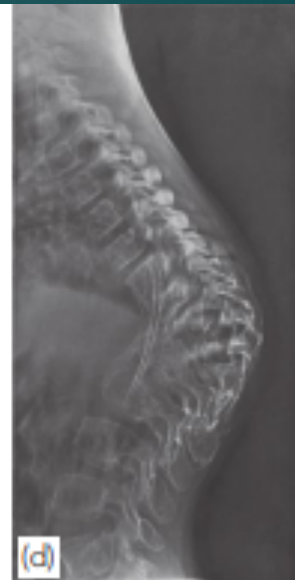
Clinical features

- ❑ midthoracic vertebrae.
- ❑ at or shortly after puberty.
- ❑ Common in boys than in girls.
- ❑ 'round-shouldered'.
- ❑ backache and fatigue.
- ❑ 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



- 
- ❓ brace worn for 1 year or 18 months will often allow a return to normal vertebral growth.
 - ❓ operative correction and fusion



18.16 Spinal tuberculosis (a) Early x-ray changes with loss of disc space. (b) A child with a severe kyphotic deformity. (c,d) X-rays before and after operative debridement and spinal fusion using a rib strut graft.

Spondylolisthesis

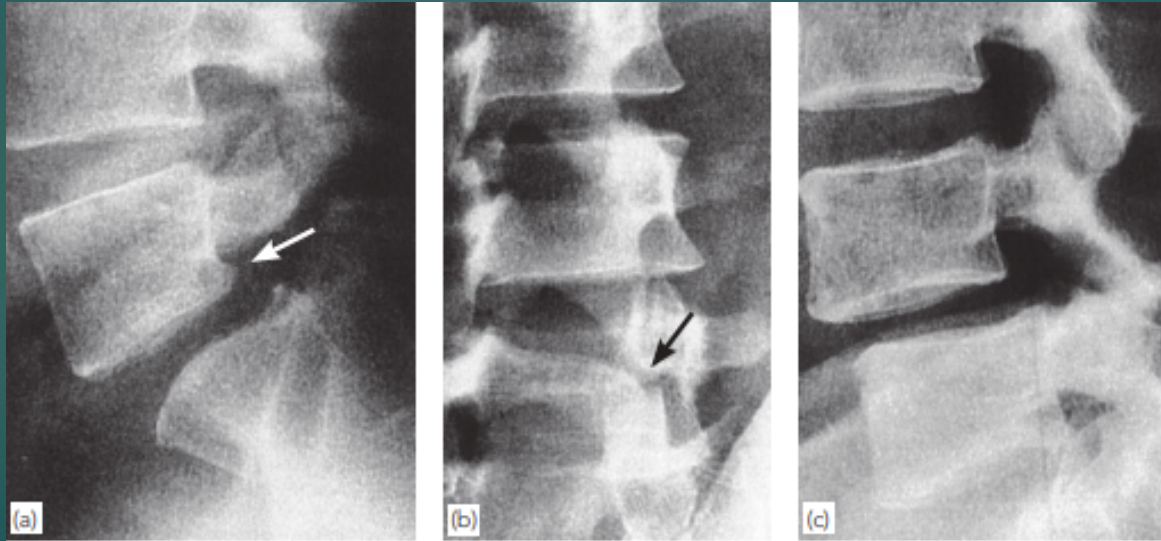
- ❑ Normal laminae and facets constitute a locking mechanism which prevents each vertebra from moving forwards on the one below.
- ❑ 'Spondylolisthesis' means vertebral displacement.
- ❑ L4 and L5, or between L5 and the sacrum.
- 1. Dysplasia of the lumbosacral facet joints (20% of cases).
- 2. Separation or stress fracture (lysis) through the neural arch (the pars interarticularis), allowing the anterior part of the vertebra to slip forward upon the one below (50% of cases).
- 3. Osteoarthritic degeneration of the facet joints, causing them to lose their normal stability. This usually occurs at L4/5 (25% of cases).
- 4. Destructive conditions such as fracture, TB and neoplasia (5% of cases).

Clinical features

- ❓ **Dysplastic spondylolisthesis** is seen in children. It is usually painless but the mother may notice the unduly protruding abdomen. There may be an associated scoliosis.
- ❓ **Lytic spondylolisthesis** is the commonest variety. It occurs in adults and intermittent backache is the usual presenting symptom.
- ❓ **Degenerative spondylolisthesis** usually occurs in patients over 40 years with long-standing backache.

Imaging

- ❓ X-rays show the forward shift of the upper part of the spinal column on the stable vertebra below.
- ❓ oblique x-ray views, and best of all in CT scans



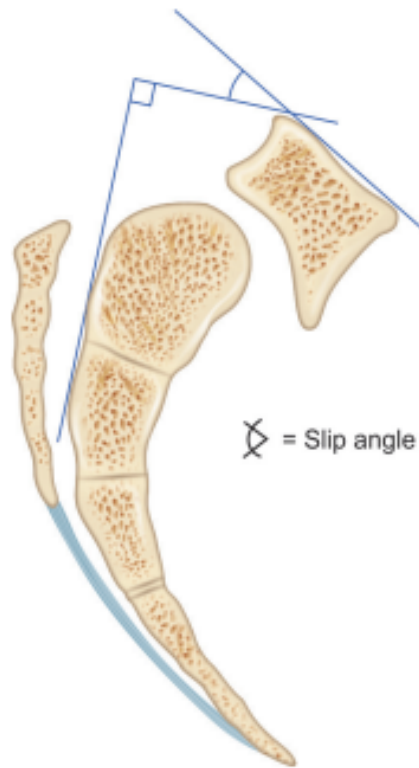


Fig. 9: Slip angle or angle of kyphosis. The progressive slip of rostral vertebra produces a sagittal rotation and is measured as an angle (see text)

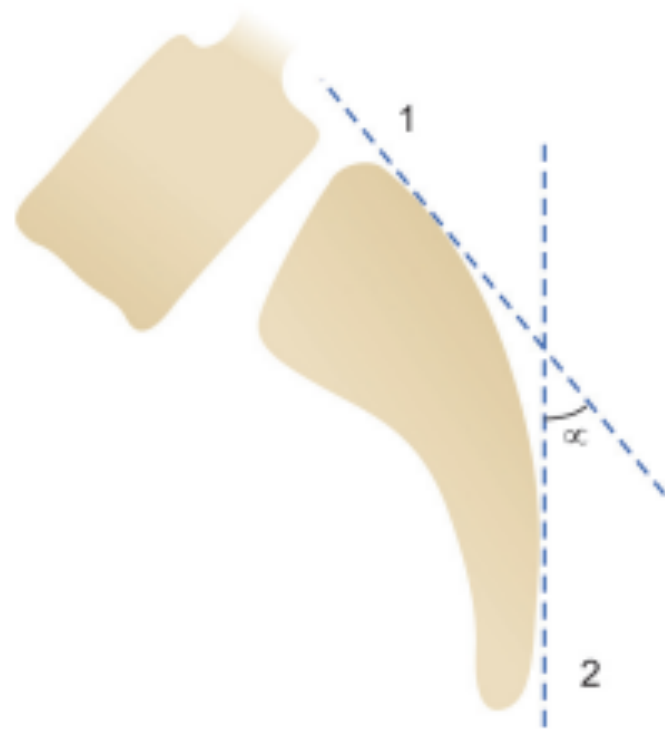


Fig. 11: Sacral inclination



Figure 18.39 Spondylolysis CT scan shows corticalization and a fibrous non-union.

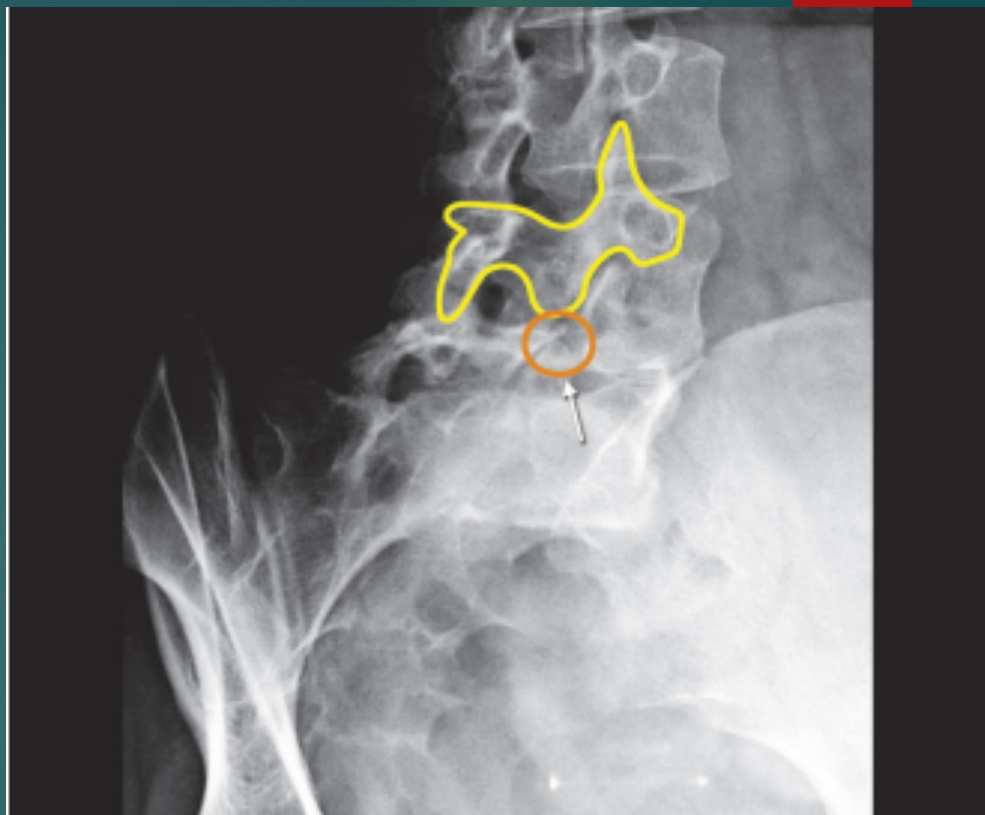
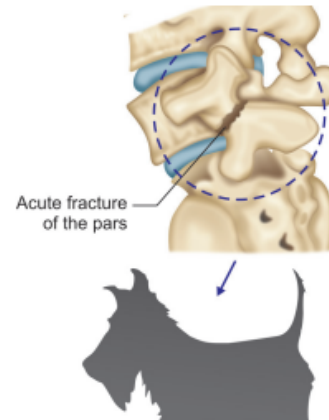
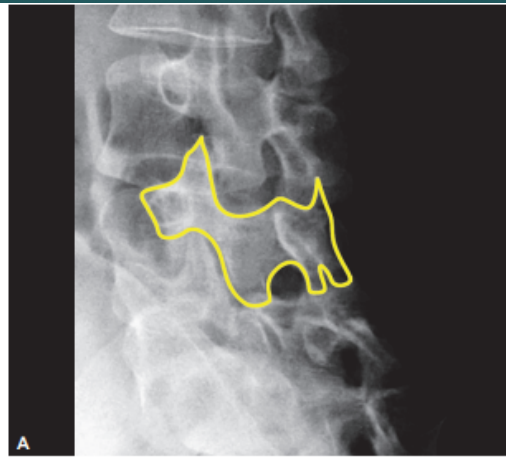


Fig. 4: X-ray spondylolysis (oblique view)—one can appreciate the normal looking scotty dog in the 4th lumbar vertebra (outlined) while the neck in the 5th lumbar vertebra is broken (encircled and arrow)



Figs 7A and B: (A) Scottie dog appearance on oblique radiographs. (B) The mouth and nose is formed by transverse process, ears are formed by the superior articular process, neck region is formed by pars interarticularis, trunk and abdomen is formed by the lamina and spinous process, front legs are formed by the ipsilateral articular process while rear legs are formed by the opposite side inferior articular process as detailed in this illustration. When the pars interarticularis is broken and gets elongated showing a fracture it resembles a "Scotty dog wearing collar"

Treatment

❑ Conservative treatment

❑ Operative treatment is indicated:

- (1) if the symptoms are disabling and interfere significantly with work and recreational activities;
- (2) if the upper vertebra has slipped forwards over more than 50% of the vertebral body below; and
- (3) if neurological compression is significant.

Spinal stenosis

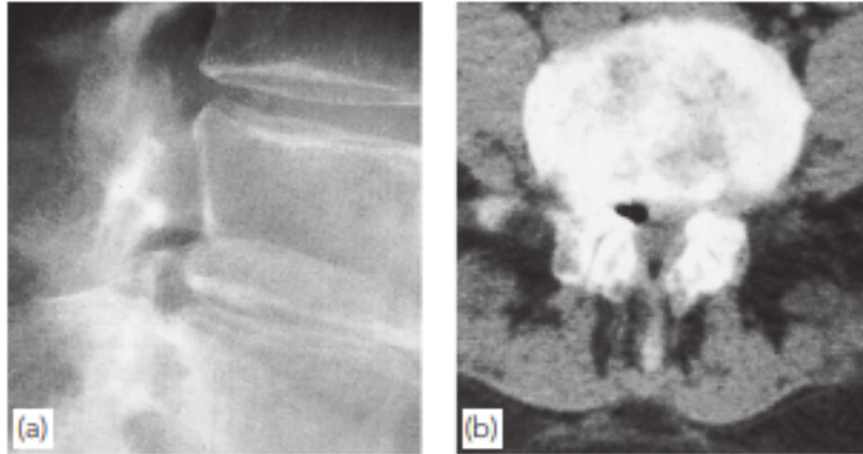
- ❓ ong-term consequences of disc degeneration and osteoarthritis is narrowing of the spinal canal due to hypertrophy at the posterior disc margin and the facet joints.
- ❓ more likely if the canal was always small,
- ❓ if a spondylolisthesis decreases its anteroposterior diameter.
- ❓ common in people with congenital vertebral dysplasia (e.g. in those with achondroplasia)

Clinical features

- ❓ aching and/or numbness and paraesthesia in the thighs, legs or feet.
- ❓ after standing upright or walking for 5–10 minutes and are consistently relieved by sitting or squatting with the spine somewhat flexed (hence the term 'spinal claudication').

Always check the upper limbs for signs of polyneuropathy and the lower limbs for evidence of peripheral vascular disease.

Imaging



18.22 Spinal stenosis (a) A lateral x-ray shows marked narrowing of the spinal canal, but the CT scan (b) provides even more convincing evidence.



Figure 18.42 Spinal stenosis (a) L4/5 Degenerative spondylolisthesis; (b) MRI confirms stenosis at L4/5 level; note the listhesis has reduced since the MRI is taken supine; (c) axial MRI shows the lateral recess stenosis from facet hypertrophy; facet effusions are found with facet incompetence and instability.

Treatment

- ❑ Conservative measures, including instruction in spinal posture.
- ❑ injection of a long-acting local anaesthetic and corticosteriod .
- ❑ operative decompression

BOX 18.3 LOWER BACK PAIN – RED AND YELLOW FLAGS

Red flags

- Age of onset less than 20 years or more than 55 years
- Recent history of violent trauma
- Constant progressive, non-mechanical pain (no relief with bed rest)
- Thoracic pain
- Past medical history of malignant tumour
- Prolonged use of corticosteroids
- Drug abuse, immunosuppression, HIV
- Systemically unwell
- Unexplained weight loss
- Widespread neurological symptoms (including cauda equina syndrome)
- Structural deformity
- Fever

Yellow flags

- Belief that back pain is harmful or potentially severely disabling
- Fear and avoidance of activity or movement
- Tendency to low mood and withdrawal from social interaction
- Expectation of passive treatment(s) rather than a belief that active participation will help

BOX 18.2 CAUSES OF LOWER BACK PAIN (LBP)

Mechanical (80%)

- Muscular strains or from ligamentous injury
- Degenerative disc disease
- Facet joint disease (facet joint dysfunction)
- Spondylolysis
- Osteoporotic compression fractures
- Instability
- Sacroiliac joint pathology

Neurogenic (15%)

- Herniated disc
- Spinal stenosis
- Foraminal stenosis
- Disc annular tear and neuritis

Non-mechanical back pain (1–2%)

- Infections
- Neoplasms
- Inflammatory conditions

Referred pain (1–2%)

- Gastrointestinal disease
- Renal disease
- Aortic aneurysm

Other (2–4%)

- Somatization disorder
- Fibromyalgia
- Malingering



MALINGARING

THE HIP

Congenital

Developmental dysplasia of the hip

DDH

خلع الولادة

- ? a spectrum of disorders
- ? shallow acetabulum without actual displacement.
- ? shallow acetabulum with subluxation.
- ? frank dislocation during the neonatal period.
- ? 5–20 per 1000 live births.
- ? After 3 weeks 1 or 2 per 1000 infants.
- ? F-M 7-1
- ? Left more than right.
- ? Bilateral in 20%

Hip joint $\Rightarrow$ ball and socket joint

formed by an articulation between

the acetabulum and head of femur.

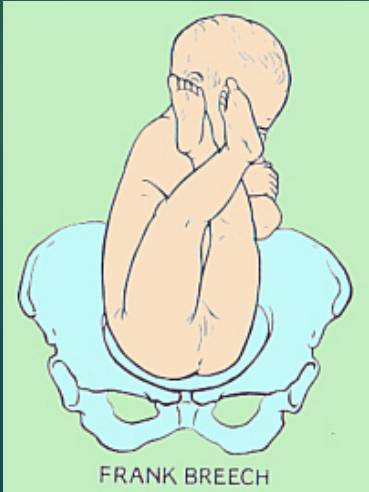
no defect $\Rightarrow$ acetabulum

no defect $\Rightarrow$ femur

Aetiology

- ? Genetic factors. $\Rightarrow$ *so why it's developmental?!*
- ? Hormonal changes. $\uparrow$ *estrogen.*
- ? *وضع الجنين في الرحم.* Intrauterine malposition.
- ? Postnatal factors

دقة مصر
أكثر مع
الأموات
التي تمنع الأطفال في الكفولة



Early detection is very important /

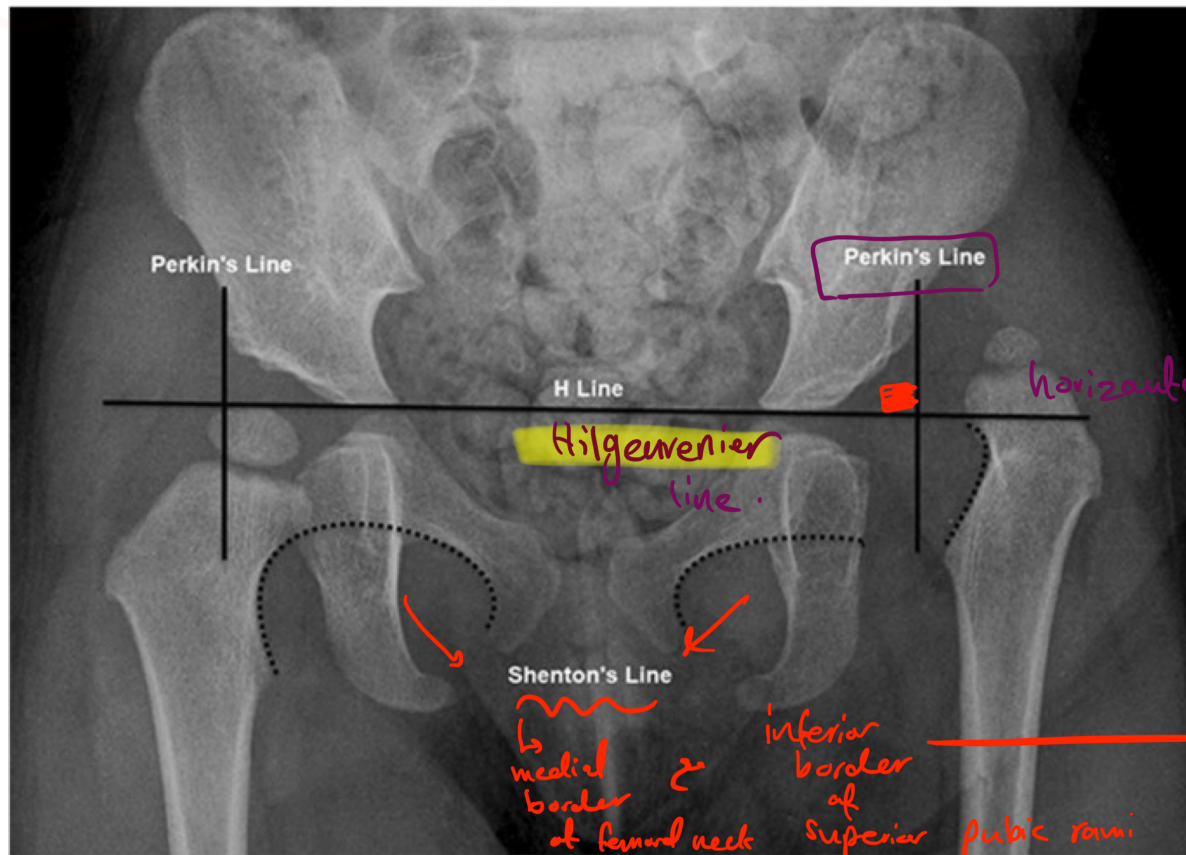
immature hip
3 week old post delivery
↓

after 3 weeks we do Ultra sound →
until 4 months → after that by x-ray

gold method
for
detection
for DDH

Other risk factors for DDH:-

- ① Torticollis. 15% "wry neck" → congenital abnormality of neck
- ② Metatarsus adductus "toes bent inward"
15 - 20%



Infra medial space should have "head of femur"

pathological changes :-

→ ? Capsule is stretched and redundant. (lax) .

? The cartilaginous socket is shallow and anteverted.

→ ? Ligamentum teres is elongated and hypertrophied.

? Acetabular socket filled with fibrofatty tissue prevent reduction. (pulvinar) →

? Labrum and capsule pushed into the socket.

? Femoral head dislocated posteriorly.

= dislocated

(pulvinar)

سوال
MCQ

↳ femoral head
ساق

another joint
leads ↓

length discrepancy.

↓
spinal abnormality.

[long term complication]

Clinical feature

⇒ may be normal.

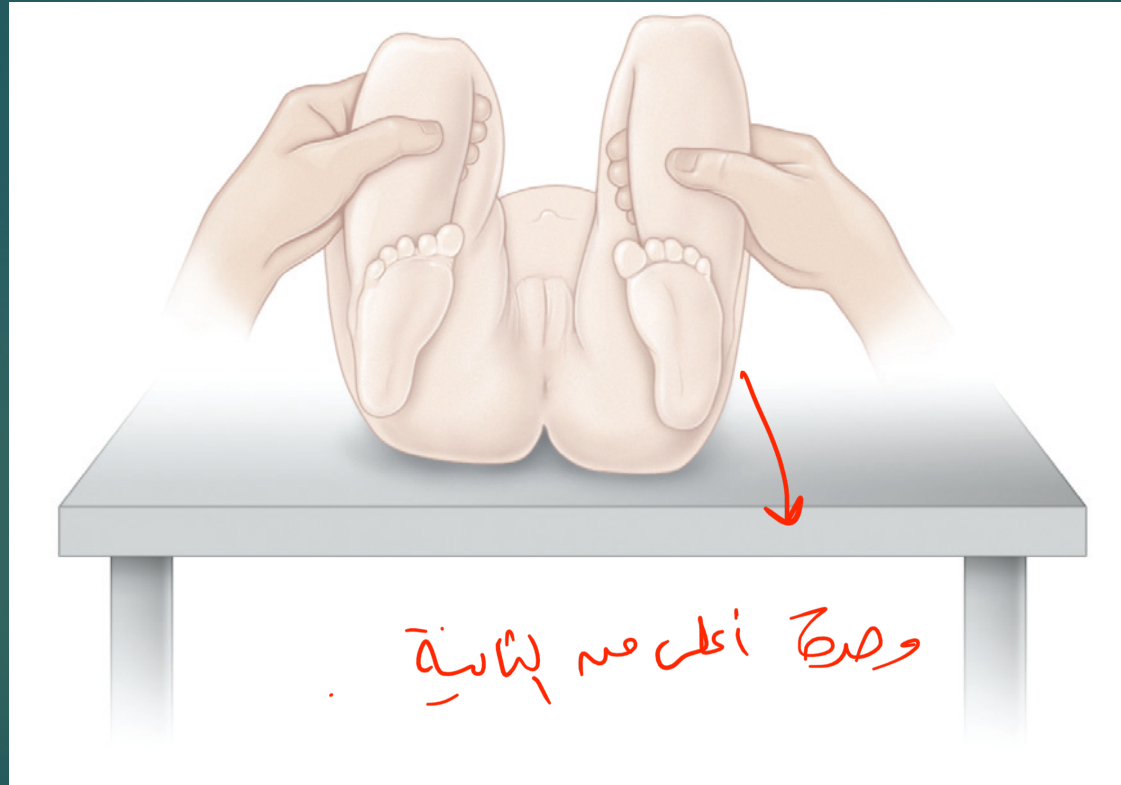
- ? High risk babies.
- ? Assymetrical gluteal fold.
- ? the leg is slightly short (Galeazzi's sign) and externally rotated.
- ? Difficulty in napkin application.
- bilateral ? Waddling gait. نمشي بطيء
- ? Associated packaging disorder

Up to 3 months :- → normal

رفع رجليه وارتاعه

صوت لا يخشونه

The Galeazzi sign.

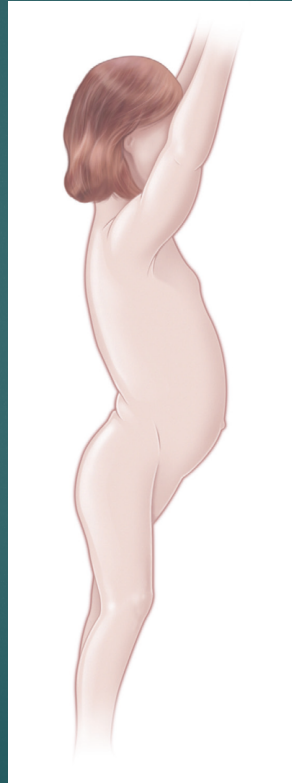


Gluteal fold

↓
السَّيَاتُ الْخَلْصِيَّةُ
لَا تَمُوتُ تَكُونُ مَسَاوِيَةً
ant. →
post. ←
كَانَ رَفَعَ الْفَقْصِ .



Abdominal lordosis



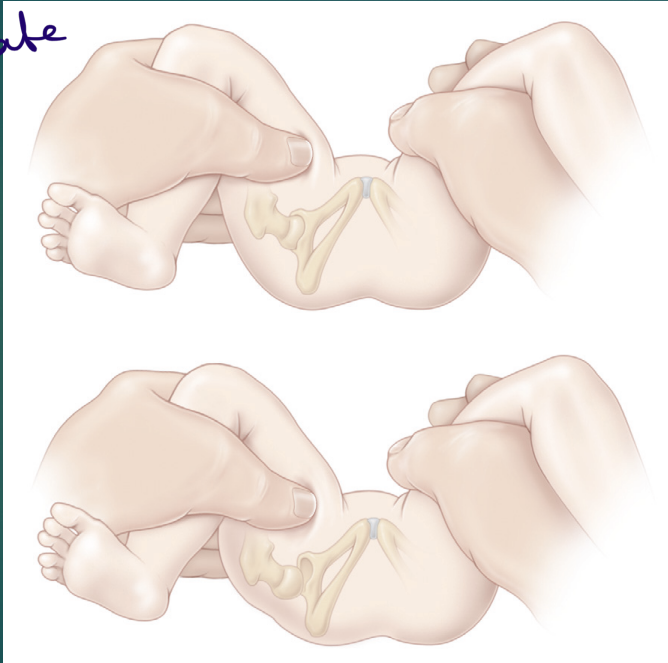
Clinical examination

for diagnosis for DDH

barlow

منبر

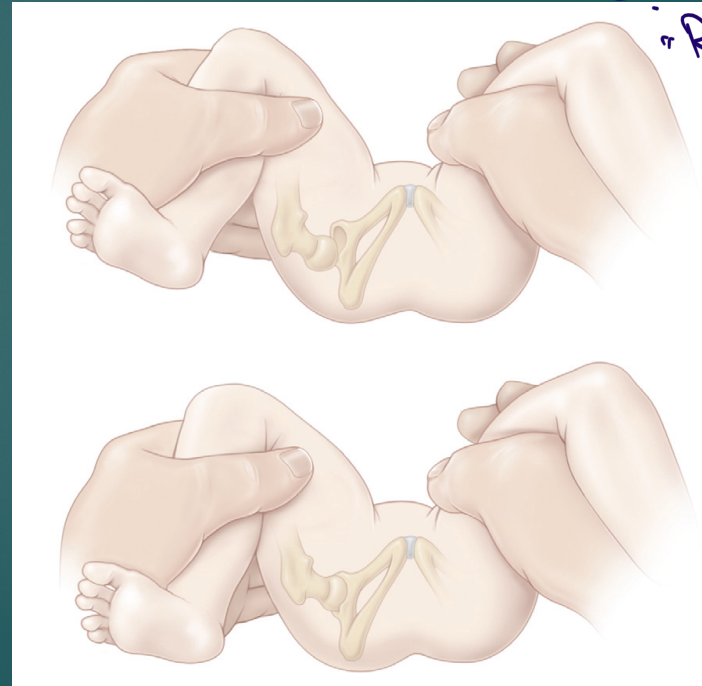
dislocate
the
hip



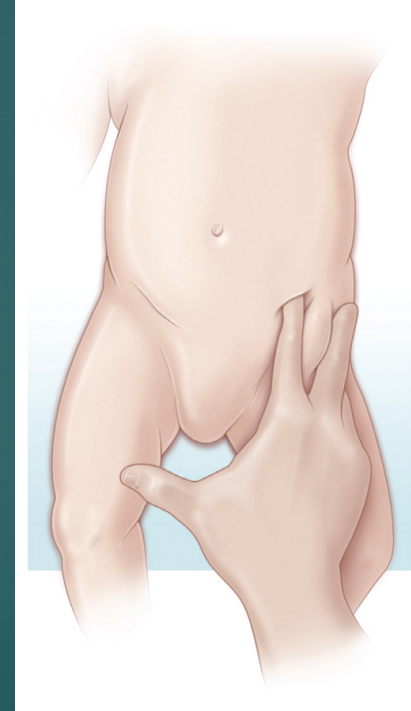
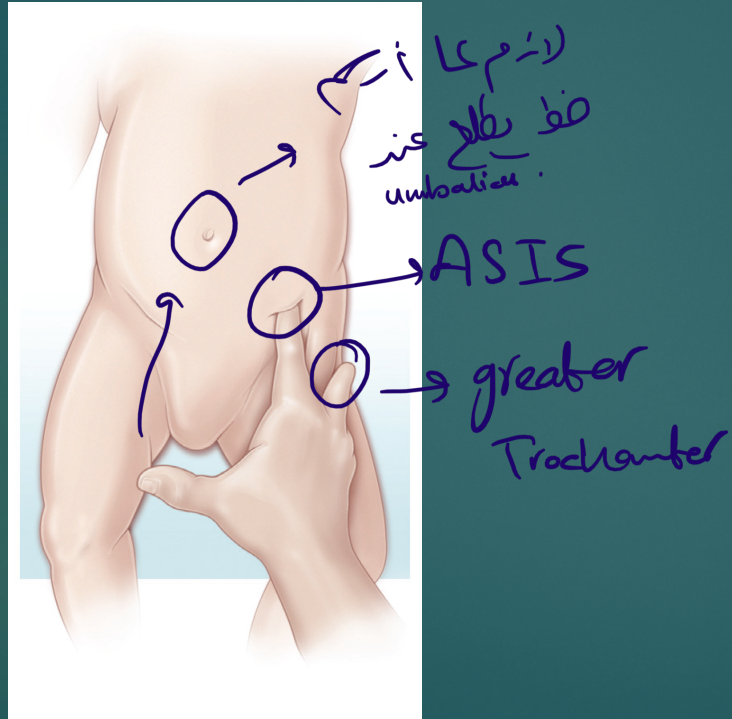
ortolani

برج
مقا

"Reduce
the hip"

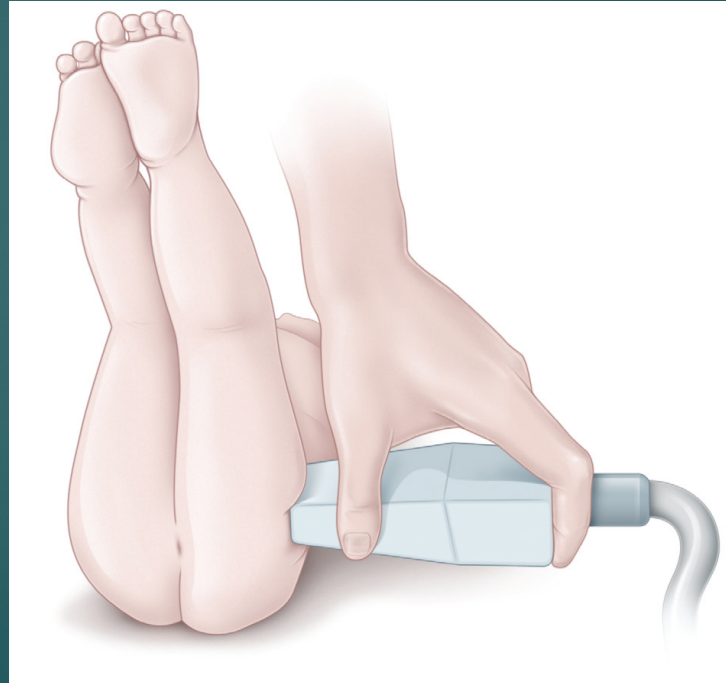


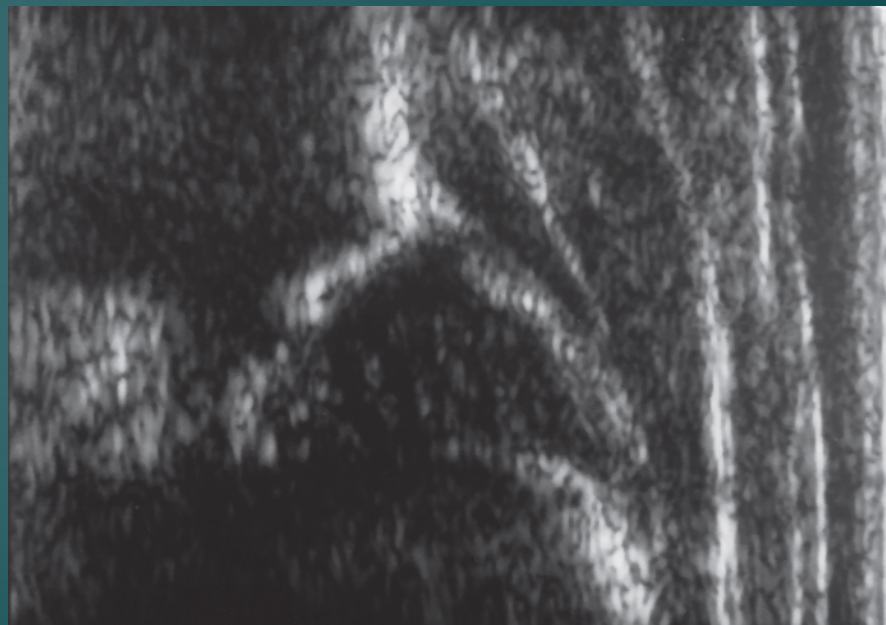
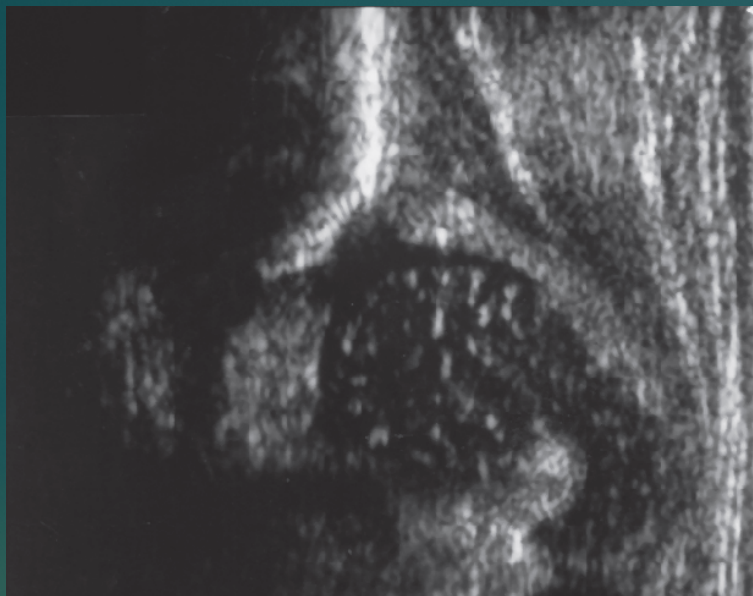
The Klisic test



Imaging.

❓ Ultrasound:- graf method replace the x-ray in the first 4 month . ✓



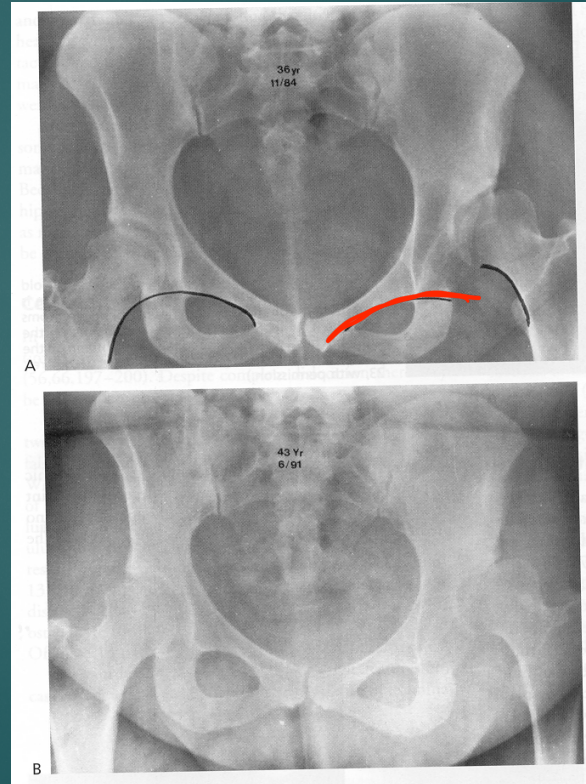


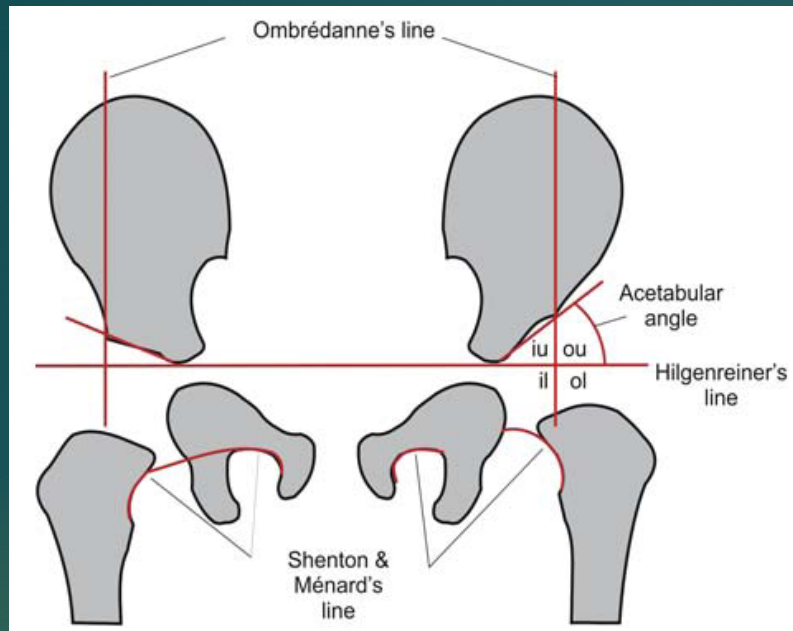
❓ X-ray used after age of 4 months

❓ After the femoral head ossify. → 4-6
months



Shentons line





Age-Based Guidelines for the Treatment of Developmental Dysplasia of the Hip

- ? **Neonate:** Place the patient in a Pavlik harness for 6 weeks.
- ? **1 to 6 months:** Place the patient in a Pavlik harness for up to 6 weeks after the hip reduces.
- ? **6 to 18 months:** Treat the patient with traction and closed reduction. If closed reduction is successful, place the hip in a cast for 3 months. If closed reduction is unsuccessful, perform open reduction. Open reduction is performed via a medial approach in children who are younger than 12 months old and via an anterolateral approach in children who are older than 12 months. + Spica لصبي على سلك (نقله)
- ? **12-18 (Same as 6-12) ⊕ adductor tenotomy (أخف قطع)**
18 to 24 months: Treat the patient with a trial of closed reduction or primary open reduction (anterolateral approach). A Salter osteotomy may or may not be part of the procedure.
- ? **24 months to 6 years:** Perform primary open reduction (anterolateral approach) and femoral shortening, with or without a Salter osteotomy

Pavlik harness





adductor
tenotomy





complication

- ❑ Failure of reduction.
- ❑ Avascular necrosis.
- ❑ Early osteoarthritic changes.
- ❑ Chronic disability and pain.
- ❑ Later for hip replacement

Protrusio acetabuli

normal acetabulum

or abnormal

(push the acetabulum inward)

DDH

like
- RA
- osteomalacia
- hematological dz.

the socket is too deep and bulges into the cavity of the pelvis.

familial tendency.

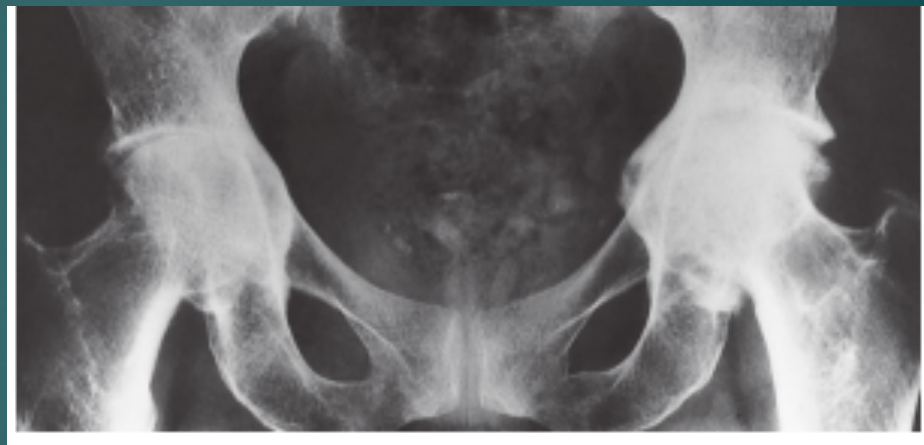
Female tendency appear at puberty.

Painless and movement limited.

secondary to bone 'softening' disorders, such as osteomalacia or Paget's disease, and rheumatoid arthritis. or leukemia.

Treatment is THR.

Total hip replacement



Perthes disease

? is a painful disorder of childhood characterized by avascular necrosis of the femoral head.

? 1-10000 incidence.

? Male –female 4-1.

? Age incidence 4-10 years.

? Unknown cause. *Hypercoagulability status:*

Risk factors ? Associated with thrombophilia, antithrombotic factor deficiency, hypofibrinolysis. *Recurrent trauma*

↓ Blood supply to femoral head.

↓ ischemia

↓ Necrosis

↓ pain

Fragmentation of the bone.

↓ Revascularization.

(Smooth ~ 6 wks)

pathogenesis

❓ Femoral head blood supply:-

1. Metaphyseal blood vessels disappear by age of 7
2. Lateral epiphyseal blood vessels.
3. Ligament teres blood vessels develop at age of 7

❓ By age 4-7 scanty blood supply reach the femoral head make it liable to ischemia.

❓ Any effusion can add more ischemia to femoral head

Pathological stages

- ✓ [?] **Ischemia and bone death:**-all or part of femoral head looks normal on x-ray.
- ✓ [?] **Revascularization and repair:**-new bone formation and fibrosis and granulation tissue appear on x-ray as fragmentation, metaphyseal cystic changes.
 → new bone
 " creeping substitution ~ ترقيف
- ✓ [?] **Distortion and remodeling:**-depend on time of repair if longtime the femoral head will be distorted mushroom head

Clinical picture

- on activities (not able to wake) → X-ray → normal → other attacks.
- ? Pain and limping continue for weeks or recur intermittently.
 - ? Well being child, or undersized or urogenital problem.
 - ? Muscle wasting may seen
 - ? Limitation of all movement (abduction in flexion).
 - ? Radiography, bone scan, MRI

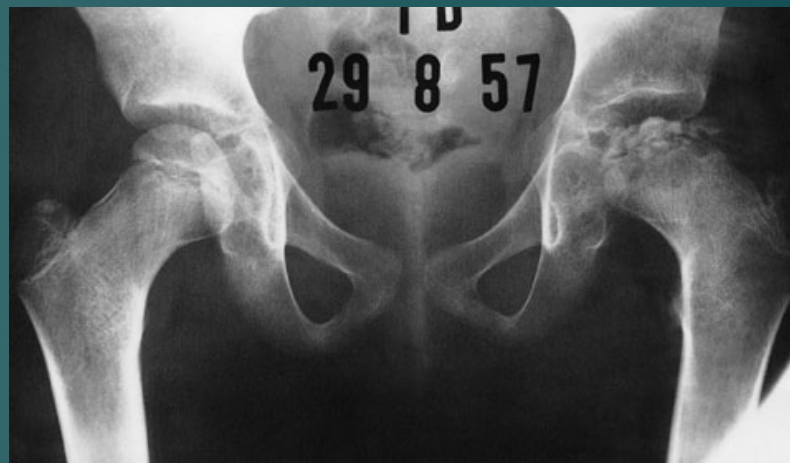
X-ray
↓
normal.

in
ultrasound
سائل في المفصل
fluid in joint.

gold
Standard

or
fragmentation
stage

already
present



The Catterall classification

قاس

- ❑ **group 1** the epiphysis has retained its height and less than half the nucleus is sclerotic.
- ❑ **group 2** up to half the nucleus is sclerotic and there may be some collapse of the central portion.
- ❑ **group 3** most of the nucleus is involved, with sclerosis, fragmentation and collapse of the head. Metaphyseal resorption may be present.
- ❑ **group 4** is the worst: the whole head is involved, the ossific nucleus is flat and dense and metaphyseal resorption is marked.

Lateral pillar classification

- ❑ **Group A** are those with normal height of the lateral pillar.
- ❑ **Group B** are patients with partial collapse (but still more than 50 percent height) of the lateral pillar.
- ❑ **Group C** cases show more severe collapse of the lateral pillar (less than 50 per cent of normal height)

management

Early (symptomatic)

- ? rest. (تجنب حركة)
- ? Pain killer. (للشفاء)
- ? Modification of activity. (Remodelling)
- ? Hospitalization and some traction.
- ? Muscle strengthening, and keep ROM mainly abduction.

Late (containment)

- ? Casting in abduction.
- ? Surgery varus osteotomy

2 years will resolve.
2 years follow up for the patient to see the complication
Observation (تتبع)

[head at risk sign]

إذا دخل المرفق بالمفاصل خلال فترة مراقبة

تتبع
Containment Surgery
Cast Osteotomy

Prognostic factor

❑ Age less than 6 years very good prognosis.

❑ Girls worse prognosis.

❑ Increased femoral head involvement

Head at risk sign

❑ Progressive uncovering of epiphysis.

❑ Calcification lateral to nucleus.

❑ Radiolucent area at the lateral edge of the bony epiphysis (Gage's sign)

❑ severe metaphyseal resorption.

① progressive sclerosis & more fragments
② lateral subluxation of femoral head.

(SCFE)

Slipped capital femoral epiphysis

Slipping away from femoral neck.

- ? Displacement of the proximal femoral epiphysis.
- ? femoral capital epiphysiolysis.
- ? uncommon (1– 3 per 100 000) and virtually confined to children going through the pubertal growth spurt.
- ? Boys (usually between 14 and 16 years old) are affected more often than girls (who are, on average, 2–3 years younger).
- ? Left more common, bilateral in up 40%.

Aetiology *with endocrine pathologies*

? The slip occurs through the hypertrophic zone of the growth plate.

? Sexual immature, fatty, tall and thin.

? **hormonal imbalance.**

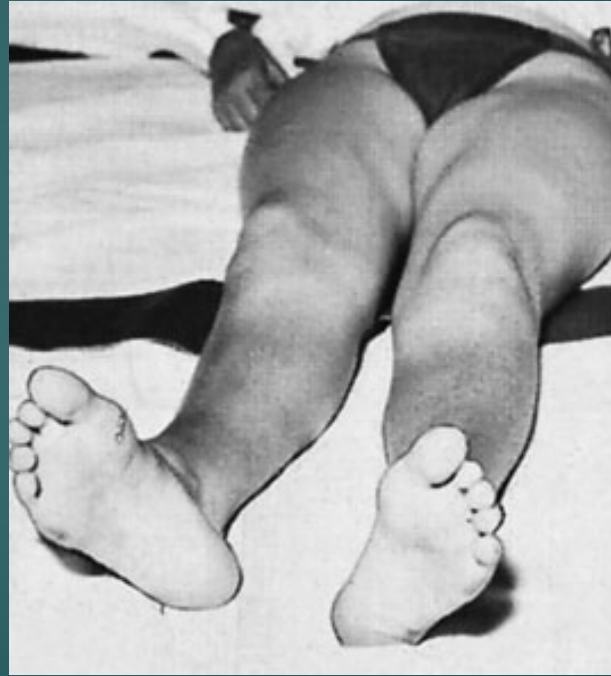
? **Hypothyroidism.**

? Craniopharyngioma.

? Oestrogen has protective effect.

? **Trauma.**

+ في سمنة
obesity
"مفروق"



Clinical picture

→ long term history of limbing & hip pain.

? a series of minor episodes rather than a sudden, acute event.

? Pain at the groin. sometimes knee pain only.

? Leg is externally rotated, 1-2cm short.

? Around puberty. abnormal body mass index.

(painful internal rotation)

Stable

VS

Unstable

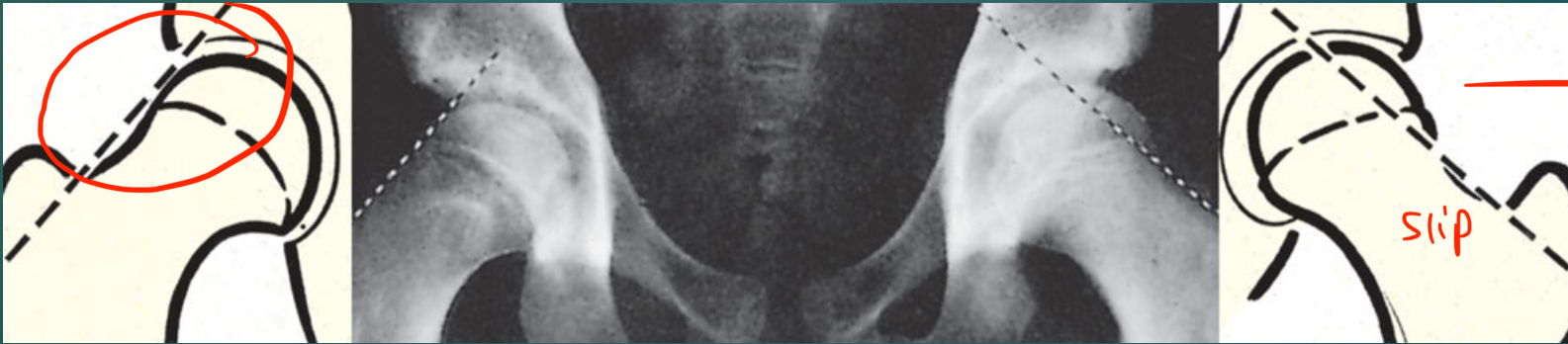
→ able to walk or bear weight

unable to walk at all.

→
sli
ule
25
treatment.

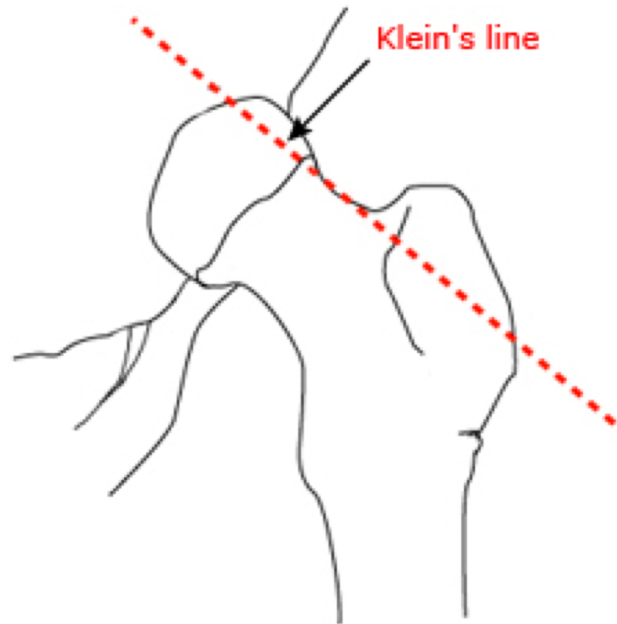
Diagnosis.

- ❑ X-ray may be regarded as normal.
- ❑ (Trethowan's sign).
- ❑ The metaphyseal blanch sign of Steel is a 'double-density' seen at the level of the metaphysis on an AP x-ray.

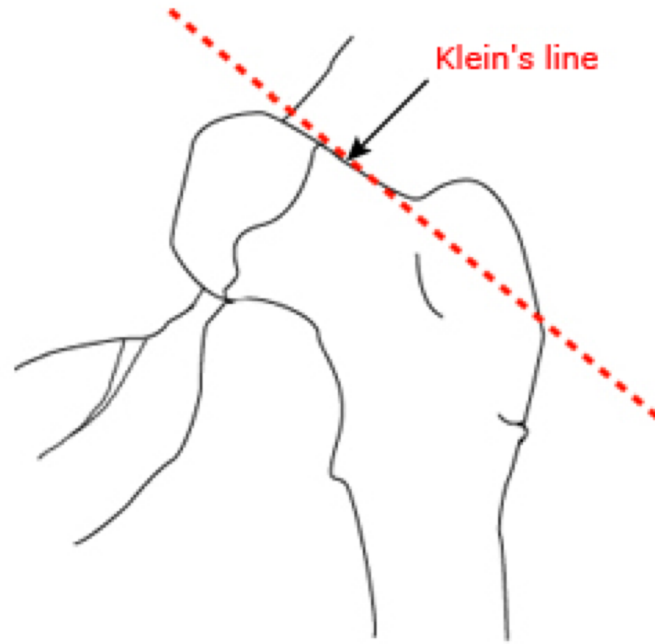


→ Klein line
↓
just touch
the
upper
corner
of
femoral head

Normal



SCFE



Grading

- ❓ **Pre-slip:** The child complains of groin or knee pain, particularly on exertion, and there may be a limp. Examination is often normal, but may demonstrate reduced internal rotation. The x-ray may show widening or irregularity of the physis.
- ❓ **Acute slip:** Symptoms present for less than 3 weeks; painful hip movements with an external rotation deformity, shortening and marked limitation of rotation (the greater the limitation of motion, the greater the degree of slip). Symptoms last for less than 3 months.

- 
- ❓ **Chronic slip:** The child has pain in the groin, thigh or knee lasting more than 3 weeks; episodes of deterioration and remission; loss of internal rotation, abduction and flexion of the hip and limb shortening.
 - ❓ **Acute-on-chronic slip:** Long prodromal history and an acute, severe exacerbation.

Grading on lat.frog view

- ❓ **Mild:** Displacement is less than one-third of the width of the femoral neck.
- **Moderate:** Displacement is between one-third and a half.
- **Severe:** Displacement is greater than half of the femoral neck width.



stable:-

able to bear weight, and less risk to progress.



Unstable:-

unable to bear weight more risk to progress.

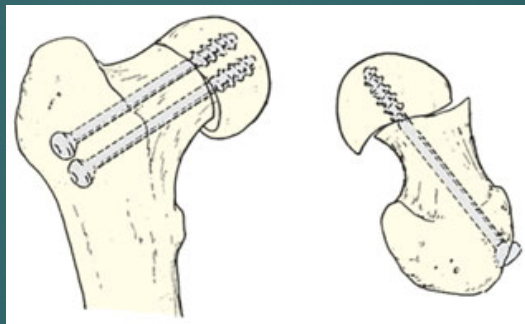
Treatment.

❓ Fixation insitu.

تثبيت في مكانه

بدون إزاحة

- vascular necrosis
- Osteoarthritis / Chondroarthritis.



if there's
endocrine
abnormality.

⇒ Prophylactic Fixation

Transient hip osteoporosis

osteoporotic
process
and edema

→ affecting the proximal femur and the femoral neck.

- ❓ This is a well-recognized, though uncommon, syndrome characterized by pain and rapidly emerging osteoporosis of the femoral head and adjacent pelvis.
- ❓ originally described in women in the last trimester of pregnancy, but it is now seen in patients of both sexes and all ages from early adulthood onwards.

Clinical picture

Pain & limbing + limitation of movement
↓
in
ant. groin (hip joint).

- ❑ The cause is unknown.
- ❑ Last for 6-12 months.
- ❑ No relation to AVN.
- ❑ treatment is symptomatic analgesia.
- ❑ no advice for core decompression.

MRI $\Rightarrow$ is the gold standard.

"confirmatory and diagnostic"

$\rightarrow$ self limited dz

but we could give analgesia (NSAIDs) $\Rightarrow$ bisphosphonates + cox + vitamin D

if pregnant
causes

The knee

Swellings around the knee entire knee

Acute swelling

- 1. Traumatic synovitis. (meniscus and ligament)
- 2. Post-traumatic haemarthrosis. (fracture)
- 3. Non-traumatic haemarthrosis. (bleeding disorder) *hemophilia*
- 4. Acute septic arthritis.
- 5. Aseptic inflammatory arthritis (gout and pseudogout)

Chronic swelling

- 1. Non-infective arthritis (OA, RA).
- 2. Chronic infective arthritis (TB).
- 3. Other synovial disorders (PVNS)

*pigmented
villous nodular
synovitis*

Swellings in front of the knee

localized.

(continuous friction of skin over the bony prominence)

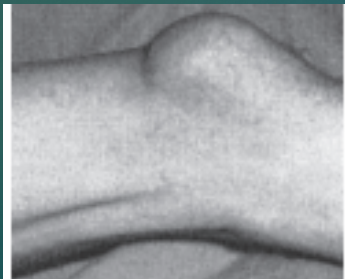
patella
صباحة

فوق

Prepatellar bursitis

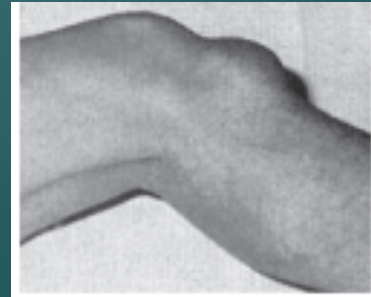
- ? an uninfected bursitis due to constant friction between skin and bone.
- ? ('HOUSEMAID'S KNEE').
- ? Painless unless infected. (asymptomatic)
- ? Treatment, firm bandaging, avoid kneeling, aspiration and excision

تحت
خلف
رأس



Infrapatellar bursitis

- ? The swelling is below the patella and superficial to the patellar ligament.
- ? more distally placed than prepatellar bursitis.
- ? Same treatment.
- ? ('CLERGYMAN'S KNEE')



~ 100%

tibial
tuberosity =
apophysitis

Fragmentation of
the tibia .

Osgood
Schlatter
disease

swelling
in front
of the
knee
is in the
bursa
bone is not

as

Swellings at the back of the knee

Semimembranosus bursa

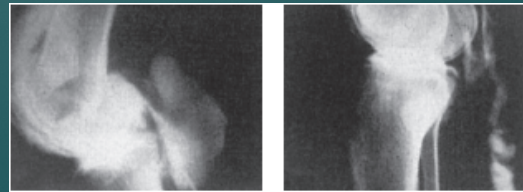
- ? between the semimembranosus and the medial head of gastrocnemius may become enlarged in children or adults.
- ? a painless lump behind the knee.
- ? fluctuant and transilluminates.
- ? Conserve as it is resolve alone



Popliteal 'cyst'

- ? Bulging of the posterior capsule and synovial herniation may produce a swelling in the popliteal fossa. ('Baker's cyst').
- ? Associated with OA, RA.
- ? painless
- ? Rupture may mimic DVT.
- ? Aspiration rarely excision

Conservative



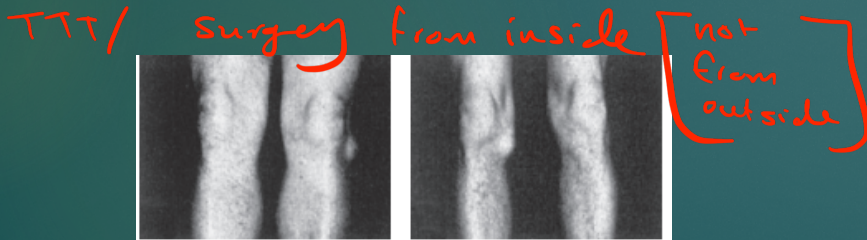
+ popliteal artery aneurysm.

→ pulsating + post trauma

Swellings at the side of the joint

Meniscal cyst

- ? a small, tense swelling, usually on the lateral side at or just below the joint line.
- ? tender on pressure.
+ post trauma



Calcification of the collateral ligament

- ? acutely painful swelling may suddenly appear, usually on the medial side of the joint.
- ? rubbery in consistency and acutely tender.
- ? Operative decompression will confirm the diagnosis (the calcific material is extruded like toothpaste)

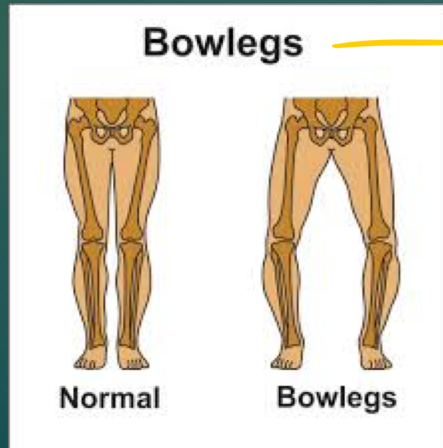
Bow leg & knock knee

genu varus genu valgum

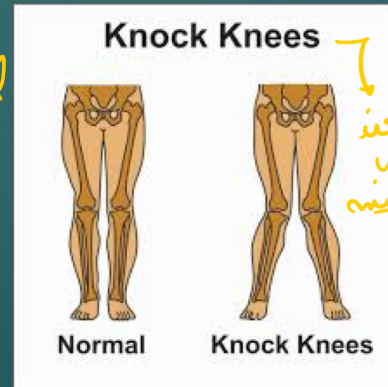
- Normal knee has 5-7 degree valgus.
- Standing ,full weight bearing is needed to show the deformity.
- Bow legs are assessed by measuring intercondyler distance normally 6 cm.
- Knock knees are assessed by measuring the intermalleolar distance 8cm.

في السنة الأولى من الحياة

lower limb grow in
Varus line

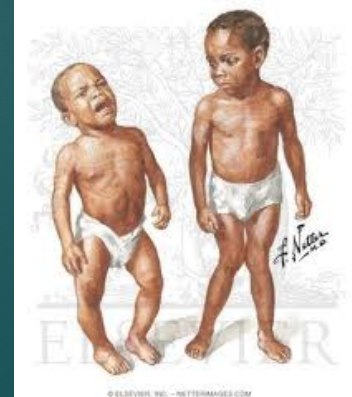
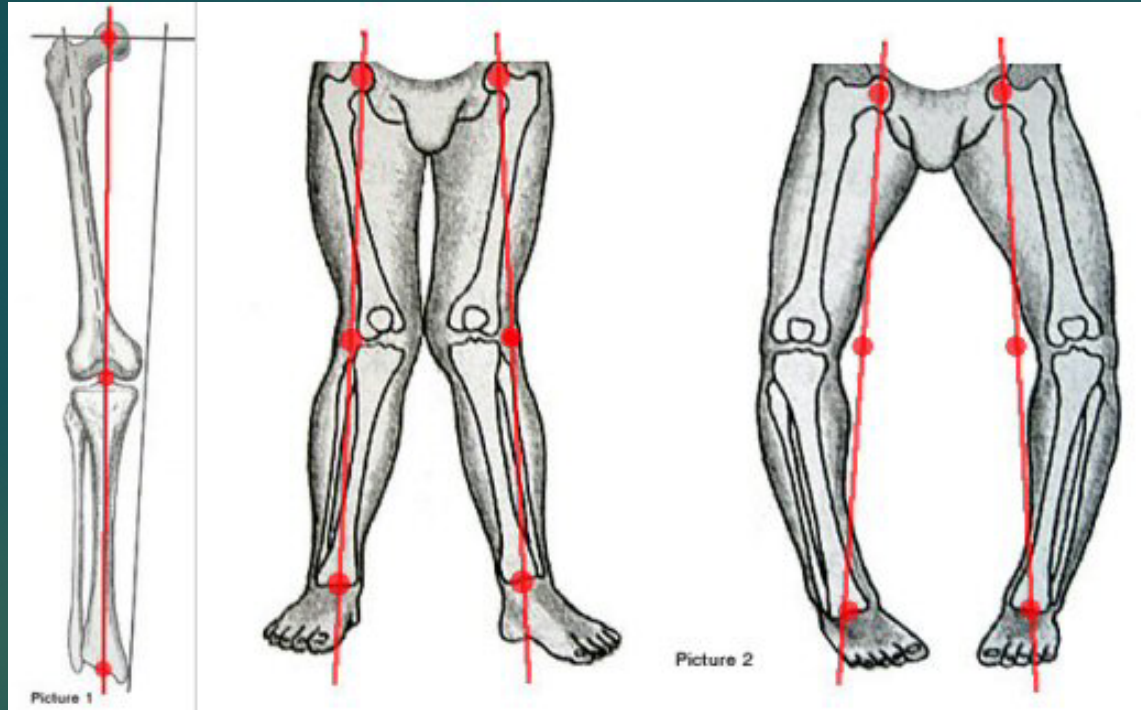


الفسيولوجي
physiological



الفسيولوجي
physiological

في السنة الثانية من الحياة
valgus



- ? They consider normal physiological development and growth.
- ? Usually correct spontaneously by age 10-12y.
- ? Family reassurance is all required.
- ? Follow up every 6 months.
- ? Surgery is needed in severe form, osteotomy and epiphysiodesis.

أهم نقطة :-

← توقف الجزء النقيض ما عدا نصير الجزء كامل نمو

needed ←

1-2 years

to show its success .



Patient before treatment



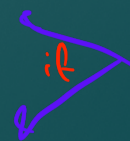
Patient after treatment

full length xray
or normal is

centre of
hip
↘
centre of
ankle

↓
Should
cut the
centre
of the
knee

varus $\in$ Medial
valgus $\in$ lateral



Take care if:-



when we start
to think that
this is
pathological ?



? Unilateral.



? Sever form.



? ^{persistent} Progressive.

↑ evidence of other dz 'findings'

Pathological causes

we use x-ray to rule out :-

- 1 - ☐ Rickets.
- 2 - ☐ Renal osteodystrophy.
- 3 - ☐ Skeletal dysplasia.
- 4 - ☐ Metabolic bone disease. (hyperparathyroidism)

☐ **Blounts disease**

Blount's disease

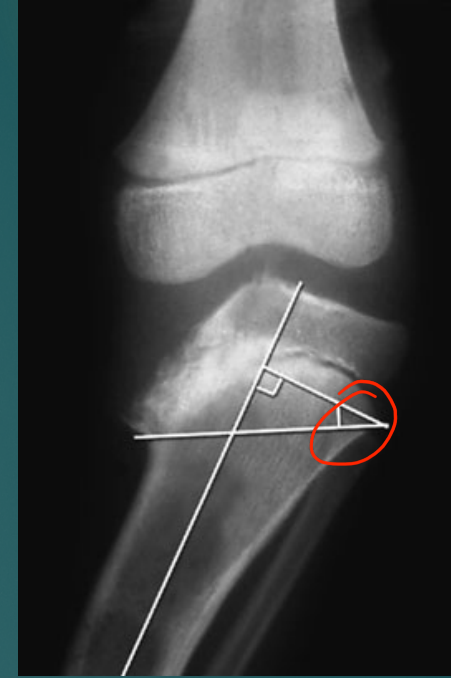
- ? a progressive bow-leg deformity associated with abnormal growth of the posteromedial part of the proximal tibia.

genetic? Overweight and start walking early.

- ? Mor common in black.
- ? 80% bilateral.
- ? may be lateral subluxation of the tibia.

(obese baby
اللي بيبدأ
يوقفوا من
بكرة)

(3-4 y.o) -



metaphyseal-diaphyseal angle: a line is drawn perpendicular to the long axis of the tibia and another across the metaphyseal flare as shown on the x-ray; the acute angle formed by these two lines should normally not exceed 11° .

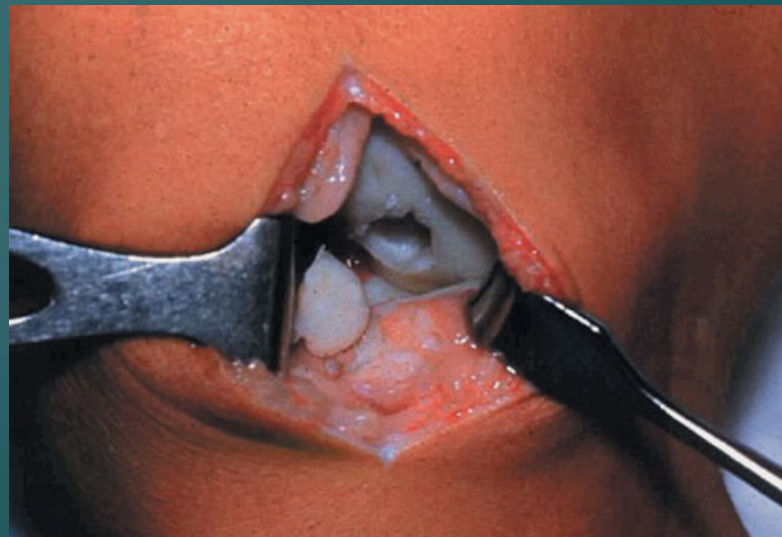
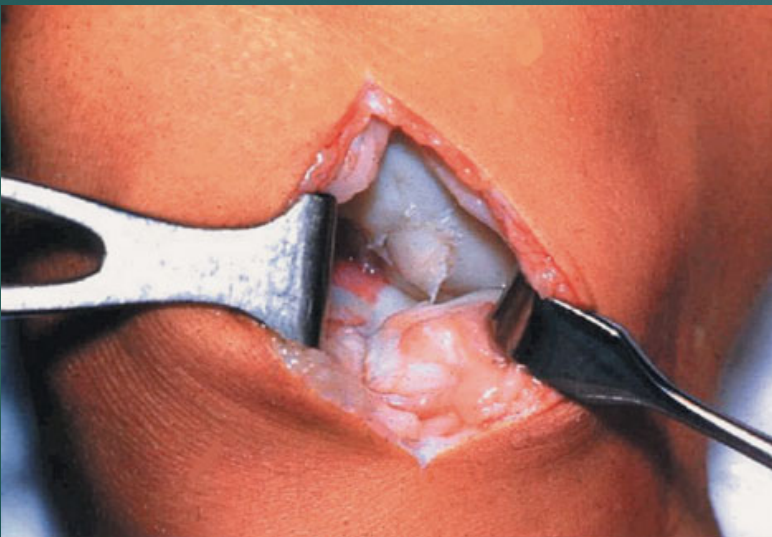
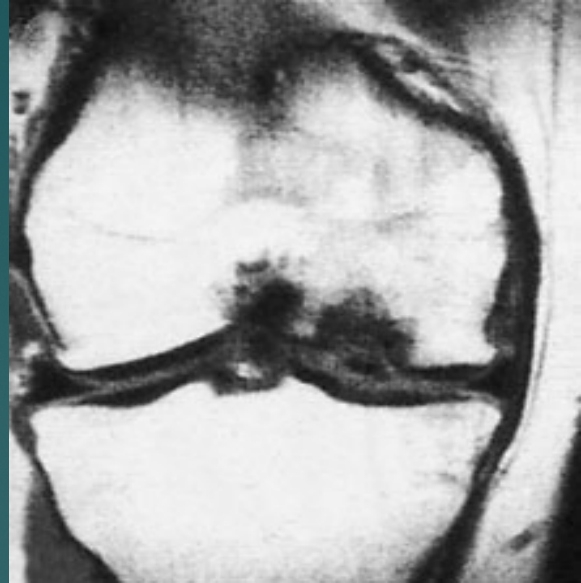
$< 11 \Rightarrow$ normal
 $> 11 \Rightarrow$ Blount
 d2

TTT/ surgery
 osteotomies

OSTEOCHONDritis DISSECANS

- ❑ A small, well-demarcated, avascular fragment of bone and overlying cartilage sometimes separates from one of the femoral condyles and appears as a loose body in the joint.
- ❑ Trauma is usual cause.
- ❑ 25% bilateral.
- ❑ Femoral condyle is a common site.

- 
- ❑ 15-20years old is common age.
 - ❑ Pain,swelling ,locking and giving away is common presentation.
 - ❑ Tenderness and wilson test are positive.
 - ❑ Radiography and MRI are needed.



Treatment.

- ❑ If small non displaced rest and non weight bearing is needed.
- ❑ If small displaced excision.
- ❑ If large displaced, fixation.then cast and NWB.
- ❑ If loose body ,excision



Meniscus tear

اصابات
الخصروف
الجلدات

? function:-

1. Stability.
2. Rolling and gliding action.
3. Load distribution.
4. Shock absorbent.

+ proprioception function
↓

? More in young adult, twisting injury.

? Medial meniscus is more common.

لرغمفت
كثير

less
mobile
fixed
← why?
lateral على

دانت نازل الربيع بتشق على

⇒ Most common mechanism that cause meniscus tear is twisting injury

↓
إصابة في الرباط الصليبي الأمامي
cruciate ligament
involvement

Clinical
Picture /

- severe pain

- bucket sound

نقطة إقترع

- second day comes with

swelling

Meniscus → avascular structure

ACL ← إصابة الرباط الصليبي الأمامي
swelling
(high B₂) high vascularized structure

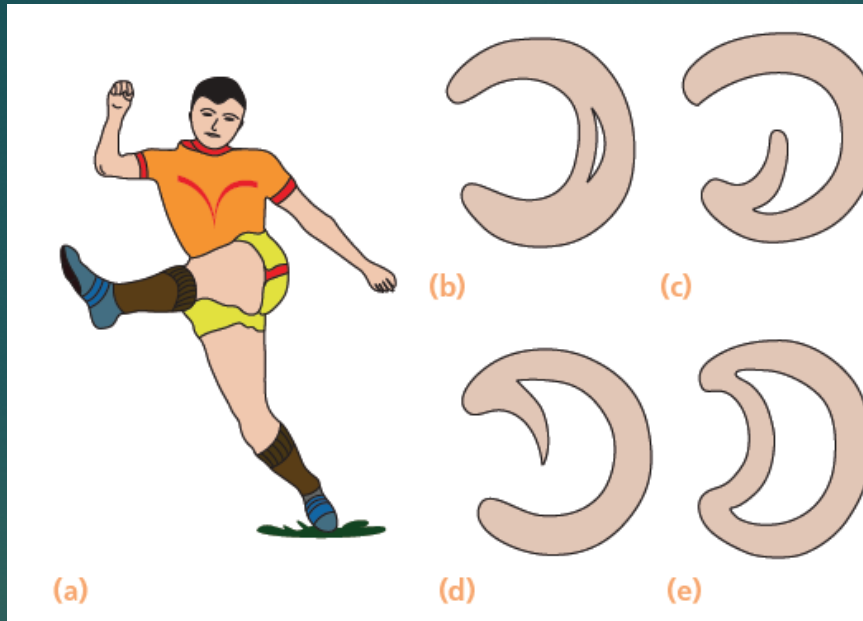
Meniscus types →

Capsule &? - ٢١٥٦ ١٥
more vascular and
more healing
potential.

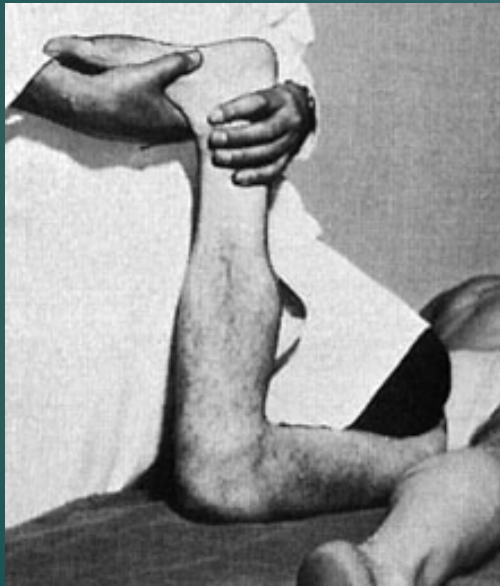
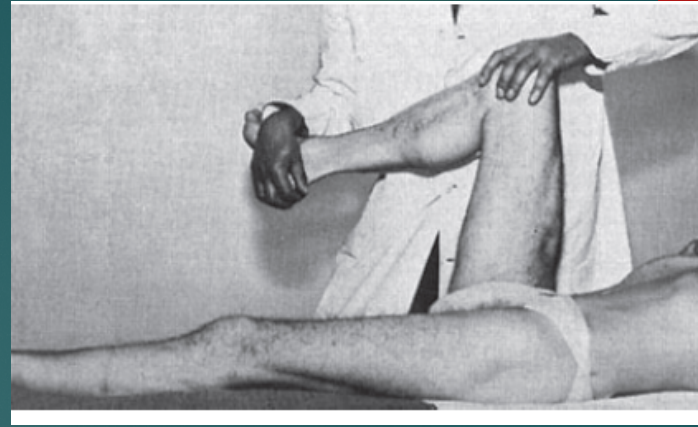
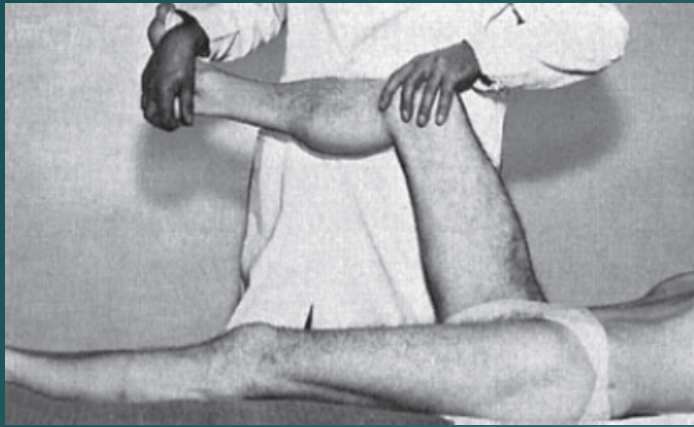
(A) peripheral Red
healing ١١ & → ١

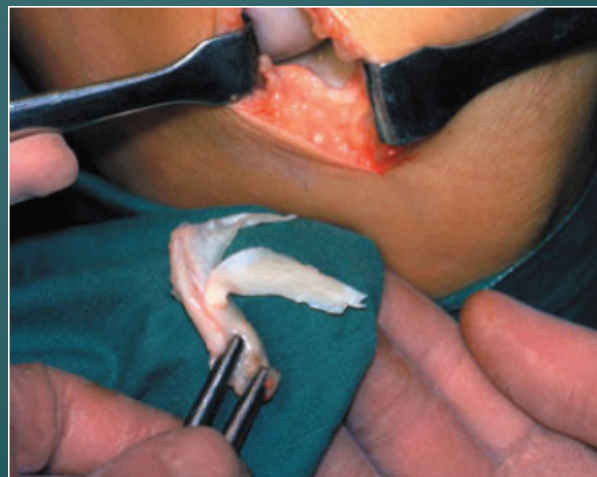
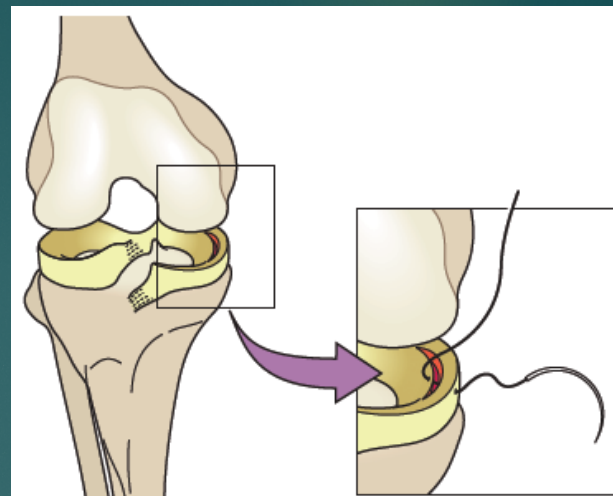
(B) central White Red

(C) inside White



20.18 Torn medial meniscus (a) The meniscus is usually torn by a twisting force with the knee bent and taking weight; the initial split (b) may extend anteriorly (c), posteriorly (d) or both ways to create a 'bucket-handle' tear (e).





Diagnosis and treatment

- ❑ Pain ,locking swelling.givingaway.
- ❑ Diagnosed by clinical examination ,confirmation by MRI.
- ❑ Treated by menisectomy or repair.

failure
for osteoarthritis.

when



① young active patient

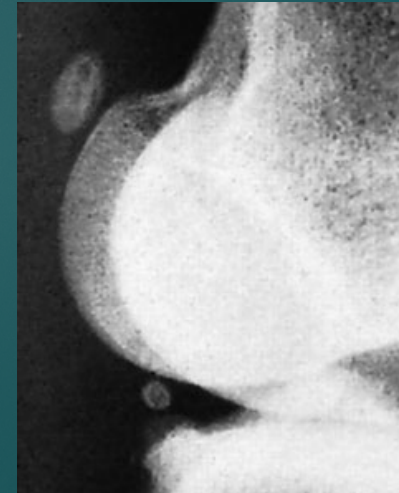
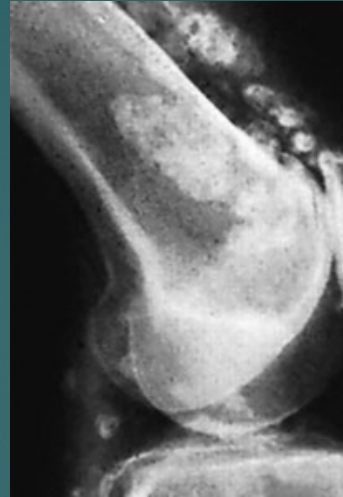
② peripheral (Red) zone

③ acute.

Loose body

اسے بے ج

- ❑ Chip of bone or cartilage.
- ❑ Osteochondritis dissecans.
- ❑ Osteoarthritis piece of osteophyte.
- ❑ Charcot disease.
- ❑ Synovial chondromatosis.

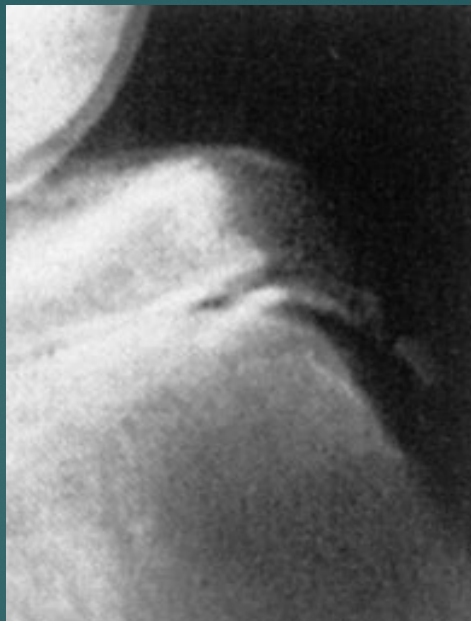
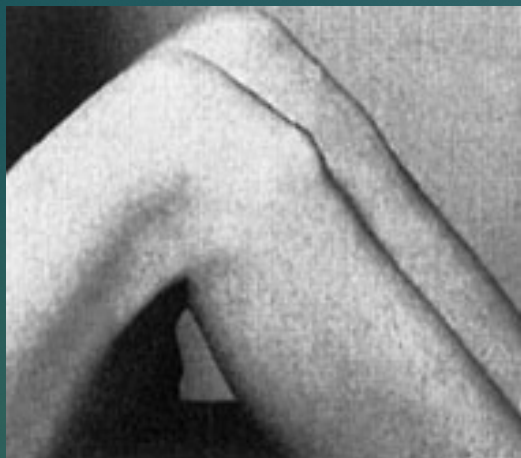


Removal of loose body

OSGOOD–SCHLATTER DISEASE (‘APOPHYSITIS’ OF THE TIBIAL TUBERCLE)

- ❑ common disorder of adolescence the tibial tubercle becomes painful and ‘swollen’.
- ❑ There is no history of injury and sometimes the condition is bilateral.
- ❑ A young adolescent complains of pain after activity, and of a lump.

- 
- ❓ Spontaneous recovery is usual but takes time, and it is wise to restrict such activities as cycling, jumping and soccer. Occasionally, symptoms persist and, if patience or wearing a back-splint during the day are unavailing, a separate ossicle in the tendon is usually responsible; its removal is then worthwhile.



Recurrent patellar dislocation

↑ common to be dislocated

patella :- largest
Sesamoid
bone
within
the
tendon
of
quadriceps
femoris.

- Acute dislocation seen after trauma, causing severe pain, and deformity.
- Treated by reduction under analgesia.
- 20% followed by recurrent attack.

with
spontaneous
reduction

female > (12 - 18 y.)

من الجنب مع الامتداد

⇒ pushing from lateral with extension of the knee

any direct force → pushing it laterally

Predisposing factor

1. Generalized laxity.
2. Lateral femoral condyle hypoplasia.
3. Maldevelopment of patella.
4. Valgus knee.
5. Primary muscle defect.

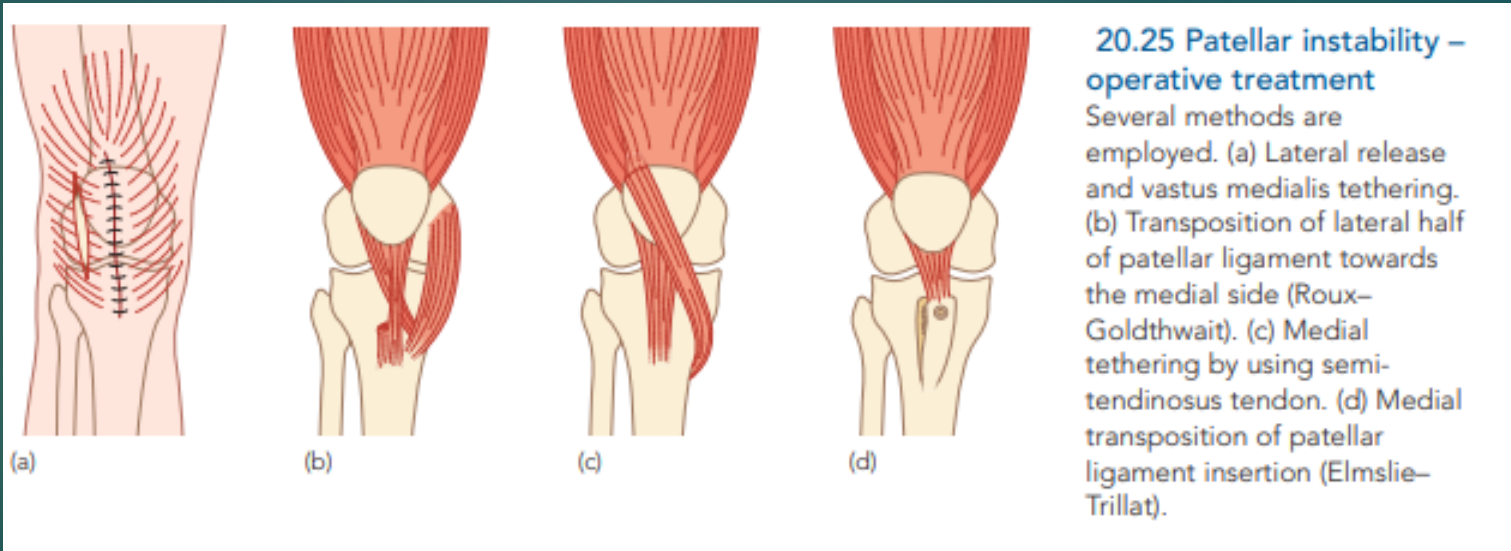
- weakness

treatment

1/ 2 hrs

① Repair of medial patellar ligament tear.

- ❑ Physiotherapy.
- ② Release the tightness of the ligament
- ❑ Recurrent attack need surgery.



Chondromalacia of the patella

ant. part of knee → ^{obese} anterior softening

? affecting adolescents and young adults.

? Anterior knee pain.

→ ? due to 'softening' of the patellar articular cartilage.

? patellofemoral overload.

pain on kneeling
[si dask]
(سجدة) + tenderness
on patella

- (1) malcongruence of the patellofemoral surfaces because of some abnormal shape of the patella or intercondylar groove.
- (2) malalignment of the extensor mechanism, or relative weakness of the vastus medialis,
- (3) X-ray examination should include skyline views of the patella, which may show abnormal tilting or subluxation, and a lateral view with the knee partly flexed to see if the patella is riding high or is unusually small

Treatment

- conservative
- muscle strengthening
- analgesia

- ? adjustment of stressful activities and physiotherapy,
- ? Exercises are directed specifically at strengthening the medial quadriceps .
- ? lateral release, or lateral release combined with one of the re-alignment procedures.
- ? Arthroscopic shaving of fibrillated cartilage is sometimes performed,

Patients should be reassured that chondromalacia does not inevitably lead to patellofemoral osteoarthritis in later life

• Osteoarthritis لا تأتي

Table 20.2 Causes of anterior knee pain

Referred from hip

Patellofemoral disorders:

- Patellar instability

- Patellofemoral overload

- Osteochondral injury

- Patellofemoral osteoarthritis

Knee joint disorders:

- Osteochondritis dissecans

- Loose body in the joint

- Synovial chondromatosis

- Plica syndrome

Periarticular disorders:

- Patellar tendinitis

- Patellar ligament strain

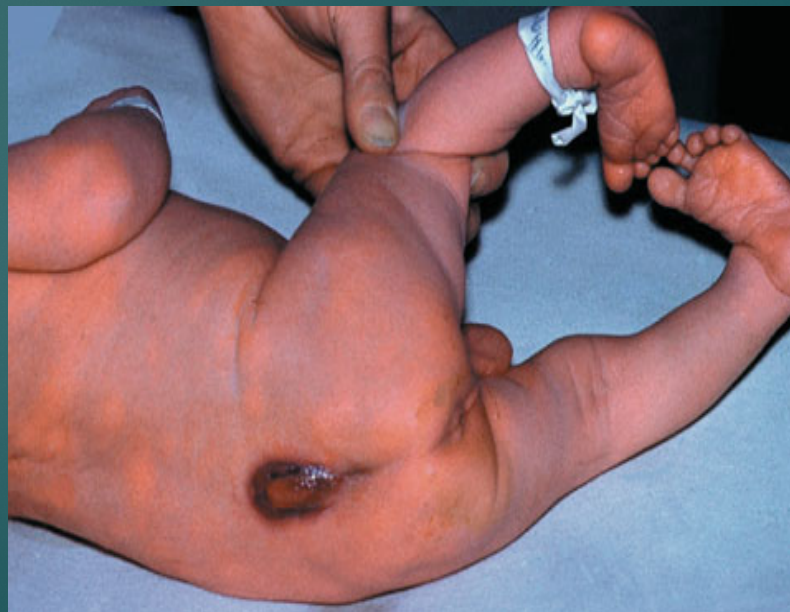
- Bursitis

- Osgood–Schlatter's disease

THE ANKLE AND FOOT

TALIPES EQUINOVARUS (IDIOPATHIC CLUB-FOOT)

- ❓ The term '*talipes*' is derived from *talus* (Latin = ankle bone) and *pes* (Latin = foot). *Equinovarus* is one of several different talipes deformities; others are talipes calcaneus and talipes valgus.
- ❓ the incidence 1–2 per thousand births.
- ❓ boys are affected twice as often as girls and the condition is bilateral in one-third of cases.



ETIOLOGY

- ❑ Unknown.
- ❑ Germ defect.arrested growth.
- ❑ Association with neurological disorder,and arthrogryposis.

Pathological anatomy

- ❑ Neck of talus pointed downward and medially.
- ❑ Body of talus rotated out ward.
- ❑ Navicular and forfoot shifted medially and go into supination.
- ❑ Skin and soft tissue in foot and calf are underdeveloprd.
- ❑ Defect in vasular supply is present.

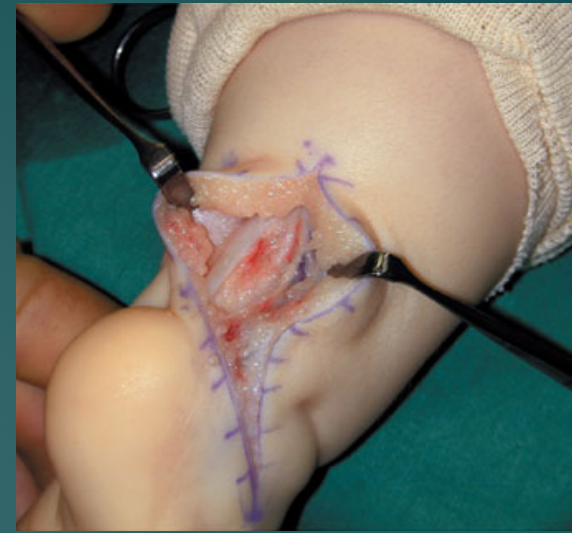
Clinical features

- ❑ Deformity is obvious at birth.
- ❑ Look for associated disease.spina bifida



Treatment.

- ❑ Serial cast since birth to correct deformity.
- ❑ Poseti technique.
- ❑ CAVE IS the order of treating the deformity.
- ❑ Last correction followed by achilles tendon lengthening .
- ❑ Then Dennis brown shoes till walking age.





❓ Sever resistant form need surgical release.

Flat foot

Congenital vertical talus

- ❑ Rare neonatal condition.bilateral.
- ❑ Opposite to club foot.foot goes into valgus.
- ❑ Rocker bottom foot.
- ❑ Calcaneum is equinus,talus point to the sole.
- ❑ Treated by surgical tendon release.befor age of 2 years



Flat foot in children and adolescent

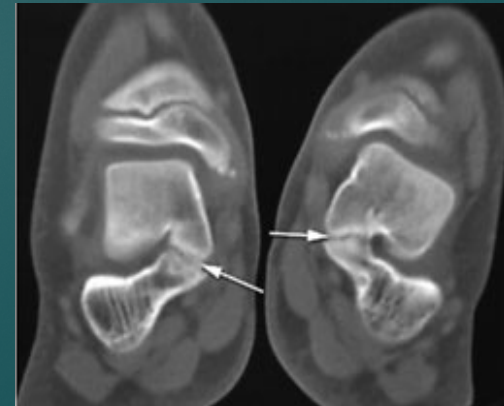
Flexible flat foot

- ❑ In toddler are normal development, disappear after few years.
- ❑ If the child has ligament laxity or has family history usually persist till adult life.
- ❑ No treatment needed, some times need medial arch support.



Stiff flat foot.

- ❓ Canot corrected passively.
- ❓ Caused by:-
 1. Tarsal coalation.
 2. Inflammatory joint condition.
 3. Neurological disease.





Pes cavus

- ❑ Medial arch higher than normal.
- ❑ Associated with claw toes.
- ❑ Tight soft tissue in the sole.
- ❑ Initially correctable then become fixed.
- ❑ Callosities usually develop.
- ❑ Underlying neuromuscular disease should be looked for.



- 
- ❑ Treatment rarely needed.
 - ❑ Shoe modification.
 - ❑ If persistent pain develop triple arthrodesis after age 16 years.
 - ❑ Flat foot in adult is due to PT tendon insufficiency.

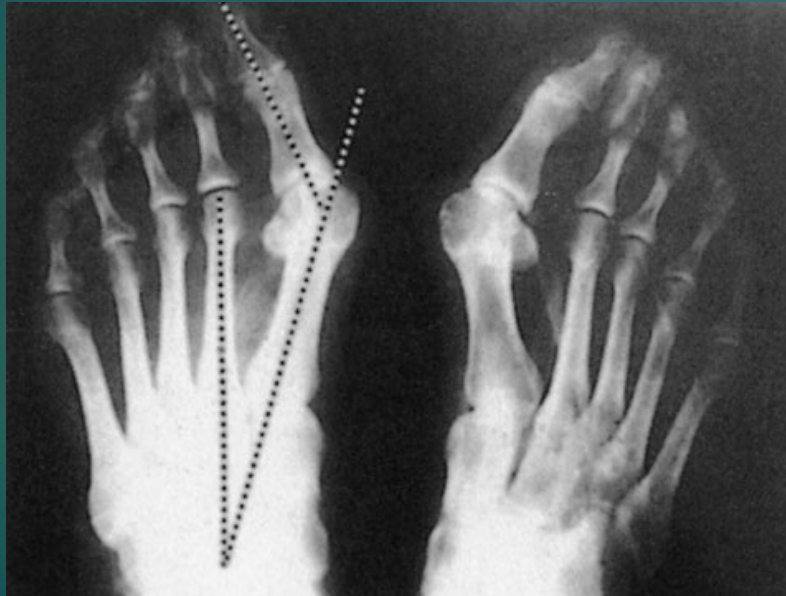
Hallux valgus

- ❑ Commonest foot disorder.
- ❑ Unknown etiology.
- ❑ Genetic predisposition.
- ❑ Shoe wear habits.
- ❑ Muscle imbalance.
- ❑ It is lateral deviation and rotation of the great toe.

- 
- ❑ Associated with exostosis of the medial joint is present.then bursa formation.
 - ❑ Overriding of the lateral toes.
 - ❑ Female 50-70years common age .bilateral.
 - ❑ Presented with deformity only, later on can lead to persistent pain.

radiography

? Ap and lateral foot x-ray.



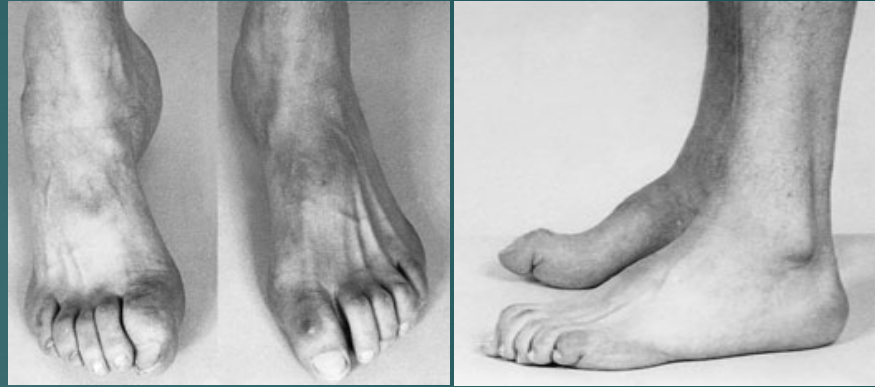
Treatment.

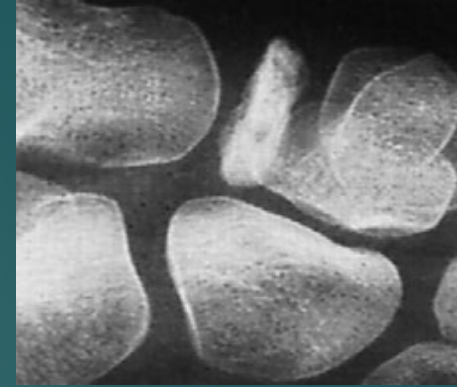
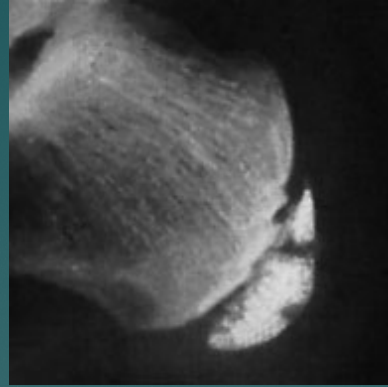
- ❑ Conservative.
- ❑ Shoe modification.
- ❑ Sever painful cases need surgical correction.
- ❑ Surgery has risk of recurrence.
- ❑ If there is hallux rigidus need arthrodesis of MPJ.

- ? **Hammer toe:-** is flexion deformity of the lesser toe, 2nd or 3rd toe. proximal interphalangeal joint.
- ? Surgery indicated if pain or ulceration develop.
- ? DIP remain straight or extend.



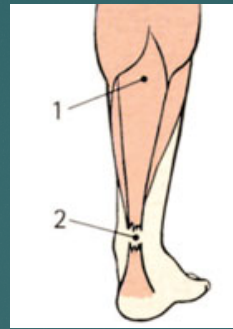
- ? Claw toe:-metatarsophalangeal joint are hyper extended,and interphalangeal joint flex.
- ? Neurological disease is underline pathology.

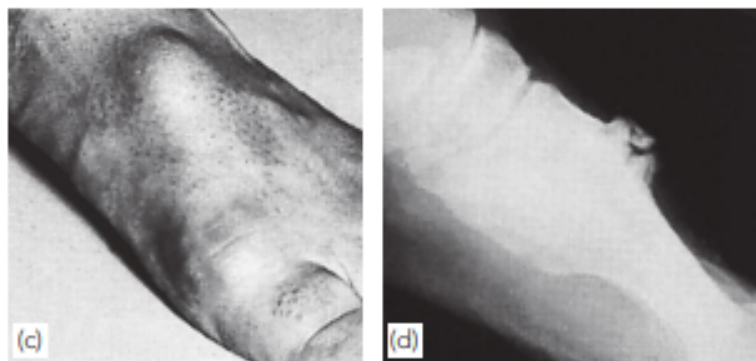
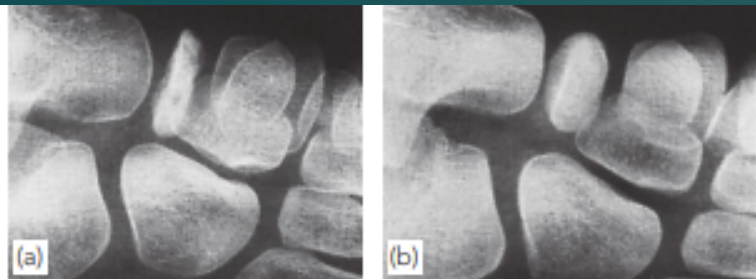




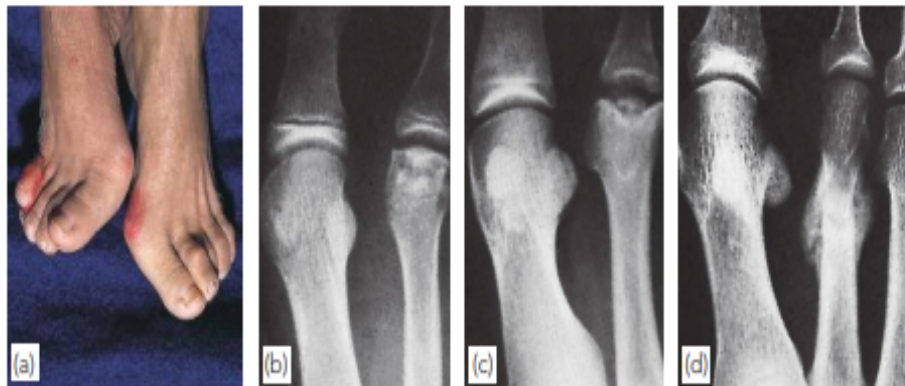
ACHILLES TENDON RUPTURE

- ❑ Underline degenerative change is seen.
- ❑ 20-40 years old.
- ❑ Running or jumping.pop sound.
- ❑ Sever intense pain,palpable gap is felt.
- ❑ Clinical diagnosis,US confirm the diagnosis.
- ❑ Thompson test
- ❑ Surgical repair is needed.
- ❑ Conservative in low demand people.





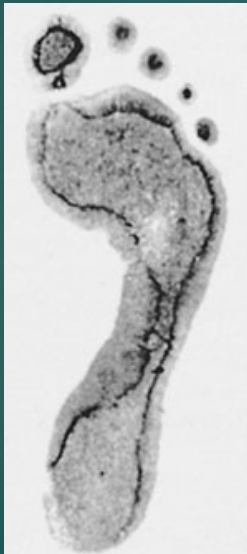
21.26 Pain over the midfoot (a) Köhler's disease compared with (b) the normal foot. (c,d) The bump on the dorsum of the foot due to osteoarthritis of the first cuneiform-metatarsal joint.



21.27 Pain in the forefoot (a) Long-standing deformities such as dropped anterior arches, hallux valgus, hammer-toe, curly-toes and overlapping-toes (all of which are present in this patient) can cause metatarsalgia. Localized pain and tenderness suggest a more specific cause. (b,c) Stages in the development of Freiberg's disease. (d) Periosteal new bone formation along the shaft of the second metatarsal, the classical sign of a stress fracture.

Planter fascitis

- ❑ Common cause of heel pain.
- ❑ Pain increase after waking up from rest. And weight bearing.
- ❑ Male mor common.30-60years age.
- ❑ Associated with tight tendoachilles.
- ❑ Gout ,Reiters disease,AS.
- ❑ Treated by rest,NSAID,shoe modification.
- ❑ Steroid injection.



Interdigital nerve compression (Morton's metatarsalgia)

- ? a woman of around 50 years,
- ? pain in the forefoot, with radiation to the toes.
- ? Tenderness is localized to one of the intermetatarsal spaces – usually the third.
- ? Squeezing the metatarsal heads together may produce a painful click (Mulder's click).
- ? an entrapment or compression syndrome affecting one of the digital nerves, secondary thickening of the nerve creates the impression of a 'neuroma.
- ? protective padding and wearing wider shoes, a steroid injection into the interspace will provide lasting relief in about 50% of cases
- ? operative division of the tight transverse intermetatarsal ligament