Clinical Cases in Orthopaedics & Traumatology

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FOREWORD

Orthopaedics is both an art and science. The accurate diagnosis and management of any condition depends upon good history and thorough clinical examination. Majority of the undergraduate and post-graduate students are ill at ease when confronted with a difficult clinical situation. The exhaustive textbooks available fail to deliver the important clinical points in a nutshell.

In this practical guide I have tried to give a simple approach to the common clinical cases encountered in Orthopaedics in a simple, lucid and easily readable style so that it is less intimidating to the beginner. This book is not intended to be a complete textbook or an exhaustive encyclopedia. It attempts to indicate the important "not to miss" points in clinical examination, so that the students can follow, improve on them and help themselves to become a "Master" - giving the fruition to the most needy - our patients.

I take this opportunity to invite constructive criticism for refining this effort. I thank Dr. K.R. Venkateshwar, Dr. R. Prabhakar, Dr. R.A. Shashidhar, Dr. S.H. Jaheer Hussain, Dr. Mohamed Sameer, Dr. Navin and Dr. Viswanath for their sincere and devoted contribution.

I also thank God Almighty and my Beloved parents for their Divine blessings without which I would not stand where I am.

May Good Befall all.

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1. NON-UNION FRACTURE - CLAVICLE

27 Years - Male

- C/o. inability to lift the right arm above shoulder - 3 months

History

- History of fall on outstretched hand on right side - 3 months ago
- History of indigenous treatment present (+) - Duration (2 months)
- History of fall on point of shoulder (or) History of direct trauma to clavicle

Inspection

- *Attitude :* Arm adducted, elbow slightly flexed, forearm and wrist in neutral position
- Swelling over the medial 2/3rd and lateral 1/3rd right clavicle present
- Deformity visibly seen
- Depression of skin over deformity seen

Palpation

- No swelling palpable but a gap is felt
- No tenderness
- Abnormal mobility + both in antero posterior plane and when asking the patient to abduct his right shoulder

Movement of Right Shoulder

Flexion	:	40 – 80 degree
Abduction	:	0 – 100 degree; further 10 degree passively possible
Extension	:	0 – 40 degree
Ext. / Internal rotation	:	0 – 45 degree further 5 degree passively possible

Measurement

- 1 cm. Shortening of right clavicle compared to Left

Investigation

- X-ray right shoulder with clavicle :- Nonunion Fracture clavicle

Important Points

1. Nonunion of fractures of clavicle is rare except in cases of middle 1/3 fractures.
2. Patients may have symptoms of pain on movement of shoulder or a grating sensation, though some patients have absolutely no symptoms.
3. Only those patients with sufficient symptoms should be considered for surgery.
4. Treatment would be plate fixation and bone grafting

2. CONGENITAL PSEUDO ARTHROSIS - CLAVICLE

2 Years - Female (Informant - Mother)

History

- C/o. lump over the right neck since birth
- Normal full term delivery
- Milestones normal
- Immunization coverage is proper
- Lump not associated with pain

Inspection

- Mass of 3 x 2 cms, seen over the right clavicle at the middle 1/3rd
- Skin over the swelling is normal
- No scars or sinuses or engorged veins

Palpation

- Not warm, no tenderness
- Deformity palpable at the middle 1/3rd of right clavicle
- Gap is palpable in the middle 1/3rd and projected medial 1/3rd of clavicle
- Yielding is present

Measurement

- Clavicle on right side is short by 2 cm, compared to left side

Movement

- Right shoulder hyper mobility present

Investigation

- X-ray right shoulder with clavicle – Gap middle 1/3rd of clavicle

Important Points

1. Rare and almost invariably occurs on the right side.
2. Clavicle develops in two masses by medial and lateral ossification centres, pseudo arthrosis develops by failure of ossification of the pre cartilaginous bridge that would normally connect the two ossification centers.
3. Other theory is that lesion is caused by compression of immature clavicle by sub clavian artery.
4. Present at birth and in the middle 1/3rd of clavicle. Differential diagnosis includes :
   a. Cleido cranial dysostosis.
   b. Non-union after a clavicular fracture c. Birth Injury.
5. Indication for surgery: Unacceptable appearance. Thoracic outlet syndrome caused by compression of the subclavian artery by the medial end of the lateral clavicular ligament. Ideal treatment is open reduction and internal fixation with plate and screws and bone grafting. Ideal age for treatment is between 3 and 5 years.

3. CLAVICLE TUMOURS

3a. OSTEO SARCOMA - CLAVICLE

16 Years - Male

- C/o. pain in the (R) clavicle - 4 months
- C/o. swelling in the (R) clavicle - 3 months

History

- Pain – started first, localized to the affected region, constant pricking pain. Aggravated during shoulder movements. Relieved by taking analgesics. Night pain present
- Swelling – occurred after the pain. Progressively increasing in size
- No H/o. trauma
- No family history of similar complaints

Inspection

- Swelling present over the distal 1/3rd of the clavicle (R)
- Skin over the swelling is shiny and stretched with engorged veins
- Wasting of deltoid present

Palpation

- Swelling of size 5 x 4 cms. Localized to distal 1/3rd of clavicle, search for lymphnodes around clavicle extending superiorly, inferiorly, medially and laterally
- Warmth +, tenderness +, firm to hard in consistency, ill defined
- Arising from the clavicle, borders not well defined, merges with the clavicle

Movement of Right Shoulder

- Flexion : 0 – 40 degree restricted by the mass
- Abduction : 0 – 60 degree restricted by mass
- External / internal rotation : 0 – 20 degree
- No distal neuro-vascular deficit

Investigation

- **X-Ray (R) Shoulder with Clavicle – AP** :- Bone lesion with ill defined and permeative borders with areas of new bone production and bone destruction. Codman's triangle + with sunburst appearance

Important Points

1. Osteosarcoma is a tumor characterized by production of osteoid by malignant cells.
2. Second most common primary malignancy of bone.
3. Onset can be of at any age, but commonly the second decade of life. Parosteal osteosarcoma has a peak incidence in the third and fourth decades and secondary osteosarcomas are more common in older individuals.
4. Incidence slightly higher in males.
5. Osteosarcoma of clavicle can be treated by complete resection of clavicle with little side effects.

3b. EWING'S SARCOMA - CLAVICLE

14 Years - Male

- C/o. pain in the (R) clavicle - 4 months
- C/o. swelling in the (R) clavicle - 3 months

History

- Pain initially localized to the (R) clavicle. Constant pricking pain. Aggravated during shoulder movements. Relieved by taking analgesics. Night pain present
- Swelling – started after the pain / progressively increasing in size
- H/o. fever present – low grade in nature, No H/o. trauma

Inspection

- Swelling seen over middle 1/3rd (R) clavicle
- Skin over the swelling shiny, but not stretched
- No dilated veins
- Wasting of deltoid and arm muscles (+)

Palpation

- Warmth +
- Tenderness +
- Swelling of size 5 x 4 cms localized to the middle 1/3 of (R) clavicle
- Swelling is firm in consistency, ill defined
- Arises from the clavicle, borders not well defined, merge with the clavicle

Movement of Right Shoulder

Flexion	:	0 – 10 degree further restricted by the mass
Abduction	:	0 – 80 degree further restricted by the mass
External/Internal rotation	:	0 – 20 degree

No distal neuro-vascular deficit

Investigation

- X-Ray Right shoulder with clavicle AP – Soft tissue tumour + with diffuse and permeative destruction of bone, with ill-defined margins in the diaphysis of the clavicle

Important Points

1. Chemotherapy is effective for shrinking the primary tumour and management of micro-metastasis.
2. The role of surgery and radiation for local disease management is controversial.
3. Lesions arising in "expendable bones" (i.e. ribs/fibula) should be excised.
4. Radiation for local treatment has risks of local recurrence (may be as high as 30% of cases), pathologic fracture, secondary osteosarcoma, fibrosis affecting function and growth disturbance in children with open physes.

3c. OSTEOID OSTEOMA - CLAVICLE

20 Years - Male

- C/o. pain right clavicle - 6 months
- C/o. swelling right clavicle - 4 months

History

- Pain started first – localised to right clavicle. Pain increases with activity and at night. Relieved by taking analgesics (aspirin).
- Swelling – occurred after the pain
- No constitutional symptoms, No H/o. trauma, No H/o. similar swellings in the body.

Inspection

- 4 x 3 cm, swelling localized to Right clavicle mid 1/3rd - distal 1/3rd junction
- Skin over the swelling normal. No dilated veins

Palpation

- Tenderness +
- Swelling of size 4 x 3 cms. localized to Right clavicle mid 1/3rd - distal 1/3rd junction, well defined swelling arising from clavicle
- No warmth/signs of inflammation.

Movement of Right Shoulder

- Full and free
- No distal neurovascular deficit

Investigation

- X-Ray Right clavicle with shoulder : Zone of bony sclerosis surrounding a radiolucent nidus of (<1.5cm)
- CT – nidus shows variable degree of mineralization

Important Points

1. Benign neoplasm of unknown etiology, composed of osteoid and woven bone.
2. Pain is believed to result from the lesion being very vascular with numerous nerve fibres. Edema and increased tension resulting in stimulation of these nerve endings causes pain.

This Condition has to be distinguished from :

a) The sclerosing non-suppurative osteomyelitis of Garre

b) Brodie's abscess

c) Osteogenic sarcoma

d) Ewings sarcoma

e) Non-ossifying fibroma (in its early stages)
   - Complete resection, if possible, will provide cure.
   - Neural staining technique helps to differentiate from osteoblastoma

Investigation

Bone marrow edema is detected around ribs

Treatment

Enbloc excision of the tumour is recommended

4. MALUNITED FRACTURE - CLAVICLE

20 Years - Male

- C/o. swelling in the upper part of right shoulder – 3months

History

- H/o fall on the outstretched hand
- H/o direct trauma following which he was not able to raise the shoulder
- H/o indigenous treatment present - native bandages
- H/o pain since the fall

Inspection

- Deformity with a mass in the right clavicular region visible at the junction of middle and outer third
- Skin over the swelling is normal
- No evidence of scar/sinus/no visible pulsation/no engorged veins

Palpation

- Not warm. No tenderness
- Hard, irregular mass of size 3 x 2 cms localized in the right clavicular region
- Edges not well defined, merges with clavicle
- No crepitus or abnormal mobility in the right clavicle

Movements

- Abduction 0 – 110 degree possible
- Further abduction painfully restricted though other movements are normal

Investigations

- X-ray right shoulder with clavicle – AP view : Malunited fracture clavicle at the junction of middle/outer third

Important Points

1. Clavicular malunion is due to opposing action of pectoralis major and sternocleidomastoid.
2. Malunions of the clavicle require no treatment unless extreme overlapping of the fragments cause shortening of the shoulder girdle or unless bone presses on the brachial plexus.
3. A malunion might result in angular deformity and shortening which can alter the position of the glenoid fossa, which in turn may affect gleno-humeral mobility and scapular rotation.
4. If surgical treatment is indicated, osteotomy and plate fixation is ideal. The clavicle must be divided through the plane of malunion or an oblique osteotomy must be made to lengthen the clavicle.

5. OSTEOMYELITIS - CLAVICLE

5a. TUBERCULOUS OSTEOMYELITIS - CLAVICLE

18 Years - Male

- C/o. discharging sinus in the lateral part of (R) clavicle - 4 months

History

- H/o. evening rise of temperature +
- H/o. loss of appetite / weight +
- H/o. cough with expectoration past 2 months
- H/o. contact with pul. TB (father – known patient)

Inspection

- Single sinus with bluish margin in mid 1/3rd - Lateral 1/3rd jn. of (R) clavicle
- Seropurulent discharge present

Palpation

- Warmth +, Tenderness +, Induration +
- Sinus fixed to underlying bone
- Thickening and irregularity of (R) clavicle
- Axillary nodes – central group – palpable and matted

Movements

- Abduction of (R) arm – 0° – 110°. Other movements full

Investigations

- ESR elevated; Mantoux positive
- X-ray (R) clavicle : irregularity + with thickening and patchy cavity in M/3 to Lat 1/3 of (R) clavicle
- Surrounding sclerosis (+)

Important Points

1. Tuberculous osteomyelitis of clavicle is rare.
2. Nearly 50% of such patient have detectable pulmonary tuberculosis.
3. The clavicle can be involved in either ends with thickening or expansion with sinus.
4. Radiologically irregular destructive areas with cavity and sclerosis seen.
5. ATT is main stay of treatment. Resection of involved end of clavicle may be done.

5b. CHRONIC PYOGENIC OSTEOMYELITIS - CLAVICLE

24 Years - Male

- C/o. swelling and pus discharge from middle 1/3 of (R) collar bone – 3 months duration with fever on and off
- Old H/o. trauma to (R) clavicle, 4 months ago treated by native bandages

O/E

Inspection

- 1 x 2 cm swelling in middle 1/3rd / distal 1/3rd jn. of (R) clavicle
- Sinus draining purulent foul smelling discharge +

Palpation

- Warmth +, tenderness +
- Sinus adherent to underlying bone
- Clavicle irregular and thickened

Movements

- Abduction : 0° – 100° degree beyond which it is restricted.
- Other movements are restricted at extremes.

Investigations

- Bone resorption with patchy density loss and sclerosis / sequestrum +
- Pus C/s. – staph aureus grown

Important Points

1. Chronic osteomyelitis of bone is difficult to eradicate completely.
2. Persistence of sinus discharging occasional bony chips of sequestrum with intermittent acute exacerbations - symptoms may be subside with antibiotics, only to recur again.
3. Hallmark is infected dead bone (sequestrum) with surrounding vascularised and fibrosed soft tissue and thickened periosteum.
4. Appropriate antibiotics and resection of the involved end may be indicated.

6. TUMOURS OF SCAPULA

6a. EWING'S SARCOMA OF SCAPULA

14 Years - Male

- C/o. pain in the left scapula - 6 months
- C/o. swelling in the left scapula - 2 months

History

- Pain – started first localized to left suprascapular region. constant pricking pain aggravated during shoulder movements. Relieved by analgesics. Night pain present
- Swelling – followed pain. Progressively increasing in size
- H/o. fever present – low grade in nature. H/o. loss of weight and loss of appetite

Inspection

- Patient anemic
- From back – Fullness seen over the left suprascapular region. Wasting of shoulder girdle muscles present
- Skin over the swelling is shiny but not stretched
- No engorged veins

Palpation

- Warmth and tenderness present
- Swelling of size 10 x 6 cms. Localized to left suprascapular region. Extending superiorly, laterally, medially and minimally to the inferior aspect as well
- Firm in consistency. Margins ill defined, merges with the surrounding scapula
- Fixed to underlying scapula

Movement of Left Shoulder

Flexion	:	0 – 40 degree further restricted by mass
Abduction	:	0 – 40 degree further restricted by mass
External/Internal rotation	:	0 – 20 degree

No distal neurovascular deficit

Investigation

- X-ray left shoulder with scapula:- Multiple osteolytic and sclerotic lesions over the left scapula

Important Points

1. The histological characteristic of Ewings is a round cell tumour, containing intracellular glycogen. Resembles metastasizing neuroblastoma or reticulum cell sarcoma.
2. Commonly occurring in the age group of 5 – 15 years, it is somewhat more common in males.
3. Bones most commonly affected are the flat and axial bones, the long bones of which tibia is the commonest.
4. Onion layer appearance is characteristic in long bones. In flat bones, it appears as a nonspecific destructive lesion.
5. Later stages, multiple deposits appear in the skull, ribs, sternum, pelvis and other long bones.
6. Pre operative chemotherapy followed by surgical resection of the tumour with post-operative chemotherapy is the treatment of choice.

6b. CHONDROSARCOMA OF SCAPULA

60 Years - Male

History

- Swelling in the region of the right scapula – 4 months duration
- H/o. pain +
- No H/o. trauma
- No H/o. similar swelling elsewhere in the body

Inspection

- Swelling of size 10 x 8 cms arising from the right scapular region. Wasting of shoulder girdle muscles +
- Skin over the swelling stretched and shiny

Palpation

- No warmth
- Tenderness +
- Hard to firm in consistency
- Mass attached to the posterior surface of the blade of right scapula
- Size 10 x 8 cms ; lobulated surface, irregular shape with ill-defined borders

Movements

- Movements of right shoulder - Flexion: 0-40 degree further restricted by mass
  Abduction : 0-40 degree further restricted by mass
  Ext./Int.rotation : 0-20 degree
  No distal neurovascular deficit

Investigation

- X-ray chest and special views of scapula
- Geographic bony lesions from scapula with variable amounts of internal punctate calcifications

Important Points

1. The roentgenographic appearance of chondrosarcoma is frequently diagnostic
2. Like enchondroma, it is a lesion arising in the medullary cavity with irregular matrix calcification
3. The pattern of calcification has been described as punctate, popcorn or comma-shaped. Compared with enchondroma, however, chondrosarcoma has a more aggressive appearance with bone destruction, cortical erosions, periosteal reaction and rarely a soft tissue mass

7. WINGING OF SCAPULA

28 Years - Male

- C/o. inability to lift his right arm – 4 months
- C/o. pain in the right scapular region – 4 months

History

- H/o. dragging feeling present since 4 month
- H/o. having undergone surgery for removal of a swelling in the upper lateral neck – 6 months ago

Inspection

- Shoulder on right side slopes down
- Healthy scar of size 4 x 1 cms in the upper lateral aspect of neck seen

Palpation

- As the patient pushes against the wall, right scapular vertebral border and inferior angle become prominent
- Inferior pole rotated medially
- Winging /prominence of right scapula palpable

Movements of Right Shoulder

- Flexion : 0-40 degree further 20 degree possible passively
- Abduction :- 0-90 degree possible ; further 90 degree possible passively
- Other movements normal

Investigation

- X-ray right shoulder with clavicle – AP view - No bony abnormality

Important Points

1. Occurs due to paralysis of the serratus anterior muscle usually due to damage to long thoracic nerve of Bell
2. The nerve is liable to damage
   - In the suprascapular region from sudden or protracted trauma (eg) carrying heavy weights on the shoulder
   - In the axilla from direct force
   - From abnormalities of first rib, at the level of union of the three nerve roots.
   - From violent contractions of scalenus medius
   - Sometimes, winging occurs following Polio, Typhoid, Measles. Influenza and other viral infections
3. Common symptom is the patient's fatigue on elevating the arm and inability to do so fully
4. Treatment is usually conservative. In Polio improvement can be seen by scapulo thoracic arthrodesis. Ideally done after 3 years
5. Winging / prominence of scapula without nerve paralysis can occur on tumours of the inner surface of scapula or outer surface of the ribs.

8. SPRENGEL'S SHOULDER

10 Years - Male

- C/o. deformity in the neck (upper back) since birth

History

- Normal full term delivery
- Milestones normal, immunization coverage is proper
- No H/o. trauma

Inspection

- Neck is short, head is deviated towards the right side
- Absence of trapezius muscle on right side
- Other scapular muscles may be hypoplastic or absent
- No mass or scar or sinus visibly seen
- Right scapula elevated and is prominently seen

Palpation

- Right scapula is elevated, hypoplastic, smooth, 7 cms. Higher (i.e.) superiorly located than the left scapula which is normal

Special Additional Feature

- Adson's test +ve. When the patient sits on a stool, takes a deep breath and turns the face to the affected side, the radial pulse is often obliterated due to compression of the subclavian artery.(Sprengels shoulder may be associated with vertebral or rib anomalies)

Movements

- Right shoulder – Abduction and flexion are restricted

Investigations

- X-ray Right scapula – elevated/small (ordinary type), presence of omovertebral bone (may be seen) if ossified
- X-ray Cervical Spine – AP/Lateral – Evidence of right cervical rib

Important Points

1. First described by Eulenberg as congenital high scapula
2. Result of imperfect descent of the shoulder girdle
3. Clinically the severity of elevation of scapula has been described by Cavendish (1972)
   Group 1 – very mild with the deformity almost unobservable
   Group 2 – mild with the shoulder joints slightly unaligned
   Group 3 – Moderate with the shoulder joint obviously higher
   Group 4 – Severe, with the superior angle of scapula near the occiput and webbing may be present

9. TUBERCULOUS OSTEOMYELITIS - RIB

22 Years - Female

- C/o. discharging sinuses in the right chest – 4 months

History

- H/o. evening rise in temperature +
- H/o. contact with pulmonary TB. (her father is a known pulmonary tuberculosis patient).
- H/o. loss of weight/appetite +
- H/o. cough with expectoration – 2 months, associated with pain in the right chest – 2 months

Inspection

- Sinus + two in number; localized to 4th rib on right chest
- Seropurulent discharge present
- Skin surrounding the sinus discolored

Palpation

- Warmth present around the sinuses
- Tenderness and induration present
- Irregular shaped sinuses with undermined edges
- Sinuses fixed to underlying rib (4th rib on right chest)

Examination of Lymph nodes

- Axillary nodes : Central group palpable, two in number, matted

Investigation

- X-Ray Right chest : Irregular cavity is evident in the 4th rib with sclerosis surrounding it

Important Points

1. Tuberculous localization of the thoracic cage is rare
2. Nearly 1/3rd of such patients have detectable tuberculous lesion in other parts of the skeleton or in the lungs
3. Positive x-ray finding occurs much later than the presenting clinical features
4. Abscess or sinuses are present before the focus can be detected radiologically, sternal disease is seen as irregular destructive areas or cavities
5. The diseased ribs may show thickening or expansion with punched out erosions; Rarely, there may be sequestrum formation of a segment of rib
6. ATT is the mainstay of treatment. Surgical treatment may be rarely justified for a doubtful diagnosis, a non-responsive case or for removal of a large sequestrum

10. COSTOCHONDRITIS
(TIETZ SYNDROME)

40 Years - Female

- C/o. pain in the (R) side of chest just lateral to sternum – 10 days duration
- Pain is aggravated by deep breathing, coughing or pressure on the thoracic cage

History

- Started insidiously 10 days ago
- No H/o. trauma
- No H/o. constitutional symptoms

Inspection

- Small mass seen at the costo-chondral junction opposite to 5th rib

Palpation

- No warmth, no tenderness of overlying skin over the costo-chondral junction opposite the fifth rib
- Tender mass at the costo-chondral junction

Movement

- Movements not affected, but pain aggravated on deep inspiration

Investigation

- X-ray Chest – No abnormality detected

Important Points

1. Aetiology of this condition is vague, but some form of trauma, mechanical stress or perhaps the onset of calcification into the chondral aspect of the rib may be a precipitating factor
2. Slow but self-limiting disease
3. Biopsy has been carried out on a few cases and oedema of the perichondrium as well as the soft tissues was found
4. Treatment is usually supportive with analgesics, local heat and local injections of hydrocortisone

11. CHONDROSARCOMA - RIBS

60 Years - Male

- C/o. pain and swelling in the region of right chest wall - 4 months

History

- Swelling in the region of right chest wall - 4 months duration
- Started insidiously, gradually progressive and reached the present size
- Associated with pain, worse at night, relieved by analgesics, not relieved by rest
- No constitutional symptoms

Inspection

- 5 x 4 cm swelling arising from the 5th rib in the right chest wall in the mid-clavicular line
- Skin over the swelling is stretched and shiny but no dilated veins

Palpation

- Not warm
- Tender, firm swelling of 5 x 4 cms. arising from the 5th rib in the mid-clavicular line
- Fixed to the underlying rib
- Examination of respiratory system : clear

Investigation

- X-Ray chest PA view: Osteolytic lesion with periosteal expansion. Variable amounts of irregular calcifications
- No evidence of secondaries chest

Important Points

1. Chondrosarcoma is a malignant cartilage producing tumour
2. 50 – 70 years, M: F equal incidence. Borders will be distinct, skin covering it will be healthy, involvement of parietal pleura is a possibility
3. Treatment is surgical resection with wide margins
4. Radiation and chemotherapy are not effective modes of therapy for primary management

Classification

1. Central (high grade or low grade); may be primary or secondary to underlying bone pathology (eg. Enchondroma)
2. Periosteal
3. Clear cell
4. Mesenchymal
5. De-differentiated – Histological
6. Osteoblastic
7. Malignant tumour of cartilaginous origin, tumour matrix is entirely chondroid in nature

Treatment

- Wide resection and covering the defect with flap

12. TUBERCULOUS OSTEOMYELITIS - STERNUM

40 Years - Male

History

- C/o. swelling and pus discharge, from a sinus in middle, upper part of chest - past 4 months
- Sinus discharging sero-sanguineous fluid
- Patient had been irregularly treated for pulmonary tuberculosis – 6 months back

On Examination

Inspection

- Swelling 2 x 1 cms over the manubrium sterni with sinus discharging sero-sanguineous fluid

Palpation

- Swelling 2 x 1 cms; irregularity of manubrium sterni (+)
- No warmth
- Tenderness +
- Sinus adherent to underlying manubrium sterni

Investigation

- X-Ray Chest : Irregular destructive cavities in manubrium sterni (+)
- Other investigations confirm tuberculosis

Important Points

1. Sternal osteomyelitis is very rare. Occurs only in 1.5% of the total osteoarticular tuberculosis
2. Nearly one third of these patients had detectable tuberculous lesion in other parts of the skeleton or in the lungs
3. Positive x-ray signs occur much later than the presenting clinical features
4. Abscesses or sinuses are present before the focus can be detected radiologically
5. All cases heal with anti tuberculous drugs. Surgical treatment may be rarely justified for a doubtful diagnosis, a non-responsive case or for removal of a large sequestrum

13. CHONDROSARCOMA - STERNUM

60 Years - Male

- C/o. pain and swelling in the region of the sternum 3 years

History

- Swelling in the region of sternum – 3 years duration
- Swelling started insidiously and reached the present size
- Associated with pain, continuous, dull aching, worse at night
- C/o. dyspnea

Inspection

- 6 X 5 cms. Swelling arising from the middle of sternum in the anterior aspect
- Skin over the swelling is stretched and shiny, no dilated veins.

Palpation

- Tender, firm swelling of size 6 x 5 cms. arising from the sternum and fixed to it.
- Examination of respiratory system : Normal

Investigation

- X-Ray chest PA view : Ill defined osteolytic lesion from the sternum with popcorn calcification
- No evidence of secondaries

Important Points

1. Occurs over a broad age range with peaks between 40 – 60 years for primary chondrosarcoma and between 25 – 45 years for secondary chondrosarcoma
2. Chondrosarcoma can occur in any location, however most are located in a proximal location such as the pelvis, proximal femur and proximal humerus but they can occur occasionally in sites such as ribs and sternum
3. Secondary chondrosarcomas arise at the site of a preexisting benign cartilaginous lesion. They occur most frequently in the setting of multiple enchondromas and multiple hereditary exostoses
4. Thoracic wall chondrosarcomas typically grow slowly and relapse locally. If not treated, late metastasis will occur
5. Purpose of first surgery must be wide resection, obtaining a 4 cm margin in all sides

14. TUBERCULOUS ARTHRITIS - SHOULDER (CARIES SICCA)

28 Years - Male

- C/o. pain in the right shoulder – 6 months
- C/o. difficulty in moving right shoulder – 6 months

History

- Pain constant, dull aching present localized to right shoulder. Aggravated on movements; relieved by taking analgesics
- H/o. fever – evening rise in temperature +
- H/o. loss of weight and appetite. Known pulmonary tuberculous patient on irregular treatment
- H/o. night pains present

Inspection

- Gross wasting of deltoid and supraspinatus and other muscles on the right side compared to left side
- No sinus or mass seen

Palpation of Right Shoulder

- Not warm but tender along anterior/posterior shoulder joint line
- Tenderness of humeral head present on palpating through axilla
- Acromion is also tender
- Deltoid and supraspinatus are wasted
- Lymph nodes - central and axillary group of lymph nodes are palpable & matted

Movements of Right Shoulder

- Initially painful limitation of abduction and external rotation
- Movements painfully restricted in all directions

Investigation

- X-ray Right Shoulder :- Generalised rarefaction is seen with varying degree of destruction of articular margins of upper end of humerus and glenoid
- Joint space is narrowed. Inferior subluxation of humeral head may occur

Important Points

1. Constitutes only 1-2% of skeletal tuberculosis
2. More frequent in adults and incidence of concomitant pulmonary tuberculosis is high
3. Disease originates in the head of the humerus, glenoid of scapula or rarely from the synovium
4. Painful limitation of abduction and external rotation occurs early
5. The common variety is a dry atrophic type (caries sicca) but very rarely there may be swelling and cold abscess or sinus formation in the deltoid region
6. Usually a case of adhesive capsulitis may be diagnosed as caries sicca if patient has co-existing pulmonary tuberculosis
7. Apart from anti-tubercular drugs, shoulder is immobilized by plaster shoulder spica in 70 – 90 degree of abduction, 30 degree forward flexion and 30 degree internal rotation (saluting position) for 3 months

15. RHEUMATOID ARTHRITIS - SHOULDER

40 Years - Female

- C/o. pain right shoulder - 4 months
- C/o. difficulty in moving right shoulder - 4 months
- C/o. difficulty in combing hair and washing her back
- C/o. pain in the left shoulder also - 1 month duration

History

- Pain and stiffness in the right shoulder; increased in the morning
- Pain and stiffness of small joints of hands +
- H/o. fever + and other constitutional symptoms present

Inspection

- Diffuse swelling in the Right shoulder + in the anterior aspect
- Small joints of the hand are swollen

Palpation

- Right Shoulder : warmth ⊕
- Tenderness + anterior aspect, superior aspect and also in axilla of shoulder joint
- Diffuse swelling of the soft tissue 4 x 3 cms ⊕
- Deltoid appears wasted on comparing with opposite side

Movement

- Movements painfully restricted in all directions, especially abduction

Investigation

- X-RAY Right shoulder :
- Soft tissue swelling due to effusion
- Periarticular osteoporosis / Intra articular osteoporosis
- Subchondral cyst formation
- Subchondral erosions
- Narrowing of joint spaces

Important Points

1. Rheumatoid arthritis frequently affects the shoulder
2. Synovial membrane of the main cavity is first affected, followed by the sub-acromial bursa, which communicates with the joint and the tendon sheath of the long head of biceps. Involvement of the sub-acromial bursa may lead to a large swelling which restricts movement and activities
3. Pain in the shoulder with restriction of movement-especially abduction is the first symptom. Pain is usually intermittent and relieved by reduced activity
4. Bilateral shoulder involvement often calls for operative treatment on one shoulder at least
5. Regular treatment for rheumatoid arthritis is continued along with intra articular methylprednisolone in early stage
6. Synovectomy and later shoulder replacement may be done in resistant painful cases

16. ADHESIVE CAPSULITIS (FROZEN SHOULDER)

45 Years - Female

- C/o. pain in the right shoulder – 2 months
- Limitation of movements - 2 months

History

- Pain – insidious onset .
- Gradually increasing in severity associated with restricted movements and difficulty in lying on affected side
- Known diabetic, hypertensive on treatment

Inspection

- Wasting of deltoid muscle present on the right side
- Skin over the right shoulder normal
- No mass or scar or sinus visibly seen

Palpation

- No localized tenderness

Movements

- Limitation of abduction and external rotation with restriction of active and passive movements in all directions

Right Shoulder	Active	Passive
Flexion	0 – 60 degree	Further 15 degree
Abduction	0 - 60 degree	Further 10 degree
External rotation	0 – 15 degree	Further 10 degree
Internal rotation	0 – 20 degree	Further 5 degree
Extension possible		

Measurements

- No limb length discrepancy
- No distal neuro-vascular deficit

Investigations

- X-ray Right shoulder :- Bone density in the head of humerus decreased
- Arthrography Right shoulder – Contracted joint

Important Points

1. Affects females more than males, over the age of 40 years. Frequently accompanied by bicipital tendinits. Occurs more frequently in diabetics
2. Marked restriction of all movements but especially abduction and internal rotation
3. X-ray examination is usually negative except for some osteoporosis
4. Pathology usually reveals a thickened, contracted capsule with fibrosis and inflammatory cells. Exudates cause intra-articular synovial membrane and capsule to adhere to one another

- *Three phases of disease:*
    1. Increasing pain and increasing stiffness
    2. Decreasing pain persistent stiffness
    3. Disappearance of stiffness with residual pain and stiffness each phase last for 4 to 8 months
        a. Surgery - Rotation internal and coraco humeral ligament release. Coraco acromial ligament is excised
        b. It is usually self limiting but symptoms can persist for more than 6 months
        c. The acutely painful stage is treated by rest in a triangular sling plus local anaesthetic and hydrocortisone injection. Manipulation is carried out in the second stage of stiffness and reduced pain

17. SUPRA SPINATUS TENDINITIS

27 Years - Male

- C/o. (R) shoulder pain for past 2 weeks
- H/o. sprain / injury (R) shoulder 2 weeks back while playing ball badminton
- Pain increases while abducting the shoulder

O/E (R) U/L

- Shoulder, elbow, wrist - neutral
- Deltoid contour - Normal

Inspection

- Shoulder contour - normal
- Skin over the shoulder - normal
- No sinus / No scar / No dilated veins

Palpation

- No warmth
- Tenderness + over the greater tuberosity
- No bony thickening

Movement

- Abduction : 0 - 60° - painless
- 60° -120° - painful, further abduction painless
- No limb length discrepancy

X-ray

- No specific changes

Treatment

- Early stages - rest with triangular sling and NSAID
- Inj. Hydrocortisone with 1% lignociane into the tender area
- After 2 weeks gentle mobilization exercises
- If the shoulder is stiff after the pain subsides, manipulation under anaesthesia is done

18. BICIPITAL TENDINITIS

40 Years - Male

- C/o. pain right shoulder - 1 week
- C/o. inability to use right shoulder - 1 week

History

- Pain right shoulder for 1 week duration following lifting of heavy weights
- Inability to use the right shoulder freely
- No swelling/constitutional symptoms

Inspection Right Shoulder

- No significant abnormality

Palpation

- Tendereness sharply localized to the bicipital groove
- Speed's test (+ve) :- Resisted flexion with elbow straight and forearm supinated causes pain
- Yergason's test +ve:- Resisted supination of the foream with the elbow bent causes pain
- No distal neuro vascular deficit

Movement

Right Shoulder	Active	Passive	] beyond
Flexion	0-90 degree	further 20 degree	] which
Abduction	0-90 degree	further 20 deg	] painful
External rotation	0-20 deg	further 10 deg	]
Internal rotation	0-20 deg	further 10 deg	]

Extension : possible

Measurement

- No limb length discrepancy

Investigation

- X-ray right shoulder – No abnormality detected

Important Points

1. The long tendon of biceps is a very intimate component of the articular capsule of the shoulder joint and therefore is frequently involved by the inflammatory processes which affect this joint, particularly capsulitis
2. Therefore it occurs together with rotator cuff impingement
3. Rarely it presents as an isolated problem in young people after unaccustomed shoulder strain
4. Rest, local heat and deep transverse friction usually bring relief
5. If recovery is delayed, a cortico steroid injection will help. For refractory cases anterior acromio plasty is indicated

19. DELTOID FIBROSIS OF SHOULDER

16 Years - Male

- C/o. deformity over the (R) upper arm - 4 months

History

- Deformity – insidious onset, slowly progressive. Associated with pain in the (R) Shoulder with restriction of movements
- H/o. multiple injections into the arm several times for pulmonary tuberculosis

Inspection

- Shoulder in abduction / elbow in flexion /wrist in neutral
- Obvious wasting of (R) deltoid present
- Winging of scapula present
- On sitting posture 1. acromion process prominently seen
  2. vertebral border of scapula prominent

Palpation

- No warmth, No tenderness
- Deltoid over the (R) arm is taut, contracted and fibrosed (especially middle fibres)

Movement of Right Shoulder

- Fixed abduction deformity of (R) shoulder – 30 degree, trying to adduct the arm produces winging of the scapula

Deformity

Flexion	0 – 100 degree
Abduction	30 – 130 degree
Ext. Rotation	0 – 45 degree
Int. Rotation	0 – 60 degree

- No distal neurovascular defict

Investigation

- X-Ray (R) Shoulder – AP view : No bony abnormality

Important Points

1. Contracture of the deltoid muscle can occur after repeated intra-muscular injections
2. Severe contractures can lead to significant pain around the neck and shoulder girdle, dimpling of the skin, winging of the scapula and an abduction contracture of the shoulder
3. MRI typically shows a fibrotic cord within the deltoid muscle, which extends from the superior acromial surface to the deltoid tuberosity
4. Surgical treatment for deltoid contractures should be reserved for patients with significant deformity and pain who have not responded to a lengthy rehabilitation programme

20. ROTATOR CUFF TEAR

52 Years - Male

- C/o. inability to lift his (R) arm - 6 months duration

History

- H/o. recurrent injury (R) shoulder
- H/o. refractory shoulder pain associated with increasing stiffness and weakness of abduction

Inspection

- Attitude : Arm by the side, elbow in extension, forearm in midprone. Obvious wasting of supraspinatus and infraspinatus present compared to (L) side
- No mass/scars/sinus seen

Palpation

- Localised, mild tenderness present over the greater tuberosity, acromio-clavicular joint
- Coarse crepitations palpable, snapping over the rotator cuff when the shoulder is passively rotated

Movement

- **Abduction :** 1. Active : impossible. On attempting produces a shrug
  2. Passive : Full
  3. Internal rotation restricted
- Drop arm sign +
- On injecting local anaesthetic into subacromial space, active abduction is possible

Special Task

Once the arm is lifted above 40^0 the patient is able to further abduct the arm

Investigation

- X-Ray – (R) Shoulder – Thinning of acromion process, upward displacement of humeral head
- Others : Arthrography, ultrasonography, MRI for demonstrating cuff tears

Important Points

1. Rotator cuff tears are uncommon before the age of 40
2. The vast majority of tears are the chronic additional type. Chronic tears are also a feature of rheumatoid disease
3. Those tears with a communication between the bursa and the joint are called complete tears and those with no communication as incomplete tears, which are further sub-classified into bursal, intratendinous and joint side tears
4. Complete tears are divided into various sizes, measured in its longest diameter; a small tear is defined as less than 1 cm, a medium size tear as 1 – 3 cm., a large tear 3 - 5 cm and a massive tear as more than 5 cm. usually with retraction of the torn cuff
5. Management: Conservative management for patient with useful range of movements, adequate strength and well controlled pain
6. Acromioplasty rotator cuff repair for chronic pain, weakness with significant loss of function and in younger active patients

21. OLD ACROMIO CLAVICULAR JOINT DISLOCATION

28 Years - Male

- C/o. difficulty in raising the right upper arm - 4 months

History

- H/o. fall of a weight on the point of the right shoulder – 4months ago
- H/o. treatment with adhesive strapping +

Inspection

- Prominent swelling at the outer end of right clavicle
- Skin over the swelling is stretched but not shiny

Palpation

- Outer end of Right clavicle displaced upwards and mild thickening and irregularity present
- Acromion process displaced downwards
- Palpable step present between the two

Movement of Right Shoulder

Flexion	:	0-90 degree possible
Abduction	:	0-30 degree possible further restricted with pain
Internal rotation	:	0-45 degree
External rotation	:	0-45degree

No distal neurovascular deficit

Investigation

- X-ray (R) shoulder with clavicle – Acromio clavicular joint dislocation is evident

Types of Reconstruction are

a) Reconstruction of superior acromio clavicular ligament
b) Transfer of coracoid to clavicle
c) Transfer of coraco acromial ligament

Important Points

1. Same classification is used for both old unreduced and acute dislocations of the acromio clavicular joint
2. In symptomatic type of unreduced dislocations, where the coraco clavicular ligaments are intact, resection of the distal end of the clavicle is done (Mumford procedure)
3. In types III, IV or V chronic unreduced acromio-clavicular dislocations the coraco clavicular ligaments should be reconstructed

22. RECURRENT DISLOCATION OF SHOULDER

25 Years - Male

- C/o. giving away (dislocation) of the right shoulder – 6 times over the past 3 months

History

- First episode occurred 3 months ago as a result of trauma following which 5 more episodes have occurred as a result of trivial trauma or even on exaggerated movement of the shoulder joint
- Patient had pain during dislocation
- Patient was able to relocate the shoulder joint himself for the last two times
- No H/o. seizures

Inspection

- No significant abnormality noted
- **Apprehension test +ve :** With the patient seated or lying, on cautiously lifting the arm into abduction, external rotation and then extension, the patient tautens in apprehension

Fulcrum test (+ve)

- With the patient lying supine, arm abducted to 90 degree, the examiner places one hand behind the patient's shoulder to act as a fulcrum over which the humeral head is levered forward by extending and laterally rotating the arm; the patient becomes apprehensive

Drawer's test :- (+ve)

- With patient supine, the scapula is stabilized with one hand while the upper arm is grasped and the head of the humerus is manipulated forwards and backwards (like a drawer)

Movements

- Movements of the shoulder are full and free. No distal neuro vascular deficit

Investigations

- On X-ray shoulder AP with shoulder internally rotated and Axillary view – Hill sach's lesion +ve

Important Points

1. Shoulder is the most common joint which undergoes recurrent dislocation
2. It can be traumatic or atraumatic
3. Depending upon the underlying pathology treatment varies from soft tissue procedure to bony procedure

23. OLD UNREDUCED ANTERIOR DISLOCATION - SHOULDER

55 Years - Male

- C/o. pain right shoulder – 6 months
- C/o. inability to use the right shoulder joint due to restriction of movements 6 months duration

History

- Patient gives H/o. trauma to the right shoulder during a bout of alcohol 6 months back with resulting pain and inability to use the right shoulder
- H/o. native treatment in the form of splinting +
- Pain on attempting to move the shoulder beyond its restricted range

Inspection

- Wasting of the deltoid muscle +
- Loss of the right shoulder contour

Palpation

- Humerus head dislocated from the glenoid fossa and lies anteriorly
- Transmitted movements +

Movements

Right Shoulder

Abduction	0 – 50 degree
Internal rotation	0 – 10 degree
Flexion	0 – 80 degree
Extension	0 – 30 degree

Measurements

- Hamilton Ruler test and Callaway's test +ve, Duga's test +ve
- No distal neuro-vascular deficit

Investigations

- X-ray Shoulder AP View : Anterior dislocation Right shoulder

Important Points

1. Unreduced dislocations produce pathological conditions both in the soft tissue and the bone. After a few weeks, fibrous and capsular contractures occur across the bone of the glenoid. The rotator cuff muscles also are contracted . The fibrosis can include other structures such as the axillary artery and nerve. Bony pathology is also apparent where a compression fracture occurs in the posterolateral aspect of the humeral head, where it impinges against the anterior glenoid rim

2. Treatment depends on the age of the patient as well as functional requirements and ranges from no treatment, closed reduction, open reduction, hemiarthroplasty and total shoulder replacement

24. SEPTIC ARTHRITIS - SHOULDER

13 Years - Female

- C/o. pain and swelling (R) shoulder 3 days
- C/o. difficulty in using (R) shoulder 3 days
- H/o. high grade fever for the past 3 days
- No H/o. trauma

O/E : Malnourished young girl

(R) Upper Limb- Shoulder mild flexion and abduction, elbow neutral, wrist neutral

(R) Shoulder - Inspection : Diffuse swelling around the shoulder
Fullness, Anterior and posterior aspect. Skin - Inflammed
No sinus / No scars, No dilated veins

Palpation

- Swelling - warmth +, tenderness+
- Movement: All movement painful and restricted
- Measurement: No limb length discrepancy
- X-ray: No bony lesion

Treatment

- Emergency arthrotomy and joint lavage should be done. Arm should be supported in triangular sling

Important Points

1. Septic arthritis of joints most commonly affects Hip, Knee and Shoulder
2. The most common etiology is haematogenous spread from a septic foci and staphylococcus remains the most common organism
3. When diagnosed initially (within 24 hrs.), it can be managed by i.v. antibiotics alone
4. Usually septic arthritis requires arthrotomy and joint lavage

25. SYNOVIAL CHONDROMATOSIS - SHOULDER

50 Years - Male

History

- C/o. pain and limitation of movement right shoulder – 2 months
- C/o. swelling right shoulder joint
- No history of trauma
- No constitutional symptoms

Inspection

- A 3 x 2 cms diffuse swelling in the anterior aspect of the right shoulder

Palpation

- Tenderness + over acromion process and coracoid process
- No warmth
- Skin appears normal
- Synovial thickening + causing the diffuse swelling
- No distal neuro vascular deficit

Movements

Abduction	0 – 110 degree
Flexion	0 – 55 degree
Extension	0 – 30 degree
External and internal rotation	0 – 20 degree

Investigations

- X-ray shoulder – AP :- loose bodies in the shoulder joint. Arthroscopy : loose bodies +, cartilage erosion +

Important Points

1. Synovial chondromatosis is a monoarticular synovial proliferative disease in which cartilaginous or osteo cartilaginous metaplasia occurs within the synovial membrane of joints, bursa or tendon sheaths
2. Milgram has classified the disease in three phases
   a) Early, with synovial chondrometaplasia but no loose bodies
   b) Transitional with active synovial disease and loose bodies
   c) Late, with loose bodies but no synovial disease
3. Treatment is controversial; many authors advise synovectomy and removal of loose bodies, whereas others prefer simple removal of loose bodies

26. NON-UNION FRACTURE SHAFT OF HUMERUS

40 Years - Male

- C/o. deformity in the (R) arm - 9 months

History

- H/o. fall and sustained closed injury to (R) upper limb 9 months ago
- H/o. indigenous treatment present
- Any H/o. radial n. involvement specially in M/3rd # SOH. (eg. Wrist Drop)

Inspection

- Attitude : Arm by the side of body, elbow in extension, wrist in neutral position
- Deformity present middle 1/3 of humerus
- Obvious lengthening of (R) arm present
- Wasting of deltoid muscle on (R) side present
- No evidence of scars, sinuses or mass

Palpation

- No tenderness
- Anterior angulations of the distal fragment present
- Gap palpable in M/3 of humerus
- Minimal thickening of humerus (R) at M/3 present
- Abnormal mobility present M/3 of humerus

Movement

- (R) Shoulder : abduction and external rotation restricted
- (R) Elbow : flexion, extension full
- (R) Wrist & Fingers : Full : so no Radial n. involvement

Measurement

- From acromion angle to lateral condyle : (L) = 20 cm, (R) = 22 cm
- True lengthening of 2 cms present

Investigation

- X-Ray (R) humerus AP & Lat. view – Fracture M/3 of humerus with no evidence of union. Atrophic ends visible. Medullary canal not seen

Important Points

1. Nonunions of the humeral shaft occur fairly often because motion is difficult to control by external means, such as casts, braces or splints
2. Gaps may result from distraction, over-riding, soft tissue interposition or loss of bone. Comminuted fractures may disturb the blood supply
3. In elderly patients with osteoporotic bone, diminished function because of a pseudoarthrosis may be preferable but generally open reduction; bone grafting and compression plating can treat humeral nonunions
4. Longer defect can be bridged with a fibular transplant
5. Ilizarov method of internal bone transplant can also be used for humeral nonunions with bone loss

27. MALUNITED FRACTURE SHAFT OF HUMERUS

38 Years - Female

- C/o. deformity in the right arm – 1 month duration

History

- H/o. fall – 2 months ago. Sustained injury to right arm
- H/o. indigenous treatment present

Inspection

- Attitude of Right upper limb : Arm by the side of body- Elbow in flexion, wrist in neutral position. Wasting of deltoid and triceps present. Angular deformity seen over the lateral aspect of arm at the junction of proximal 1/3 - mid 1/3

Palpation

- Irregular thickening of lateral aspect of Right humerus at the P/3 – M/3 junction
- Lateral Angulation present
- Step palpable between thickened area and proximal humerus
- No abnormal mobility at angulation site

Movement of Right Shoulder

Flexion	:	0 – 80 degree
Abduction	:	0 – 30 degree
Ext. Rotation	:	0 – 10 degree
Int. Rotation	:	0 – 20 degree
Right elbow	:	FFD of 20 degree. Flexion upto 90 degree possible

Measurement

Shortening of Right arm by 2 cm.

Acromion angle to lateral condyle : Right 20 cm Left 22 cm

No distal neurovascular deficit

Investigation

- X-ray Right humerus AP& Lat : Malunited fracture P/3 –M/3 junction with angulation and callus

Important Points

1. Malunion of middle third of the humeral shaft rarely requires correction unless femur is similarly affected
2. If surgery is contemplated, then the deformity is corrected by osteotomy and a compression plate applied. Cancellous grafts are placed above the osteotomy
3. In malunions of the proximal third of the humeral shaft, the bone is angulated medially and either anteriorly or posteriorly ; the medial angulation makes it impossible to touch the elbow to chest. Shoulder motion is limited in abduction and external rotation. Malunions of distal humerus causes cubitus varus, which is associated with ulnar neuropathy, snapping of the medial head of the triceps

28. RUPTURE OF THE BICEPS TENDON

50 Years - Male

- C/o. pain in the (R) elbow – 1 week duration

History

- H/o. having lifted a heavy weight and felt something snapping
- Now has pain on moving (R) elbow

Inspection

- Prominent lump seen in Distal 1/3 of (R) arm when elbow is flexed
- Ecchymosis seen on the anterior aspect of upper arm

Palpation

- Lump 4 x 2 cm in size
- Rounded in shape, lower in location
- Not warm but tenderness present around the upper 1/3 arm
- No bony crepitus or abnormal mobility

Movement

- Flexion up to 110 degree possible
- Extension possible

No distal Neurovascular deficit

Important Points

1. Injury may follow violent activity in a young person but generally occurs in older individuals associated with spontaneous degeneration of the tendon with a possible attrition of the tendon against osteophytes at the margin of the glenoid
2. Patient observes that the biceps has increased in size especially when flexing the elbow
3. Treatment is almost always conservative. In the older patient it is difficult to achieve repair of the tendon
4. Rarely, there may be avulsion of the distal end of the biceps from its insertion into the tubercule of the radius
5. In young patients, anterior acromioplasty is indicated

29. CHRONIC OSTEOMYELITIS - HUMERUS

28 Years - Male

- C/o. discharging sinuses from the (R) arm – 3 months

History

- H/o. trauma 5 months ago and sustained injury to (R) arm
- H/o. bone spike projecting out through the open wound
- H/o. fever on and off present; H/o. seropurulent discharge present with occasional bone chips
- No H/o. indigenous treatment
- No H/o. immunological disorders, or any other chronic illness

Inspection

- (R) arm – two sinuses seen on the anterior and medial aspect M/3
  Skin around the discharging sinuses is hyper pigmented and discolored
  Both sinuses have a unhealthy sprouting granulated margin

Palpation

- Warmth and tenderness present around the sinuses
- Both sinuses are indurated
- Ill defined margins +
- Seropurulent discharge +
- Irregular thickening of humerus present on the anterior and medial aspect.
  Tenderness present at the M/3 humerus

Measurement - True shortening of 2 cm in (R) arm

Movement - (R) Shoulder : Free and Full

- (R) Elbow : Flexion / Extension free

Investigation

- X-ray (R) Humerus – AP and Lat. Cavity with a sequestrum present. Sclerosis around the sequestrum +
  Sinogram : Sinus tract leads to the cavity

Important Points

Chronic osteomyelitis once established is liable to the following complications

a) Recurrent infection

b) Pathological fracture – sometimes resulting in amputation of a major weight-bearing bone

Papineau Treatment is Recommended consisting of

1. Stabilizing the bony fragments by an external fixation device –
   eg : The Wagner-Oxford apparatus
2. Extensive debridement
3. Continuous irrigation of the bed with isotonic saline
4. Cancellous bone grafting with repeat debridement
5. Complications
   a) Epithelioma b) Growth interference c) Amyloid disease

30. OSTEOSARCOMA OF PROXIMAL HUMERUS

12 Years - Male

- C/o. pain and swelling of (L) arm - 3 months

History

- Pain Started first; swelling later on
- Constant aching pain throughout
- Aggravated on movements
- Relieved by taking analgesics
- H/o. night pain +
- H/o. trauma +, not significant
  H/o. swelling - Localised to (L) arm
  - Progressively increasing in size
- No H/o. swelling elsewhere in the body
- H/o. familial exostosis + / –

Inspection

- (L) Humerus – Arm by the side of body, forearm in midprone, wrist in neutral
- Diffuse swelling seen over the upper end of humerus
- Skin over the swelling is stretched and shiny
- Engorged veins seen
- No visible pulsation
- Wasting of muscles present. Deltoid, biceps and scapular muscles ⊕
- Warm, tenderness ⊕

Palpation

- Swelling of size 10 x 8 cm localized to the proximal third of (L) humerus
- Swelling is fusiform in shape involving the anterior, medial and lateral aspect of U/3 of humerus. Edges merge with humerus; margins not well defined. Irregular, firm to hard in consistency. No distal neurovascular deficit

Examination of Chest

Normal.

Movement of Right Shoulder

Flexion	0 – 90 degree
Abduction	0 – 80 degree further restricted with pain

External / Internal rotation restricted with pain

Investigation

X-Ray (R) Humerus	–	Mottled areas of rarefaction with areas of sclerosis at the metaphyseal end. Periosteal reaction + Sunray appearance present, Codman's triangle seen
Chest X-Ray	–	Normal
Serum Alkaline phosphatase	–	Raised

Important Points

1. Osteosarcoma is a tumour arising from osteoblasts
2. With the advent of multi-drug chemotherapy, it is possible for endoprosthetic replacement after resection of the proximal humerus
3. Osteosarcomas can affect all skeletal location but most primary osteosarcomas occur at the sites of the most rapid bone growth, including the distal femur, the proximal tibia and the proximal humerus
4. On a radiograph, the most common appearance is that of an aggressive lesion in the metaphysis. Although the lesion can be either predominantly blastic or lytic, more commonly both areas of bone production and bone destruction are present. Periosteal reaction may take the form of a "Codman's triangle" or it may have a "sunburst" or " hair on end" appearance

31. MALUNITED SUPRACONDYLAR FRACTURE HUMERUS WITH CUBITUS VARUS

15 Years - Male

History

- Gives H/o. deformity right elbow with inability to use right upper limb – 6 years
- Gives H/o. fall on outstretched right hand, sustaining injury to right arm
- Native treatment taken in the form of splinting and massage +

Inspection

- Normal carrying angle is lost and the right forearm appears adducted when the elbow is extended
- Deformity disappears with the elbow flexed

Palpation

- Three point bony triangle landmark of the elbow joint maintained
- Supracondylar ridge thickened and slightly tender
- Skin is normal / no scars or sinuses

Movements

- Full range of flexion and extension is possible

Measurements

- Carrying angle obliterated on the right side and a cubitus varus deformity of 13^{o} degree present
- No distal neuro vascular deficit

Measurements

- X-ray: Distal humerus and lateral malunited supracondylar fracture with cubitus varus deformity

Important Points

1. Loss of carrying angle following supracondylar fracture may occur in as many as 30% of displaced fractures. The most probable cause of the deformity is residual medial tilt and rotation of the distal fragment following reduction
2. Most times the deformity is a cosmetic rather than a functional problem
3. If deformity is severe and requires treatment, it can be corrected by osteotomy either by using
   a) medial based opening wedge osteotomy
   b) lateral base closing wedge osteotomy
      (Most commonly used is the French closing wedge osteotomy) or
   c) Dome osteotomy

32. NON-UNION LATERAL CONDYLE - HUMERUS

10 Years - Male

- C/o. swelling in the lateral aspect of (R) arm - 3 months

History

- H/o. fall on the hand and sustained injury to (R) arm - 3 months ago
- H/o. indigenous treatment present

Inspection

- Mass of size 3 x 2 cm prominently seen on the lateral aspect of distal 1/3 of (R) arm
- Skin over the swelling normal

Palpation

- Not warm / not tender
- Size 3 x 2 cm
- Bony hard in consistency
- Irregular margins, smooth surface
- Abnormal side to side mobility +
- Step between the bony mass and lateral supracondylar ridge present

Measurement

a. Distance between	(R)	(L)
1. Medial epicondyle to olecranon	4 cm	4 cm
2. Lateral condyle to olecranon	6 cm	5 cm
	(⇧	on (R) side)

Movement

- (R) Elbow Flexion upto 70 degree possible / extension restricted

Investigation

- X-Ray (R) Elbow with Arm - e/o non union lateral condyle ⊕

Important Points

1. Two types: a) Fracture lateral to the trochlea: humerus; humero ulnar joint is not involved
   b) Fracture through the middle of the trochlea; this injury is more common, the elbow is unstable and may dislocate
2. Nonunion of the lateral condyle in a child may result in cubitus valgus; if fragments are not apposed perfectly. It can also result in instability of the elbow
3. In children surgery for established non-union is rarely indicated, as symptoms usually are minimal and any attempt to freshen and appose the fragments usually fails to establish union
4. Exception is treatment of early Non-union of the lateral humerus condyle in which the condylar fragment is in good position and the physes of the fragment has not closed. It is usually fixed by a screw and peg bonegraft

   In adults, the only treatment indicated in asymptomatic elbow is anterior transposition of ulnar nerve. But when joint is painful and unstable, surgery is indicated

33. MALUNITED INTERCONDYLAR FRACTURE OF HUMERUS

25 Years - Male

- C/o. inability to extend the elbow (R) - 4 months

History

- H/o. fall on the point of elbow – 4 months ago and sustained injury
- H/o. indigenous treatment present

Inspection

- From the front (R) UL : Attitude – Arm by the side of body, elbow in flexed position, wrist in neutral
- Lower end of humerus is broadened
- From the side : Increase in Anteroposterior width of the elbow. From behind: Widening of the lower end of humerus is prominent

Palpation

- Broadening of distal humerus confirmed
- Both condyles are thickened, irregular, separated widely
- Tenderness present in both condyles
- Upper end of radius, ulna, olecranon process are normal
- Relative position of three bony points altered when compared to other side

Deformity

Fixed flexion deformity of (R) elbow – 30 degree

Measurement

- Intercondylar distance (R) increased, olecranon to medial condyle and olecranon to lateral condyle distance increased
- (R) arm segment is short by 2 cm

Movement

- (R) Elbow – Flexion 30 degree → 100 degree possible
- Examination of ulnar nerve – Intact; more posteriorly palpated but not thickened Median nerve – Intact

Investigation

X-Ray (R) elbow with humerus AP & Lat. – Malunited Intercondylar Fracture

Important Points

1. Malunions of distal humerus can develop after the following fractures :
   a. Supracondylar fractures
   b. Transverse fractures of the condyles
   c. Fractures of the distal condylar articular surface
   d. Fractures of the condyles
2. The resultant cubitus varus may be associated with ulnar nerve dislocation, ulnar neuropathy, snapping of the medial head of triceps, secondary distal humeral or lateral condylar fracture and even osteoarthritis

34. OLD UNREDUCED POSTERIOR DISLOCATION OF ELBOW

27 Years - Male

- C/o. deformity in the (L) elbow - 2 months duration

History

- H/o. fall on outstretched hand and sustained injury to (L) elbow 2 months ago
- H/o. indigenous treatment present

Inspection

- (L) Elbow – Arm by the side, (L) Elbow in 20 degree flexion
- Deformity present
- Olecranon seen more prominently on the posterior aspect

Palpation

- Olecranon is above the intercondylar line
- Triceps is taut and prominent posteriorly
- Triangular relationship between lateral condyle, medial epicondyle and olecranon altered on 90 degree flexion of elbow
- Step sign positive

Deformity

- Fixed Flexion deformity – 20 degree

Movement

- Flexion of (L) elbow – 20 degree → 100 degree present
- Pronation and supination are limited, pronation is more limited

Measurement

- Lateral condyle to radial Styloid (R) – 24 cm (L) – 21 cm
- True shortening 3 cm
- No distal NV deficit

Investigation

- X-Ray (L) Elbow – AP – Lat views – Post dislocation with coronoid process posterior to condyles of humerus

Important Points

1. The arm is generally fixed in extension or in very slight flexion with minimal range of motion. Pronation and supination are limited. Pronation is usually more limited than supination because the biceps is under tension from angulation around humeral condyles. The biceps then pulls the forearm into supination
2. Pathological findings associated with old unreduced dislocation of the elbow, including extensive myositis ossificans around the joints, especially in the brachialis and triceps muscles
3. Management of treatment is open reduction, V – lengthening of triceps muscles and anterior transposition of ulnar nerve
4. Hotchkiss reported good results in dislocations treated late using hinged external fixation to maintain joint reduction, permit movements and enhance muscle tendon stretching

35. MYOSITIS OSSIFICANS - ELBOW
(WITH STIFFNESS)

14 Years - Male

- C/o. inability to use his (R) Elbow – 1 month

History

- H/o. fall on outstretched hand and sustained injury to (R) elbow 2 months ago
- H/o. native indigenous treatment present
- H/o. massage +

Inspection

- Swelling of size 4 x 2 cm seen on the anterior aspect of (R) Elbow
- Skin over the swelling normal

Palpation

- Swelling – 4 x 2 cm – anterior aspect of (R) Elbow confirmed
- No Warmth, No Tenderness
- Shape irregular / no smooth surface
- Firm to hard in consistency
- Triangular Bony marks not disturbed

Deformity

- FFD of (R) Elbow 20 degree

Movement

- Flexion 20 degree → 40 degree possible
- No distal NV deficit

Investigation

- X-Ray (R) Elbow – dense irregular mass (+) anteriorly

Treatment

- Joint is rested in position of function until pain subsides, gentle active movements are then begun
- Months later, excision of the bony mass may be helpful. Indomethacin or Radiotherapy may be helpful

Important Points

1. Soon after injury, there is local swelling and soft tissue tenderness. X-ray is normal, but bone scan shows increased activity
2. Over 2-3weeks, pain gradually subsides, but joint movements is limited, X-ray may show fluffy calcification in soft tissues
3. By 8 weeks, the bone mass is palpable and is clearly defined in the X-ray
    1. Extraskeletal ossification may occur in muscle and other soft tissue The phenomenon may be classified as :
        a) Progressive myositis ossificans
        b) Traumatic localized myositis ossificans
        c) Non-traumatic localized myositis ossificans
    2. The localized forms must be distinguished from osteogenic sarcoma
        a) Myositis ossificans usually is situated over the diaphysis as opposed to the metaphyseal site for osteogenic sarcoma
        b) In myositis ossificans, the pain, warmth and mass decrease with time, whereas the opposite is true for osteogenic sarcoma
        c) In myositis ossificans, roentgenograms demonstrate an intact underlying cortex, whereas the cortex is violated in osteogenic sarcoma

36. SEPTIC ARTHRITIS - ELBOW

19 Years - Male

- C/o. pain and swelling (L) elbow for the past 2 days
- H/o. thorn prick injury 5 days back to (L) elbow while playing in the garden.
- H/o. high grade fever for the past 2 days

O/E : (L) Upper Limb : Shoulder - Neutral, elbow mild flexion, wrist neutral

Inspection

- Fullness around the joint ⊕. Skin - Red and Inflamed
- (L) Elbow - mild flexion

Palpation

- Warmth + around the joint, tenderness + , fluctuation present
- Bony tenderness + , Epitrochanteric and axillary nodes palpable
- Movement: Painfully restricted
- Measurement: No limb length discrepancy

X-ray

- No bony lesion

Treatment

- Splintage / Sling
- Arthrotomy / Joint lavage

Important Points

1. Any joint can be infected by
   i) Direct invasion – wound / injection
   ii) Direct spread from adjacent sites
   iii) Haematogenous spread
2. Most common organism is staphylococcus
3. Predisposing condition include RA, intravenous drug abuse and immunocompromised state
4. Treatment principles include general supportive care, splintage, appropriate antibiotics and drainage

37. TUBERCULOUS ARTHRITIS - ELBOW

55 Years - Female

- C/o. swelling in the (R) elbow – 1 week duration
- C/o. pain in the (R) elbow – 8 months
- Pain – insidious onset, localized to (R) elbow
- Aggravated by lifting, relieved by taking analgesics
- H/o. night pain present
- No H/o. remission or exacerbation

History

- Known pulmonary tuberculosis patient on irregular anti-tuberculous therapy
- H/o. having had multiple discharging sinuses over (R) elbow which have healed after starting ATT

Inspection

- (R) elbow : Attitude – Arm by the side, flexion at the elbow, forearm in midprone position, wrist in neutral
- Wasting of arm and forearm muscles ⊕
- Fullness of elbow more on posterior aspect, on either side of olecranon and triceps insertion. Healed sinuses three in number seen on anterior, medial and lateral aspect

Palpation

- Diffuse swelling palpable over the posterior aspect of (R) elbow
  Warmth+; Tenderness + at the joint line
  Bony tenderness present over olecranon / radial head
  Indurated / healed sinuses palpable
  Deformity FFD 60 degree

Movement of Right Elbow

- 60 degree → 70 degree of flexion possible further restricted with pain and spasm

Measurment

- (R) arm wasted by 4 cm / (R) forearm muscles wasted by 2 cm
- No distal neurovascular deficit

Investigation

- X-Ray (R) elbow AP and Lat. – areas of destruction in the olecranon and lower end of humerus. Generalised demineralization and fuzziness of joint margins. Subperiosteal new bone formation in upper end of ulna, lower humerus and upper radius

Important Points

1. TB of the elbow starts commonly from the olecranon or the lower end of the humerus, though sometimes the onset is synovial or from the upper end of radius
2. Onset is insidious, accompanied by pain, swelling and limitation of movements of the joint. Movements are accompanied by pain and muscle spasm. Marked wasting of arm and forearm muscles is obvious
3. Areas of destruction can be seen radiologically in the olecranon and/or lower end of humerus. Changes in the x-rays may not be consistent with the degree of loss of movements
4. Specific treatment for tuberculosis with ATT, elbow is given rest in best functional position. In unilateral disease, 90° of flexion and midprone position is advisable
5. Arthrotomy or synovectomy with or without joint clearance for :
   a. Synovitis or early arthritis stage
   b. Unreceptive cases. Cases unresponsive to ATT
   c. Whenever diagnosis is uncertain / Excision arthroplasty
6. After completion of growth, when the elbow has healed in unacceptable position or in gross anklyosis, when a mobile joint is needed - arthroplasty may be done rarely arthrodesis for heavy manual work –
   For unilateral cases – elbow in 90° flexion
   For bilateral cases – one elbow in 110° flexion to reach the mouth and other elbow is 65° flexion to attend to personal body hygiene

38. RHEUMATOID ELBOW

42 Years - Female

- C/o. inability to use (R) elbow for past 3 months
- H/o. pain (R) elbow for 3 months
- Known Rheumatoid arthritis patient on treatment

O/E : (R) Upper limb

- (R) Shoulder neutral, (R) elbow flexion, wrist neutral
- Ulnar deviation, swan neck and boutonnière deformity of the fingers

Inspection

- (R) Elbow : Elbow in flexion
- Diffuse swelling around elbow
- Subcutaneous nodules seen on the posterior aspect of elbow and forearm

Palpation

- FFD : 10 degree
- Diffuse swelling around elbow
- Tenderness + over the bony landmark
- Synovial thickening +
- Loose bodies palpable

Movements

- 10° to 90° - flexion possible, further flexion not possible
- Supination and pronation painfully restricted

Measurement

- No limb length discrepancy

Investigation

X-ray

- Soft tissue shadowing
- Marginal erosion of distal humerus, radial head
- Joint space narrowing
- Bony destruction
- Loose bodies

Treatment

- Synovectomy may be useful in grade 1 and grade 2 disease
- Excision of radial head increases range and pain free movement (pronation and supination)
- Arthrodesis may be required, the optimum position in 90° of elbow flexion with forearm in neutral position

39. SIDE SWIPE INJURY ELBOW - SEQUELAE

42 Years - Female

- C/o. unstable elbow (R) past - 6 months
- H/o. RTA - 9 months back
- While travelling in a bus with elbow on the window oncoming vehicle ran through his elbow
- H/o. debridement and external fixation application done at the time of injury.
- H/o. discharging sinuses from the (R) elbow

O/E : Unstable, dangling (R) upper limb

Inspection

- (R) elbow : Healed skin graft on the posterior aspect elbow, multiple healed pin tracks, healed sinuses +

Palpation

- Scars indurated - adherent to ulna, humerus
- Healed sinus adherent to ulna
- No bony landmarks
- Humeral end / Radial end and ulnar border separately palpable
- No warmth / no tenderness

Movement

- No active movements, passive movement - full range
- Measurement : 2cm of shortening +, measured from angle of acromion to humerus end, humerus end to radial styloid

X-ray of Elbow Joint

- Bone loss - distal humerus / radial head / olecranon

Treatment

- Arthrodesis in functional position
- Total elbow replacement with hinge joint for good range of movement

40. NON-UNION OLECRANON

27 Years - Male

- C/o. inability to extend his (R) elbow - 2 months

History

- H/o. fall – 2 ½ months ago
- Direct blow or fall on elbow
- Fall on outstretched hand
- H/o. indigenous treatment present

Inspection

- Attitude of (R) UL : Arm by the side, elb in flexion, wrist in neutral
- A protruding on the posterior aspe (R) elbow is seen
- Triceps appears contracted and wasted

Palpation of Right Elbow

- Olecranon – irregular, non-tender with a transverse gap or step
- Proximal fragment migrated upwards and is hard, irregular
- Both medial and lateral condyles are normal
- Supracondylar ridges are normal
- Triangular bony relationship altered
- Triceps contracted / taut

Deformity

- Fixed flexion deformity 80 degree

Movement

- (R) Elbow – Flexion 80 degree → 120 degree possible
- No distal neurovascular deficit

Investigation

- X-Ray (R) elbow AP & Lat – Non union of olecranon fracture

Important Points

1. Fractures are caused by either direct trauma falling on tip of elbow – or by indirect trauma, falling on partially flexed elbow against a contracting triceps
2. Transverse fractures are usually treated by tension band wiring technique with bone grafting
3. Comminuted fractures with a reconstructable articular surface are plated with semi tubular plate and screw fixation

41. EPIPHYSEAL INJURIES AROUND ELBOW AND ITS SEQUELAE (PREMATURE EPIPHYSEAL ARREST WITH SHORT ARM)

16 Year - Male

- C/o. decrease in length of (R) arm - 1 year

History

- H/o. fall at the age of 4 years following that he had pain and tenderness near the (R) elbow joint
- Treated indigenously and was apparently normal after that

Inspection

- (R) arm – by the side of body, elbow in neutral, forearm in midprone, wrist in neutral position
- Obvious shortening of (R) arm present
- Hyper extension deformity +

Palpation of Right Humerus

- Thickening of lateral and medial supracondylar ridge
- Both condyles are small. Olecranon is normal
- Ulnar nerve more anteriorly palpable but not thickened

Measurement

- Angle of acromion to Lat. Condyle
  (R) 20 cm (L) 24 cm
- Lateral Condyle to Radial styloid
  (R) 47 cm (L) 47 cm
- True shortening of (R) arm by 4 cm

Movement

- (R) Shoulder – external rotation 0-25 degree possible further restricted all other movements normal
- (R) Elbow – Hyper extension of 5 degree +

Investigation

- X-ray Both Elbows with humerus AP & Lat. – (R) E/o. Old united. Lat Condyle #

Diagnosis

- Old compression injury of Epiphysis of distal humerus (R) with growth arrest

Important Points

1. In upper extremity, length is not as important to function as in the lower extremity. Hence post-epiphyseal injuries with resulting shortening can be left alone
2. In cases of lower limbs, if shortening is significant in a younger child, epiphysiodesis of the opposite limb can be performed
3. For evaluation of lower extremity, the Green-Anderson tables, as well as the Moseley straight line graph should be used

42. TENNIS ELBOW

38 Years - Female

- C/o. pain in the right lateral aspect of elbow - 3 months

History

- Pain – localised to lateral aspect of elbow. Aggravated on pouring out tea, turning a stiff door handle, shaking hands, washing clothes
- Relieved by taking rest

Inspection

- Right elbow looks normal. No scars, sinuses, dilated veins

Palpation

- No warmth
- Localised tenderness present at the lateral condyle of right humerus
- On passive stretching of the wrist, patient experiences pain
- **Cozen's test +ve**
  Patient asked to extend her clenched fist against resistance. She experiences pain at the lateral condyle

Mill's Maneuver +ve

- Pain produced by extending the elbow, pronating the forearm and then passively flexing the wrist

Movement of Right Elbow

- Flexion / Extension : Full / free

Investigation

- X-Ray (L) elbow - normal

Important Points

1. Usually due to a strain of the origin of the extensor group of muscles particularly extensor carpi radialis brevis in elbow. Some authors have attributed it to be due to a radiohumeral bursitis.Also called epicondylitis
2. Has a sudden onset, accompanied by a definite swelling. Tenderness is present on the lateral or anterior aspect of the lateral epicondyle of the humerus. Pain is very persistent
3. Rest and avoidance of causative factor will bring immediate relief and cure usually results. This can be supplemented by various types of physical treatment-shortwave, ultrasound, etc
4. Subperiosteal injection of hydrocortisone is very beneficial in resistant cases Sometimes operative treatment may produce relief. It consists of cutting down to the bone and raising the origin of the common extensor tendon together with the periosteum

43. GOLFER'S ELBOW

28 Years - Male, a Volleyball Athelete

- C/o. pain right elbow – 1 week

History

- Pain in the region of medial epicondyle of right humerus – 1 week duration following a game of volleyball
- Patient is a volleyball athlete on training

Inspection (R) Elbow

- No significant findings clinically

Palpation

- Tenderness + in the region of the medial epicondyle of right humerus
- Area of maximum tenderness is approximately 5 mm distal and anterior to the midpoint of the medial epicondyle
- Pain becomes worse on resisted forearm pronation or wrist flexion

Movements

Right elbow :- Extension full and free
Flexion full, but final 30 degree of flexion associated with pain
No distal neuro-vascular deficit

X-ray (R) Elbow ∠ AP : / Lat: No bony lesions

Important Points

1. Medial epicondylitis or Golfer's elbow is similar to tennis elbow, although much less common and more difficult to treat
2. The origin of the flexor carpi radialis and pronator teres (flexor pronator mass) are commonly involved and less typically, the flexor digitorum superficialis and flexor carpi ulnaris
3. This entity occurs in athletes playing overhead games and others participating in activities that create a valgus force at the elbow
4. Roentgenograms usually are normal, but medial ulnar fraction spurs and medial collateral ligament calcification may be seen
5. Conservative treatment is the mainstay. Analgesics, splinting and an occasional steroid injection provide sustained relief
6. If non-operative treatment fails, excision of the diseased tendon origin and reattachment usually are successful

44. MALUNION BOTH BONES - FOREARM

30 Years - Male

- C/o. pain right forearm with restriction of movement - 1 month

History

- H/o. sustaining trauma to right forearm 3 months back
- Treated by native splinting
- Now patient has difficulty in rotatory movements of the forearm

Inspection

- Deformity seen in the M/3rd of the right forearm
- Skin over deformity is normal
- No scars/sinuses
- Wasting of right forearm muscles +, forearm appear shortened
- Forearm is held in midprone position

Palpation

- No warmth
- Tenderness on palpation +
- Both radius and ulna are continuous proximal and distal to the angular deformity
- No abnormal mobility in both anteroposterior and medio-lateral plane, but tenderness on attempting to move the bones +

Movement of Forearm

Forearm :- Pronation - 10°, Supination - 20° from midprone position

Movement of Wrist and Elbow Joint

Wrist joint	-	Full and Free	
Elbow joint	-	Flexion:	- 0 – 60 degree
		Extension:	- upto 0 degree

Investigation

- No distal neuro-vascular deficit
- X-Ray Right forearm – AP / Lateral - Fracture Malunion both radius and ulna M/3rd

Important Points

1. Malrotation, angulation with encroachment on the interosseous space between the radius and ulna and loss of the radial bow all have been associated with loss of motion and compromised functional outcomes in fractures of BB Forearm
2. There is an insignificant reduction in forearm rotation with a 10-degree angulatory deformity whereas a 20-degree angulation causes a functional loss of pronation and supination
3. Malunions are corrected by osteotomies of one or both bones of the forearm, correction of the deformity in all planes, compression plating and bone grafting

45. NON-UNION FRACTURE - BOTH BONES - FOREARM

50 Years - Female

- C/o. pain right forearm - 4 months
- C/o. inability to use the right forearm – 6 months and deformity in the middle 1/3rd right forearm

History

- H/o. trauma to right forearm 7 months back
- Treated by native splinting for one month following which patient was unable to use the right forearm

On Examination

Inspection : Deformity seen in the M/3rd of the right forearm

- Skin over deformity is normal
- No scars/sinuses
- Forearm muscle wasting present. Forearm appears shortened

Palpation

- No warmth / No tenderness
- Proximal fragment of both ulna and radius are not continuous with the distal fragment
- Abnormal mobility + in both antero-posterior and medio lateral plane

Movement

- Forearm :- No movements of pronàtion or supination possible

Movement of Wrist and Elbow Joint

Wrist joint – Full and Free

Elbow joint – Flexion 0 – 50 degree
Extension 0 – 50 degree

No distal neuro-vascular deficit

Measurement

- 3cm shortening of forearm segment present : muscle wasting – 1cm present
- X-ray Right forearm – AP/Lateral : Fracture nonunion both bones forearm M/3rd

Important Points

1. When treating nonunions of both forearm bones, resecting the ends of the fragments within the permissible amount of shortening (4 cms) usually permits equalization of the length of the bones
2. Then the nonunion can be treated by compression plating and cancellous grafting; with care to preserve the interosseous space

46. VOLKMANN'S ISCHAEMIC CONTRACTURE - FOREARM

30 Years - Male

- C/o inability to use the right forearm with wasting of forearm muscles and deformity of the right forearm - 3 months duration

History

- Patient gives H/o. sustaining a massive blow to the right forearm
- H/o. native splinting + - 3½ months
- Patient gives H/o. severe pain in the right forearm with resultant swelling in the right forearm, treated also by native medicine practitioners
- Patient then developed inability to use the right forearm with wasting - 3 months back

Right Forearm

Inspection : Gross wasting of the right forearm muscles

- Attitude of the right upper limb is elbow flexion, forearm mid prone position, wrist flexion, thumb adduction, metacarpophalangeal joint extension and finger flexion
- Scars due to native medications (+)

Palpation

- The deformity typically worsens on wrist extension but when the wrist is passively flexed, the patient can extend the fingers (This shows that the deformity is due to contracture of the forearm muscle)
- Forearm bones appear thickened, no abnormal mobility deformities and movements

Elbow : Fixed in 50 degree flexion – further flexion of 10 degree possible

Forearm : Fixed in 10 degree pronation from mid prone position

Wrist : Wrist is in 30 degree flexion can be passively flexed by another 20 degree and can be extended upto 10 degree beyond neutral

Fingers : Metacarpo phalangeal joints are in 10 degree extension. Deformity decreases only when wrist is flexed and interphalangeal joints are flexed at 30 degree

Important Points

1. If compartment syndrome is untreated or inadequately treated, compartmental pressures continue to rise until irreversible tissue ischemia occurs. Volkmann's ischemic contracture is the result of several different degrees of tissue ischemia
2. Earlier changes involve the flexor digitorum profundus muscles in the middle third of forearm
3. Treatment modality depends on whether the contracture is mild, moderate or severe. In mild cases, conservative treatment with dynamic splinting may be helpful. When multiple tendon units are involved a muscle sliding operation is better than lengthening of multiple tendon
4. In severe contracture, early excision of all necrotic muscles combined with complete median and ulnar neurolysis to restore sensibility and possibly intrinsic function of muscles, may be done

47. OLD MONTEGGIA FRACTURE DISLOCATION

50 Years - Female

- C/o. pain in the right upper forearm and difficulty in moving the right elbow joint and rotatory movements of right forearm – 6 months duration

History

- H/o. fall on the hand with the body twisted at the moment of impact 6 months ago
- Treated by native splinting following which patient has difficulty in using the right forearm and elbow

On Examination : Right forearm

Inspection

- Attitude of the limb is flexion at the right elbow joint
- Deformity noted in the proximal ulna
- Wasting of right forearm muscles
- Fullness in the cubital fossa present

Palpation

- Deformity confirmed in proximal 1/3rd of ulna
- No abnormal mobility but tenderness +. Anterior angulation present
- Radial head is dislocated anteriorly

Movement

- Elbow Joint : is fixed at 40 degree of flexion. Further flexion upto 60 degree possible. Pronation and supination – 10 degree from mid prone position each

Measurement

- A shortening of 1 cm compared to the opposite side
- No distal neuro-vascular deficit
- Three point relationship of bones maintained

Investigation

- X-Ray Right elbow with forearm AP/Lateral – shows malunion of the right ulna with anterior dislocation of radial head
- # of Proximal ulna with dislocation of radial head is called Monteggia #

Important Points

1. Four types of Monteggia fractures as well as three equivalent types have been described
2. Most common is fracture of proximal third ulna, anterior angulation of the fracture and anterior dislocation of radial head
3. Second is fracture of the proximal ulna, posterior angulation of the fracture and posterior dislocation of the radial head
4. Third type is lateral angulation of the proximal ulnar fracture with lateral dislocation of the radial head
5. Fourth type constitutes a proximal both bone fracture and anterior dislocation of the radial head
6. Treatment for fresh fractures is to restore the length of the fractured ulna, only then can the dislocated joint be fully reduced and remain stable. In adults this usually means open reduction and internal fixation with plate and screws. Radial head usually reduces, if it does not open reduction is done
7. In old unreduced cases, open reduction internal fixation of ulna with plate and screws and bonegrafting with radial head excision is carried out

48. OLD GALEAZZI FRACTURE DISLOCATION

48 Years - Female

- C/o. pain right forearm with restriction of movement - 1 month
- C/o. inability to use the right wrist joint and to do rotatory movements of the right forearm with associated deformity at the distal forearm - 6 months
- C/o. pain on attempting to move the wrist

History

- Patient gives history of fall on hand with a superimposed rotation force – 6 months ago
- Was treated by native splinting

On Examination : Right forearm and wrist

Inspection

- Deformity + distal 1/3rd of Right radius
- Skin over the deformity is normal

Palpation

- No discontinuity made out in the distal 1/3rd radius, but angulation and deformity present. No abnormal mobility but tenderness +
- Piano-key sign is positive (Instability of the distal radio-ulnar joint is demonstrated by 'ballotting' the distal end of the ulna or by rotating the wrist)

Movement

Wrist Joint :	Flexion	0 – 40 degree
	Extension	0 – 30 degree
	Ulnar deviation	0 – 20 degree
	Radial deviation	0 – 5 degree
Forearm :	Pronation	0 – 20 degree
	Supination	0 – 20 degree

Measurement

- Shortening of 0.5 cms compared to opposite side. No distal neurovascular deficit
- X-Ray Right wrist with forearm – AP/Lateral – Malunion of right radius with distal radio-ulnar Disruption

Important Points

1. Galeazzi fracture is much more common than Monteggia Fracture
2. Prominence or tenderness over the lower end of the radius is the striking feature
3. In children, closed reduction is often successful. In adults reduction is best achieved by open reduction and compression plating of the radius
4. In old unreduced cases, malunion or nonunion must be corrected by open reduction and internal fixation with plate and screws supplemented by bone grafting following which the triangular fibro cartilage complex and dorsal capsule are repaired and forearm immobilized in the position of stabilization (supination) for 6 weeks

49. DISLOCATION HEAD OF RADIUS

30 Years - Male

- C/o. pain right elbow joint with associated prominence right elbow joint – 1 month duration

History

- Patient sustained H/o. trauma 1 month back due to fall and developed prominance below the right elbow joint
- No constitutional symptoms

Inspection

- 3 x 2 cms prominence below the right elbow joint
- No scars or sinuses
- Triangular bony landmarks of elbow maintained

Palpation

- 3 x 2 cms prominence confirmed to be dislocated radial head on pronation and supination. Radial head can be reduced manually
- Tenderness +
- Triangular bony landmarks maintained
- No deformities
- No distal neuro-vascular deficit

Movements

Elbow Joint Flexion	0 – 110 degree
Extension	upto Neutral 0 degree
Forearm Pronation	0 – 70 degree from midprone, further movement restricted
Supination	0 – 70 degree from midprone

Investigations

- X-Ray Right elbow joint AP/Lateral – Dislcoation of radial head anteriorly

INDICATION

Open reduction and repair of annular ligaments is indicated :

- When the dislocation recurs after closed reduction and immobilisation of the elbow in more than 90 degree of flexion
- When it has gone untreated for 2 – 4 weeks
- When it is irreducible by closed means, usually because the radial head is trapped by interposed soft tissues
- If the dislocation has gone untreated for more than 4 or 5 weeks in an adult, the radial head should be excised

Important Points

1. If dislocation of the radial head occurs without dislocation of the humero ulnar joint, the radial head is always displaced anteriorly and can be easily reduced manually
2. Because the annular ligament has been ruptured or displaced, the pull of the biceps muscle often causes the dislocation to recur and unless the radial head remains reduced, it will limit flexion of the joint

50. CONGENITAL ABSENCE OF ULNA / RADIUS

50a. CONGENITAL ABSENCE OF ULNA

(CONGENITAL ULNAR CLUB HAND / POST- AXIAL ULNAR HEMIMELIA)

3 Years - Male

- Parents C/o. deformity of the left upper limb from birth

Inspection

- Atrophy of the forearm, which is short and stubby
- Hand is stable
- Elbow joint is unstable
- Hyperextension of the elbow and internal rotation at the shoulder with forearm in supination

Palpation

- Inspectory findings are confirmed
- Radius is bowed, shortened, thickened with radial head dislocated.
- Ulna is absent
- There is a fixed supination deformity

Movements

- Elbow : Flexion 0 – 100 degree
  Extension upto neutral 0 degree
- Forearm:- Fixed supination deformity. Further supination of 30 – 60 degree
- Gross decrease in forearm segment of 3 cms

Important Points

1. This is a rarer lesion than absence of radius and is more difficult to differentiate from it
2. Hand in the ulnar club hand is stable but there is an unstable elbow joint
3. There is a severe functional deformity
4. Treatment is rotational osteotomy of the humerus on one side and a flexion osteotomy in the area of synostosis to provide a hand-to-hand activity

50b. CONGENITAL ABSENCE OF RADIUS (Meromelia)
(RADIAL CLUB HAND)

2 Years - Male (Informant : Mother)

- Mother C/o. deformity in the right forearm from birth

History

- Child has had the deformity in the right forearm since birth and has difficulty in using the right upper limb
- First born male child to consanguinous parents

Inspection

- Affected right forearm shows marked atrophy and is short, stubby and bowed with a posterior convexity
- Hand and arm are atrophic

Palpation

- Radius is absent

Movements

- Could not be measured in the child but, good deal of movement possible and some amount of functional ability is present

Measurements

- There is shortening of right forearm by 1 cm. Measurement is taken with ulnar styloid as reference point
- X-ray right elbow and forearm – AP/Lateral – Radius is absent
  Bowing of ulna made out

Important Points

1. Incidence is 1:100000 live births with bilateral cases being as frequent as unilateral
2. In unilateral cases, the opposite thumb may be hyperplastic
3. Associated anomalies are common, (eg) Cardiac septal defects in the Holt-Oram syndrome; blood cell changes in Fanconi syndrome
4. Usually the whole radius is absent, but occasionally when the defect is only partial, a small portion of it remains, generally at the upper end. The ulna is short, thick and curved and the concavity of its curvature is nearly always directed towards the radial side of the forearm
5. When radius is totally absent, the biceps is usually inserted into the lacerates fibrosus though in some cases the muscle is either fused with brachialis or coracobrachialis or may be absent
6. The most successful cosmetic and functional result in treatment of this deformity is found only in infancy

51. CONGENITAL RADIO-ULNAR SYNOSTOSIS

15 Years - Female

- C/o. inability to perform rotatory movements of both the forearms from birth
- No H/o. trauma

Inspection

- Elbows : Neutral in position, Wrist : Neutral
- Both the forearm are fixed in mid prone position
- No scars or sinuses

Palpation

- No bony thickening or irregularity
- Both the forearms fixed in mid prone position

Movements

Forearms

- Both forearms fixed in mid prone position
- No further pronation or supination made out

Elbow

- Full range of flexion and extension possible

Wrist

- Full range

Measurements

- No limb length discrepancy
- No distal neuro-vascular deficiency

Important Points

1. There are three types of synostosis of the radius and ulna and the condition may be unilateral or bilateral
2. In the congenital radio ulnar synostosis, the upper end of the radius is imperfectly formed, being fused to the ulna for a distance of several centimeters
3. In the second type, there is a congenital dislocation of an ill-formed head of the radius and the radius and ulna are anchored posteriorly, a short way distal to their upper extremities
4. In the third type, the head of the radius is present but is malformed and together with the upper part of the shaft, is fused with the upper end of the ulna

52. MALUNITED COLLES FRACTURE

60 Years - Female

- C/o. deformity in the (Left) wrist - 2 months

History

- H/o. fall on outstretched hand with wrist in dorsiflexion
- H/o. indigenous treatment present

Inspection

- Diffuse swelling involving the distal 1/3 of (L) forearm
- Dinner fork deformity present

Palpation

- No warmth, No tenderness in distal radius
- No crepitus
- Both radial and ulnar styloid process are at the same level
- No tenderness in the ulnar bone and in anatomical snuff box

Movement

- (L) wrist Dorsiflexion 0-30 degree; further dorsiflexion painfully restricted
- Palmar flexion 0-40 degree

Measurement

- Shortening of (L) forearm segment by 1 cm

Investigation

- X-Ray (L) wrist with forearm : Malunited fracture at the corticocancellous area of distal radius
- Dorsal displacement +
- No E/o. of bony injury in ulnar styloid

Treatment

a) For extrarticular malunion
With dorsal angulation - Osteotomy and grafting of radius.
- External fixation and osteotomy

b) For Intraarticular malunion i) > 2mm incongruity in young patients, with no evidence of post traumatic arthritis - Intraarticular osteotomy ii) if arthritis occur – radiolunate arthrodesis iii) Distal radio ulnar joint incongruity – Ulnar shortening osteotomy – Milch, Darach's Osteotomy

Important Points

1. Malunions of the distal radius may be associated with extra articular deformities, intra articular malalignment, distal radio-ulnar joint incongruity or instability or a combination of these features
2. Extra articular deformities include shortening and excessive dorsal or volar tilt of the distal radial articular surface
3. Roentgenographic measurement of alignment of an intact distal radius demonstrates an average of 22 – 23 degrees of radial inclination 11 – 12 mm of radial height, 11 –12 degrees of volar tilt and 2 mm of ulnar variance
4. Roentgenographic criteria for acceptable healing of distal radial fractures include the following :
   a. Radioulnar length – Radial shortening of < 5 mm at distal radio-ulnar joint compared with contralateral wrist
   b. Radial inclination – Inclination on postero-anterior film $\geq$ 15 degrees
   c. Radial tilt: - Sagittal tilt on lateral projection between 15 degree dorsal tilt and 20 degree volar tilt
   d. Articular incongruity: - Incongruity of intra-articular fracture $\leq$ 2 mm at radio carpal joint
5. Indications for surgery
   a. Pain
   b. Functional deficits severe enough to interfere with daily activities

53. SUDECK'S OSTEODYSTROPHY - HAND

56 Years - Male

- C/o. pain (L) wrist and hand from 1½ months
- H/o. injury (L) wrist 4½ months ago underwent native bandaging 3 times
- H/o. stiffness of wrist 1½ months

O/E

- (L) Upper limb - shoulder / Elbow / Wrist in neutral
- (L) Upper limb - forearm muscle wasting, deformity of wrist +

Inspection

- Fullness around the wirst. Dinner fork deformity +, ulnar head prominence +,
- Skin - stretched and shiny

Palpation

- Mild warmth +, Diffuse tenderness +
- No abnormal mobility
- No point tenderness. No distal neurovascular deficit

Movement

- Wrist movement - painful and restricted
- Dorsal flexion - 0 to 20 degree
- Palmar Flexion - 0 to 30 degree

Measurement

- 1cm shortening of the forearm segment

X-ray

- Osteoporosis of distal third of radius and ulna; patchy porosis of carpal bones

Treatment

- Conservative line of management would be the mainstay of treatment
- Non-steroidal anti-inflammatory drugs / night splints
- Sympathetic manipulation
  a) Guanethidine blockage
  b) Stellate or lumbar sympathetic blockage with local anaesthetic or epidural blockage

54. TUBERCULOSIS OF METACARPALS AND PHALANGES

6 Years - Male

- H/o. pain in the (R) middle finger with swelling gradually increasing in size associated with painful movement – past 2 months
- Known case of primary complex on treatment (irregular)

O/E : Inspection

- Diffuse swelling in the middle phalanx of (R) middle finger
- No sinus, no discharge

Palpation

- Swelling is warm and tender
- Finger is held in palmar flexion and movements are decreased with gross wasting of intrinsic muscles
- Enlargement of axillary lymph nodes +

Movements

- All movements are restricted

Investigation

X-ray

- Features of lytic lesion in middle of bone, subperiosteal new bone formation soft feathery sequestra +; honey comb pattern seen

Rx : ATT is mainstay of treatment

Important Points

1. Tuberculosis of short tubular bones, is called tuberculos dactylitis. Hand is more frequently involved than foot
2. Due to lavish blood flow through a large nutrient artery entering almost in middle of bone, infection is lodged in the centre of marrow cavity which leads to spindle – shaped expansion of bone called spina ventosa.
3. Secondary infection if present leads to intense subperiosteal new bone formation and reactive sclerosis with sequestra and thickening

55. ARTHRITIS WRIST
(TUBERCULOSIS)

20 Years - Female

- C/o. pain in the (L) wrist - 5 months
- Pain – Insidious onset, dull aching
- H/o. night pain
- Associated with difficulty in extending the wrist; aggravated on movements, relieved by taking rest, analgesics
- Limitation of movement – 5 months, progressive in nature, no remissions and exacerbations

History

- H/o. evening rise in temperature present
- H/o. loss of weight and appetite
- Her mother is a known pulmonary tuberculosis patient on ATT

Inspection

- Of (L) wrist - Attitude – in palmar flexion
  - Diffuse swelling seen over the wrist
  - Skin over the swelling is slightly reddish
  - Forearm appears wasted

Palpation

- Warmth present
- Joint line tenderness present
- Palpable swelling present over the volar aspect of wrist
- Soft in consistency
- Associated compound palmar ganglion may be present

Movement of Left Wrist

- Dorsiflexion 0 deg - 10 degree possible restricted with pain
- Palmarflexion 0 deg - 20 degree possible further restricted with pain
- Radial deviation 0 deg - 5 degree further restricted
- Ulnar deviation 0 deg - 15 degree further restricted

Measurement

- Forearm is wasted by 3 cm

Examination of Lymphnodes

- Supratrochlear or axillary group of lymph nodes palpable – two in number; matted
- X-Ray (L) wrist AP & Lateral – Washed out appearance; osteoporosis, Demineralisation, joint space decreased

Differntial Diagnosis - 1. Mono articular, Rheumatoid arthritis
2. TB-Arthritis

Important Points

1. It is a rare localization, more frequent in adults
2. The disease may start in the synovium but very soon gets disseminated in the whole carpus
3. Patient rarely presents before the disease has progressed to arthritis
4. Common sites for the primary osseous focus are the capitulum or the distal end of radius
5. The disease may spread to the neighbouring flexor tendon sheaths or in the extensor tendon sheaths
6. Abscess and sinus formation with regional lymph node enlargement is common
7. Management is essentially chemotherapy, correction of deformity and splintage of the wrist in 10 – 15 degree of dorsiflexion and forearm in midprone position
8. Operative treatment includes - Synovectomy and curettage of destroyed areas when the disease is unresponsive to medical treatment (or) when diagnosis is in doubt
9. Arthrodesis is done with wrist in functional postion (10^0 to 15^0dorsiflexion, 5^0 radial deviation) and midprone position of the forearm

56. RHEUMATOID ARTHRITIS - WRIST

40 Years - Female

- C/o. pain and stiffness of the right wrist joint – 3 months duration

History

- Pain started 3 months back in the right wrist accompanied by stiffness which is increased early in the morning. H/o. on and off swelling of the wrist +
- Patient has difficulty in using the right hand
- Patient has occasional on and off pain in the left wrist joint also

Inspection (Right wrist and hand)

- Swelling of the wrist joint +
- Radial deviation at the wrist +
- Ulnar deviation of the fingers +

Palpation

- Warmth +, tenderness +
- Synovial thickening + at the wrist joint
- Piano-key sign + of the radio-ulnar joint. Subluxation of the radio-ulnar joint causes the head of the ulna to pop up on the back of the wrist where it can be jogged up and down (piano-key sign)
- No distal neuro-vascular deficit

Movements

Wrist Dorsiflexion	0 – 40 degree
Palmar flexion	0 – 40 degree
Ulnar deviation	0 –10 degree - associated with pain
Radial deviation	0 – 5 degree

Investigations

Palpation

- X-Ray Right wrist joint – AP/Lateral – shows osteoporosis and erosions of the ulnar styloid and of the radio-carpal and intercarpal joints

Important Points

1) After the metacarpophalangeal joints, the wrist is the most common site of rheumatoid arthritis
2) In the early stages, there is synovitis of the radio-carpal and radio-ulnar joints and teno-synovitis of the extensor tendons. If the disease persists, the radio-carpal and inter carpal joints become eroded and the associated tendon weakness, leads to instability

57. DUPUYTREN'S CONTRACTURE OF HAND

50 Years - Male

- C/o. deformity in the right hand and inability to use right hand – 3 months duration

History

- 6 months back patient developed a swelling in the palm
- Gradually the swelling extended distally to involve the ring or little finger
- Then the disease process progressed to produce flexion contractures of fingers
- No history of pain
- Patient is a known diabetic

Inspection

- Palm is puckered and thick
- There is flexion deformity at both the meta carpo phalangeal and proximal inter phalangeal joints of ring and little finger
- There is no evidence of skin laceration or change in deformity with change in wrist position

Palpation

- No warmth/tenderness
- Palm is puckered, thick and nodular
- Deformity does not change with change in wrist position

Movements

- Flexion of the metacarpophalangeal joints – 10 degree – Further flexion of 10 degree +. Extension not possible
- Flexion at interphalangeal joints – 10 degree – Further flexion of 10 degree possible. Extension not possible
- No distal neuro-vascular deficit

Important Points

1. This is a nodular hypertrophy and contracture of the superficial palmar fascia (Palmar aponeurosis)
2. Commonest in males and associated with diabetes, epileptics receiving phenytoin therapy, smoking, liver cell failure
3. Essential problem is proliferation of myo-fibroblasts
4. It must be distinguished from skin contracture, tendon contracture and proximal interphalangeal joint contracture
5. Treatment is to correct the deformity reasonably, not completely

58. PARTIAL CLAW HAND

30 Years - Male

- C/o. deformity in the little and ring finger of left hand and numbness of the two fingers – 2 months

History

- Patient sustained a cut injury due to glass at the level of wrist joint – 2 months back. Treated natively. No constitutional symptoms. No H/o. leprosy

Inspection

- Healed scar over the wrist joint
- Hypothenar and interosseous muscle wasting is present
- Patient has hyperextension of the metacarpophalangeal joints of the ring and little fingers and flexion at the interphalangeal joints

Palpation

- Loss of sensation of the little and one half of ring finger
- Inspectory findings are confirmed
- Finger abduction is weak and together with loss of thumb adduction makes 'pinch' difficult
- Deformity is passively correctable
- Froment's sign positive: +
- The patient is asked to grip a sheet of paper forcefully between thumbs and index fingers while the examiner tries to pull it away; powerful flexion of the thumb interphalangeal joint signals weakness of adductor pollicis and over compensation by flexor pollicis longus
- Card test +ve:- Patient is asked to hold a card placed in between the fingers firmly. In ulnar nerve lesions, the hold will be very loose or not possible

Important Points

1. Ulnar nerve is composed of fibers from C8 and T1 comes from the medial cord of the brachial plexus. It may be divided at any point along its course by missile wounds or lacerations
2. The nerve is most commonly injured in the distal forearm and wrist. In these locations gunshot wounds, lacerations, fractures or dislocations may injure it
3. Traction on the nerve, subluxation or dislocation of the nerve and entrapment syndromes can also cause ulnar nerve deficits that may require surgical treatment

59. CARPAL TUNNEL SYNDROME

39 Years - Female

- H/o. pain and numbness (R) hand for the past 3 months. Pain increased in the night and on flexing the wrist
- H/o. numbness over the index and middle finger

O/E

- Obese lady - Shoulder, elbow, wrist in neutral

Inspection

- (R) wrist - neutral. Skin normal, no swelling, no fullness

Palpation

- Diffuse tenderness + wrist. No warmth / No swelling / No bony abnormality

Movement

- Palmar flexion : 0° to 80°
- Dorsi flexion : 0° to 80°
- Radial deviation / Ulnar deviation satisfactory
- Phalen's Test +ve
- Reverse Phalen's test +ve
- Good Fellow's test +ve

Investigation

- X-ray (R) Wrist AP & Lat : No bony abnormality

Important Points

1. Syndrome characterised by compression of the median nerve, as it passes beneath the flexor retinaculum
2. Any space occupying lesion of the carpal tunnel may be responsible
3. Some of the common causes are RA, malunited colles, myxedema, acromegaly and idiopathic
4. The pin and tingling sensation is more prominent during sleep
5. Treatment is by surgical division of flexor retinaculum and decompression of nerve

60. GANGLION - WRIST

30 Years - Female

- C/o. swelling in the dorsum of right wrist – 2 months duration

History

- Swelling appeared 2 months back, insidiously and slow growing
- No pain or constitutional symptoms
- No H/o. trauma

On Examination of (R) wrist :

Inspection

- 3 x 3 cms swelling over the dorsum of right wrist
- Skin over the swelling is not stretched or shiny
- No scars/sinuses

Palpation

- 3 x 3 cms, smooth, well defined, fluctuant, cystic non-tender swelling seeming to arise from the tendon (does not move with the tendons but there is movement in the medio-lateral plane) swelling is trans-illuminable

Movement

- Movements of the wrist joint are full and free
- No distal neuro-vascular deficit

Important Points

1. The ganglion cyst is the most common swelling in the wrist
2. It arises from the leakage of synovial fluid from a joint or tendon sheath and contains a glairy, viscous fluid
3. It can appear anywhere around the carpus, usually develops on the dorsal surface of the scapholunate ligament
4. Palmar wrist ganglion usually arise from the scapholunate or scapho trapezio-trapezoid joint
5. Treatment is usually unnecessary

61. COMPOUND PALMAR GANGLION

60 Years - Female

- C/o. swelling in the left wrist for past 2 months

H/o

- Apparently normal 2 months back
- Noticed a swelling in the left wrist, initially small, mobile, gradually increasing, to attain the present size
- Associated with paraesthesia in the lateral 3 fingers
- No H/o. trauma / constitutional symptoms
- Known patient of Koch's, treated with ATT

O/E

Inspection

- 3x5 cm hourglass shaped swelling in (Lt) wrist, just above and below the wrist crease with ill defined edges
- No sinus / scar / erythema
- No abnormality of joints of hand

Palpation

- Boggy non tender swelling, not warm
- Extends above and below the flexor retinaculum with ill defined edges
- Cross fluctuation is present
- Parasthesia + in median nerve distribution

Movements

- Dorsiflexion 0-60°, ulnar deviation – 0-20°
- Palmar flexion – 0-90°
- Radial deviation 0-10°

Xray Left Wrist : AP / Lat :

- No bony abnormality

Diagnosis

- Compound palmar ganglion

Important Points

1. Compound palmar ganglion is neither a ganglion nor compound
2. Chronic inflammation distends the common sheath of the flexor tendons both above and below the flexor retinaculum
3. RA and TB are the commonest causes
4. The synovial membrane becomes thick and villous with fibrin particles in the shape of 'melon seeds'
5. Complete excision is the treatment of choice

62. DEQUERVAIN'S DISEASE

40 Years - Female

- C/o. pain on the radial side of right wrist – 1 week duration

History

- Pain started 1 week back on the radial side of the right wrist, sometimes radiating up to the forearm and is aggravated by the use of the thumb
- History of unaccustomed activity right hand past 1 month

Inspection

- No significant findings

Palpation

- Tenderness + over the tip of the styloid process
- Tendon sheath feels thick and hard
- Finkelstein's test +ve. The examiner places the patient's thumb across the palm in full flexion and holding the patients hand firmly, turns the wrist sharply into adduction. If it is painful it is positive

Movements

All the movements of the wrist are restricted due to pain

Wrist dorsiflexion	0 – 90 degree
Wrist Palmar flexion	0 – 90 degree
Ulnar deviation	0 – 10 degree
Radial deviation	0 - 5 degree

No distal neuro vascular deficit

Investigations

- X-Ray Right wrist – AP/Lateral – No significant findings

Important Points

1. It is caused by a reactive thickening of the sheath around the extensor pollicis brevis and abductor pollicis longus tendons within the first extensor compartment
2. It may be due to overuse but may also occur spontaneously
3. It is treated by a cortico steroid-injection in the tendon sheath, sometimes combined with splintage of wrist
4. Resistant cases need to be operated, consisting of slitting the thickened tendon sheath

63. FLEXOR TENDON INJURIES

25 Years - Male

- C/o. inability to flex index, middle and ring fingers of left hand following an injury to the (L) forearm while working in a cutting machine

History

- Apparently normal till the injury happened; was treated by suturing the wound on (L) forearm – healed well
- Now has inability to flex 2nd, 3rd and 4th finger

O/E

Left Hand Inspection

- 5x1cm transverse healed scar on volar aspect of (L) forearm (+)
- Index, Middle and Ring fingers hyper extended - aggravated by flexion of wrist

Palpation

- Not tender or warm
- Flexion of distal inter phalangel joints (+) on restraining proximal IP joints (Flexor Profundus +)
- While restraining other fingers in extension simultaneously, could not flex the fingers
- No tinel sign
- Sensation normal

Important Points

1. Flexor tendon injuries are common especially in machine accidents. The location and depth of skin injury indicates the possibility of tendon injury
2. When both flexor tendons are severed, finger lies in hyper extension and passive extension of wrist does not produce normal flexion of fingers
3. Conventionally, management of flexor tendon injury depends upon the level of injury in 5 zones
4. Primary repair is indicated in clear wound – within 12 hours of injury
5. Delayed primary repair is done from 24 hrs to 10 days and secondary repair 10 to 14 days

64. SWAN-NECK DEFORMITY OF FINGERS

50 Years - Female

- C/o. weakness and deformity right hand – 1 month duration

History

- Deformity in the little and ring finger of the right hand started insidiously 1 month back
- Patient is a known rheumatoid arthritis patient on treatment for the past – 6 years duration

Inspection

- There is hyperextension of the proximal inter phalangeal joint of the ring and little finger of the right hand and flexion at the distal interphalangeal joints
- No swelling / scars / sinuses

Palpation

- No warmth
- No tenderness/swelling
- Inspectory findings and hyperextension of the proximal interphalangeal joint and flexion at the distal interphalangeal joint confirmed but the deformity is passively correctable
- No distal neuro-vascular deficit

Important Points

1. This is the reverse of the boutonniere deformity. The classic deformity occurs in patients with rheumatoid arthritis
2. The clinical disorder has many causes, with two things in common, imbalance of extensor versus flexor action at the proximal interphalangeal joint and laxity of the palmar plate
3. If the deformities are allowed to persist, secondary contractures of the intrinsic muscles and eventually of the proximal interphalangeal joint itself occurs, making correction increasingly difficult and ultimately impossible
4. Treatment depends on the cause and whether or not the deformity has become fixed. If the deformity corrects passively, then a simple ring splint to maintain the proximal interphalangeal joint in a few degrees of flexion may be all that is required. If the intrinsic muscles are tight, they are released. If the deformity is fixed, it may respond to gentle manipulation supplemented by temporary K-wire fixation in a few degrees of flexion

65. MALLET FINGER

20 Years - Male

- C/o. inability to extend the tip of the middle finger of the right hand – 2 days

History

- Patient developed the deformity when the finger tip was forcibly bent in active extension when the patient was trying to catch a ball while playing and the ball hit the finger

Inspection

- No swelling/scars/sinuses
- The distal interphalangeal joint of the middle and ring finger is held flexed

Palpation

- No warmth. No tenderness
- Inspectory findings are confirmed but the joint can be passively extended
- No distal neuro vascular deficit

Movements

- Movements at the wrist and rest of the fingers of the right hand are full and free

Important Points

1. It results from injury to the extensor tendon of the terminal phalanx
2. It can occur due to direct trauma or due to tendon rupture during the act of catching a ball or tucking a mattress
3. An acute mallet finger should be splinted with the joint in hyper extension for 8 weeks. This will be the treatment modality even if the patient presents after a few weeks
4.. Old lesions need treatment only if the deformity is marked, hand function impaired and the joint still mobile. Then either fusion, tendon reconstruction or Fowler's central slip tenotomy can be considered

66. INTRINSIC PLUS HAND (RHEUMATOID)

50 Years - Female

- C/o deformity of all the fingers of the right hand – 1 month duration. Started insidiously. Patient is not able to use the right hand for activities of daily living
- History of rheumatoid arthritis for the past 7 years +

Inspection

- No swelling, scars, sinuses
- There is flexion at the metacarpophalangeal joints with extension at the interphalangeal joints from the index to the ring finger and adduction of the thumb

Palpation

- No warmth
- No tenderness. Skin appears normal
- Inspectory findings are confirmed. Passively the deformity is correctable
- No distal neuro-vascular deficit

Movements

- Movements of the wrist joint- full and free

Important Points

1. The intrinsic plus deformity is caused by tightness and contracture of the intrinsic muscles
2. Often the deformity develops in combination with volar subluxation of the metacarpophalangeal joints and ulnar deviation of the fingers
3. Bunnel test :- This is to unmask slight degrees of deformity that is otherwise not obvious. It is also called 'Intrinsic-plus' test. Here when the metacarpophalangeal joints are pushed passively into hyperextension (pulling the intrinsic on stretch), it is difficult or impossible to flex the interphalangeal joints passively
4. The causes of intrinsic shortening or contracture are
    - # Spasticity (eg. Cerebral palsy)
    - # Volar subluxation of the MCP joints (eg. In Rheumatoid arthritis)
    - # Scarring after trauma or infection and
    - # Shrinkage due to distal ischemia
5. Moderate contracture can be treated by resecting a triangular segment of the intrinsic 'aponeursis' at the base of the proximal phalanx (Littler's operation)

67. KIENBOCK'S DISEASE OF THE LUNATE

30 Years - Male

- C/o. pain and stiffness of the right hand – 1 month duration

History

- Sudden onset of pain and stiffness in the right hand 1 month
- No precipitating trauma
- Inability to grasp objects (+) – 1 month
- No constitutional symptoms

Inspection

- No obvious findings

Palpation

- No warmth
- Tenderness localized over the lunate
- No swelling
- Hand grip weak in the right hand

Movements

Wrist :	Wrist dorsiflexion	0 – 60 degree	all painfully restricted
	Palmar flexion	0 – 60 degree	
	Ulnar deviation	0 – 20 degree	
	Radial deviation	0 – 10 degree	
	No distal neuro-vascular deficit		

Investigations

- X-ray wrist – AP/Lateral – Sclerosis, diffuse density of the lunate bone +; no change in shape

Important Points

1. Kienbock's disease of lunate is a form of ischaemic necrosis following chronic stress or injury
2. *The pathological stages proceed in 4 stages:*
   Stage 1 : Ischaemia without naked-eye or radiographic abnormality
   Stage 2 : Trabecular necrosis with reactive new bone formation and increased radiographic density – but little dislocation of shape
   Stage 3 : Collapse of the bone
   Stage 4 : Disruption of radio-carpal congruence and secondary OA
3. MRI is the most reliable way to detect early changes. Bone scan may reveal increased activity
4.. In early cases, splintage of wrist for 6 – 12 weeks relieves pain. If the disease has progressed, options are limited. Lunate replacement by a silicone prosthesis or radio-carpal arthrodesis may be considered

68. BOUTONNIERE'S DEFORMITY

50 Years - Female

- C/o. deformity of the little finger of the left hand – 1 month duration with inability to use the little finger in activities of daily living

History

- Patient developed the deformity insidiously
- Patient is a known rheumatoid arthritis patient for the past 5 years
- No H/o. trauma/constitutional symptoms

Inspection

- There is a flexion deformity of the proximal interphalangeal joint and extension at the distal interphalangeal joint
- No swelling/sinuses/scars

Palpation

- No warmth. No tenderness
- Inspectory findings are confirmed and the deformity is passively not correctable
- No distal neuro-vascular deficit

Movements

- Movements at the wrist and other fingers full and free

Important Points

1. This lesion is due to interruption or stretching of the central slip of the extensor tendon where it inserts into the base of the middle phalanx ; the usual causes being direct trauma or rheumatoid disease
2. The lateral slips separate and the head of the proximal phalanx comes through the gap like a button through a button hole
3. The early boutonniere is a dynamic, imbalance in which the deformity is passively correctable indicating that the lateral bands have subluxated anteriorly but are not adherent. This is best treated with splinting and exercises
4. The mid stage boutonniere deformity is characterized by a PIP extensor lag of 30 – 60 degree which is not passively correctable indicating that the lateral bands are adherent in a volar subluxated position and the oblique retinacular ligaments are tight. This might respond with exercise and splinting but operative treatment is indicated if the condition does not improve
5. The late stage of the deformity consists of a fixed flexion deformity of the PIP of as much as 90 degree due to contracture of capsule. Treatment is difficult

69. TRIGGER FINGER

40 Years - Male

- C/o. swelling in the right hand and an inability to freely extend the ring finger after flexion. The extension is possible with increased effort and palpable click - 1 month duration
- No H/o. trauma
- Patient is a known diabetic

Inspection

- No obvious swelling and deformity made out

Palpation

- 4 x 1 cm tender swelling is present at the level of the meta carpophalangeal joint of the right ring finger. The swelling moves in the direction of the tendon
- No distal neuro-vascular deficit

Movements

- On attempting to extend the flexed ring finger the patient is able to do so only after a considerable effort and with a palpable click sound

Important Points

1. The trigger finger or stenosing teno synovitis is caused by a nodule or thickening of the flexor tendon which catches on the proximal edge of the first annular pulley (A1) when the finger is actively flexed
2. When severe, the finger may lock in flexion, requiring the patient to use the other hand to release the finger. The catching and locking is often painful and interferes with activity
3. The aetiology is unclear but repetitive trauma does appear to play a role. It occurs with increased frequency in patients with rheumatoid arthritis or diabetes mellitus
4. Treatment of trigger digits depends on the aetiology. In non-rheumatoid patients, a steroid injection is very effective
5. In those with persistent triggering, a surgical release should be performed under tourniquet control. In rheumatoid, steroid injections should not be used due to the chances of tendon rupture. Splinting and exercises should be tried. If triggering persists, surgical synovectomy should be performed

70. POST TRAUMATIC STIFFNESS OF HAND

30 Years - Male

- C/o. inability to move the small joints of the hand and wrist
- Patient sustained trauma to the hand. 2 months back and was treated by native splinting – 4 splints at an interval of 10 days each
- Now patient has severe pain on attempting to move the joints of the hand

Inspection

- No scars or sinuses
- Skin of the hand appears rough and darkened
- No obvious swellings/scars/sinuses

Palpation

- No warmth
- No palpable swelling
- No distal vascular deficit
- No sensory deficit
- Tenderness in the small joints on palpation

Movements

- Severe pain on attempting to move any joint of the hand
- X-Ray Right hand – AP/Oblique – Malunited Fracture base of 3rd metacarpal with features of regional osteoporosis

Important Points

1. Joint stiffness after a fracture occurs due to the following causes :

   Due to haemarthrosis leading to synovial adhesions. Stiffness due to oedema and fibrosis of the capsule, the ligaments and the muscles around the joint, or adhesions of the soft tissues to each other or to the underlying bone. These conditions are made worse by prolonged immobilisation

2. More over if the joint has been held in a position where the ligaments are at their shortest, no amount of exercise will succeed in stretching these tissues and restoring the lost movement completely

3.. Treatment would be active and prolonged physiotherapy

71. NON-UNION FRACTURE SCAPHOID

30 Years - Male

- C/o. persisting pain in right wrist – 1 month duration
- Patient had sustained trauma to the right wrist as a result of a fall on a dorsiflexed hand – 4 months back. Patient was treated by native splints

Inspection

- No obvious deformity/swelling
- Skin over the hand and wrist- normal

Palpation

- Mild tenderness in the anatomical snuff box +
- No tenderness in the wrist joint
- No distal neuro-vascular deficit

Movements

- Movements are full but extremes of radial deviation and flexion are painful

Investigation

- X-ray Right wrist AP/Lateral and scaphoid views – shows fracture non-union Scaphoid proximal 1/3rd

Important Points

1. Non-union of scaphoid fractures is influenced by delayed diagnosis, gross displacement, associated injuries of the carpus and impaired blood supply. Of these fractures, an estimated 40% are undiagnosed at the time of the original injury
2. By 3 months it may be obvious that the fracture will not unite. Bone grafting may still be attempted, especially in the younger, more vigorous type of patient, because this probably reduces the chance of later symptomatic osteo arthritis
3. In older patients and those who are completely asymptomatic, non-union may be left untreated. Sometimes, a patient seen for the first time with a 'sprain' has an old un-united fracture with sclerosed edges on x-ray. 3 – 4 weeks in plaster may suffice to make the person comfortable once again

72. CARPAL INSTABILITY

30 Years - Male

- C/o. severe pain and swelling in the right wrist and hand following trauma
- H/o. fall – 1 day duration
- Patient sustained fall on an outstretched hand and developed pain and swelling in the right wrist and hand
- No constitutional symptoms

Inspection

- No external injuries
- Swelling right wrist and hand
- No scars/sinuses

Palpation

- Tenderness + in the middle of the wrist joint
- No distal neuro-vascular deficit

Movements

- Movements of the wrist severely restricted due to pain
- X-Ray right wrist joint with hand – AP/Lateral and Oblique – shows Peri-lunate dislocation

Important Points

1. The wrist functions as a system of intercalated segments or links, stabilized by the intercarpal ligaments and the scaphoid which acts as a bridge between the proximal and distal rows of the carpus. Fractures and dislocations or sprain disturb this system
2. In the lateral view it is easy to distinguish a lunate from perilunte dislocation. The dislocated lunate is tilted forwards and is displaced in front of the radius, while the capitate and meta carpal bones are in line with the radius. With a perilunate dislocation the lunate is tilted only slighter and is not displaced forwards and the capitate and metacarpals lie behind the line of the radius (DISI pattern)
3. Treatment is closed reduction. If it fails, open reduction by an anterior approach and lunate fixed with K-wire. The wrist is splinted in a plaster slab which is retained for 3 weeks

73. UNREDUCED DISLOCATION OF MCP JOINT

50 Years - Male

- C/o. inability to use the index finger of the right hand – 10 days duration
- Patient sustained trauma to right hand – 10 days back resulting in inability to use the index finger of the right hand. Patient gives H/o. native splinting

Inspection

- Right Hand : The metacarpophalangeal joint is only slighter hyper extended and the interphalangeal joint is flexed. There is puckering of the volar skin
- No external injury

Palpation

- Metacarpophalangeal joint of the right index finger not congruent
- Volar displacement of the metacarpal head and dorsal displacement of the base of proximal phalanx noted
- 10 degree extension deformity (fixed) at the right MCP joint

Movements

- No movement possible at the right MCP joint of index finger
- No DNVD

Investigations

- X-ray right hand – AP/Oblique : Dislocation + at the MCP joint of the right index finger
- The PPx and the metacarpals are nearly parallel

Important Points

1. Metacarpophalangeal joint dislocations are less common than interphalangeal dislocations. They occur most often in the index finger
2. The dislocated metacarpal head lies between the natatory ligament and the superficial transverse ligament of the palmar fascia. The flexor tendons and pretendinous bands are on one side and the lumbrical muscle on the other
3. When the dislocation is incomplete, reduction by manipulation is easy. When complete, open reduction by Kaplan's procedure is required

74. MADELUNG DEFORMITY

11 Years - Female

- C/o. outward deviation and difficulty in using both hands for past 4 years

History

- Apparently normal till 5 years
- Noticed to have outward deviation of B/L hands – progressive
- Associated with difficulty in movements and swelling in the dorsal aspect
- No H/o. trauma / constitutional symptoms

O/E B/L wrists

Inspection

- B/L deviation of the wrist to the ulnar side
- Dorsal dislocation of ulna (+)
- No scars / sinuses
- No muscle wasting / limb length discrepancy

Palpation

- Dorsal and lateral bowing of distal radius +
- Subluxation of inferior radio ulnar joint (+)

Measurement

- B/L Shortening of radius +

Movements	**R**	**L**
- Dorsiflexion	0° – 50°	0° – 40°
- Plantar flexion	0° – 110°	0° – 100°

- X-ray B/L wrists – AP – Lat :
  Sclerosis of distal radial epiphysis +
  Articular surface of radius faces ulnarwards and anteriorly

Important Points

1. Madelung's deformity is the deformity of the wrist where there is dorsal and lateral bowing of the distal radius with shortening
2. It may be congenital / post traumatic
3. Deformity is usually seen in girls, bilateral and rarely seen before 10 years.
4. The defect is damage to the distal radial growth disc with tethering
5. If the deformity is severe surgical treatment in the form of Darrach's procedure or excision of the tethered cord may be done

75. MADURA MYCOSIS - HAND

37 Years - Male

- C/o. pain and swelling (R) hand for the past 2 years
- H/o. discharging sinuses from the dorsum and palmar aspect of the hand.
- H/o. thorn prick injury 2½ years ago after which swelling started
- No H/o. evening rise of temperature
- No H/o. loss of weight/appetite

O/E

- Moderately Built, Nourished, middle aged adult

Inspection

- 2 sinuses in thenar eminence
- 1 sore sinus is present over the dorsal aspect with skin excoriation

Palpation

- 2 Sinuses on the thenar eminence are adherent to the soft tissue
- Induration around the sinuses, mild tenderness
- 1 Sinus on the dorsum of Hand
- Tenderness +
- Sensation on the fingers decreased
- Finger stiffness present
- Wrist movements decreased

Important Points

1. Maduramycosis - Causative agent - may be Fungi/Bacteria
2. Ist described by Gill in 1832 from Madurai, Tamil Nadu
3. Massive doses of penicillin/dapsone for long periods is the treatment
4. Localised lesion: Debridement and Excision
5. Disorganized Hand: Amputation

76. FOCAL GIGANTISM

43 Years - Female

- Swelling middle finger of (L) hand – 20 years
- Multiple nodules on the trunk of body
- Disfigurement of face – (L) side of face

O/E of (L) Hand :

Inspection

- Middle Finger – Large
- Other fingers Normal
- Skin over the middle finger – Normal

Palpation

- Skin over the finger – Normal
- Mild decrease in sensation
- No tenderness

Movement

- Good range of movements

Note:

- Gigantism of digits occurs in Neurofibromatosis (Von- Recklinghausen's disease)
- *Associated features:*
  - Osteoporosis
  - Hyperostosis
  - Subperiosteal cyst of bone
  - Scoliosis
  - Pseudo arthrosis

77. NON-UNION FRACTURE NECK OF FEMUR

60 Years - Female

- H/o. slip and fall in the bathroom – 6 months back
- Inability to use the right lower limb since injury and pain right hip – past 6 months

Right Hip

- Attitude of the right lower limb is extension at the hip, extension at knee, neutral at ankle and externally rotated

Inspection

- Right lower limb appears shortened. Wasting of thigh and calf muscles +
- No exaggerated lumbar lordosis. Both ASIS appears to be at the same level
- No scars or sinuses seen. Trochanter not well made out

Palpation

- No exaggerated lumbar lordosis
- Both ASIS at the same level
- No warmth
- Scarpa's triangle tenderness +
- Vascular sign of Narath-ve
- Trochanter is regular, elevated, not thickened on the right side
- No mass palpable posteriorly
- No fixed deformities

Movements

Flexion	0 – 60 degree – No pain
Extension	0 – 5 degree
Abduction	0 – 30 degree
Adduction	0 – 20 degree
Internal rotation in extension	0 – 20 degree
External rotation in extension	0 – 30 degree

Measurements

- There is an apparent shortening of 1 cm and true shortening in the right lower limb confined to the supra trochanteric region as confirmed by Bryant's triangle
- Special Tests : Telescopy +ve right side
  Trendelenburg test +ve right side
- X-ray Right hip with femur – AP:- shows fracture nonunion neck of femur Right
- Special X-rays to be taken :- X-ray Right hip with femur – traction and internal rotation view to assess calcar

Important Points

Some general guidelines for treatment are:

1. In adults younger than 60 years of age, nonunions in which femoral head is viable can be treated by angulation (valgus) osteotomy. This provides a line of weight bearing more directly beneath the femoral head

2. In children and in adults less than 21 years of age, non-unions in which the femoral head is not viable can be treated with an arthrodesis. In exceptional circumstances a young adult may be treated with prosthesis

3. In adults between 21 and 60 years of age non-unions in which the femoral head is not viable can be treated with a prosthesis, a total hip arthroplasty or an arthrodesis depending on the circumstances in the given patient and on the experience and preference of the surgeon

4. In patients over 60 years of age, non-unions, regardless of the viability of the femoral head, usually are treated with a hemiarthroplasty or a total hip arthroplasty

78. MALUNITED TROCHANTERIC FRACTURE WITH COXA VARA

30 Years - Male

- C/o. pain and limp in the right hip – 8 months duration
- Patient gives H/o trauma to the right lower limb – 10 months ago. Treated by native splinting for 2 months following which patient developed pain and limp in the right hip

O/E of (Rt) hip / lower limb

Inspection

- Attitude of the right lower limb is extension at the hip, extension at knee, neutral at ankle and externally rotated. Right lower limb appears shortened. Wasting of thigh and calf muscles +. No exaggerated lumbar lordosis. Right ASIS appears to be at a higher level. No scars or sinuses seen. Trochanter dimple made out and appears raised

Palpation

- No exaggerated lumbar lordosis
- Right ASIS at a higher level
- No warmth. Scarpa's triangle tenderness +
- Vascular sign of Narath-ve
- Trochanter is elevated, regular, thickened on the right side
- Pertrochanteric and bitrochanteric tenderness +
- No mass palpable posteriorly
- Adduction and external rotation deformities +

Movements

- There is an apparent shortening of 1 cm and a 2 cm true shortening in the right lower limb confined to the supratrochanteric region as confirmed by the Bryant's triangle

Special Tests

- Telescopy negative
- Trendelenburg's test +ve
- X-ray Right hip with femur – AP : shows trochanteric malunion with coxa vara

Important Points

1. Malunited fractures of the trochanteric region can be divided into two types : Those with internal or external rotation coxa vara and shortening of about 2.5 cms and those with internal or external rotation, severe coxa vara and shortening of 5 cms or more
2.. Malunions of the first type are corrected by a sub-trochanteric osteotomy
3. Malunions of the second type are treated by a procedure similar as that for malunited cervico trochanteric fractures

79. PERTHE'S DISEASE HIP WITH COXA VARA

7 Years - Male

Complaints

- Patient's parents C/o. "the boy walks with limp of the right lower limb" for the past 6 months
- The limp started insidiously. No H/o. trauma
- Pain 6 months ago, but now there is no pain

Inspection of Right Hip and Lower Limb

- Attitude is extension at the hip, extension at knee, neutral at ankle and mild external rotation
- Right lower limb appears shortened
- Wasting of thigh and calf muscles +
- No exaggerated lumbar lordosis
- Both ASIS at the same level
- No scars or sinuses seen

Palpation

- No exaggerated lumbar lordosis
- Both ASIS at the same level
- No warmth. Scarpa's triangle tenderness +
- Vascular sign of Narath-ve
- Trochanter is elevated, thickened
- No mass palpable
- No fixed deformities
- No distal neuro-vascular deficit

Movements

Flexion	0 – 120 degree
Extension	0 – 15 deegree
Abduction	0 – 10 degree
Adduction	0 – 35 degree
External rotation	0 – 30 degree
Internal rotation	0 – 5 degree

Measurements

- There is an apparent shortening of 1 cm and 1.5 cm true shortening in the right lower limb confined to the supra-trochanteric region as confirmed by the Bryant's triangle
- Special Tests :-Trendelenberg +ve. Telescopy – ve
- X-ray Pelvis with both hips – AP view :- widening of the medial joint space right side

- Flattening and lateral displacement of the epiphysis with rarefaction and widening of the metaphysis
- Head at risk signs (+)
- Progressive uncovering of the epiphysis
- Calcification in the cartilage lateral to the ossific nucleus
- Radiolucent area at the lateral edge of the bony epiphysis (Gage's sign)
- Severe metaphyseal resorption

Important Points

1. It is a disorder affecting the capital femoral epiphysis. It is the most common form of osteochondroses, characterized by avascular necrosis (AVN) and disordered enchondral ossification of the primary and secondary centers of ossification

Guidelines to treatment :

1. Children under 6 years of age :- symptomatic treatment
2. Children aged 6- 8 years
   a. Bone age at or below 6 years : Lateral pillar groups A & B (or catterall stages 1 & 2):- symptomatic treatment. Lateral pillar group (or catterall stages 3 & 4) - Abduction brace
   b. Bone age over 6 years : Lateral pillar groups A & B (catterall stages 3 & 4) Outcome unaffected by treatment , but some would operate
   c. Children 9 years and older : Except in very mild cases (which is rare) operative containment is the treatment of choice

80. SLIPPED CAPITAL FEMORAL EPIPHYSIS WITH COXA VARA

15 Years - Male

- C/o. pain right hip and limp right lower limb – 4 weeks
- H/o. trivial fall +

General Examination

- Patient obese, secondary sexual characters not well developed

Right Lower Limb

- Attitude is extension at the hip, extension at knee, neutral at ankle and externally rotated
- Right lower limb appears shortened
- Wasting of thigh and calf muscles +
- No exaggerated lumbar lordosis
- Both ASIS appears at the same level
- No scars or sinuses seen

Palpation

- No exaggerated lumbar lordosis
- Both ASIS at the same level
- No warmth. Scarpa's triangle tenderness +
- Vascular sign of Narath-ve
- Trochanter is elevated, not thickened
- No mass palpable
- No fixed deformities

Movements

Flexion	0 – 120 degree
Extension	0 – 15 degree
Abduction	0 – 10 degree
Adduction	0 – 35 degree.
External rotation	0 – 30 degree
Internal rotation	0 – 5 degree

Measurements

- There is an apparent shortening of 1 cm and a 1.5 cm true shortening in the right lower limb confined to the supra-trochanteric region as confirmed by the Bryant's triangle
- Special tests : Trendelenberg +ve. Telescopy -ve
- X-ray Pelvis with both hips – AP and Frog leg view slip + - Right femoral epiphysis
- Trethovan's sign is +ve :- Line drawn along the superior margin of the neck, transects the epiphysis normally, but will be above it in slipped epiphysis

Principles of Treatment

- Minor Slip :- Epiphyses is fused at once by pinning in displaced position
- Acute major slip :- Emergency reduction is done under (GA) or reduction is obtained by traction and fixed with pins. Irreducible displacement : This is treated by open reduction and cervical osteotomy
- Old fixed displacement :- This is treated by a corrective osteotomy at inter trochanteric or subtrochanteric level

Important Points

1. Slipped capital femoral epiphysis occurs during adolescent rapid growth period when epiphyseal plate is weak and the capital epiphysis is displaced down and back
2. The three stages are pre-slipping, chronic slipping and stage of fixed deformity

81. ARTHRITIS - HIP

81a. TUBERCULOUS ARTHRITIS - HIP

40 Years - Male

- C/o. pain, limp and difficulty to perform activities of daily living in the right lower limb
- Pain started 6 months back: H/o. night cries present; progressive
- Limp - insidious in onset and progressive
- H/o. irregular treatment for tuberculosis of lungs + 1 year back

Examination

- Patient poorly built

Right Hip

- Attitude of right lower limb – extension at the hip and knee, neutral at the ankle and internally rotated
- Right lower limb appears shortened
- Wasting of thigh and calf muscles +
- Exaggerated lumbar lordosis
- Right ASIS is a higher level than the left
- No scars/sinuses seen
- Trochanter is elevated

Palpation

- Exaggerated lumbar lordosis + (confirmed by Thomas's hip flexion test)
- Right ASIS at a higher level
- No warmth. Scarpa's triangle tenderness +
- Vascular sign of Narath-ve
- Trochanter is elevated, regular, not thickened on the right side
- Pertrochanteric and bitrochanteric tenderness +
- No mass palpable posteriorly
- Fixed flexion, adduction and internal rotational deformities

Movements

- Fixed flexion deformity of 30 degree. Further flexion upto 60 degree associated with pain
- Fixed adduction deformity of 20 degree. Further adduction of 10 degree with pain
- Fixed internal rotation deformity of 5 degree. Further internal rotation of upto 15 degree

Measurements

- Apparent shortening of 1.5 cms and true shortening of upto 2.5 cms confined to supratrochanteric region as confirmed by Bryant's triangle

Special Tests

- Trendelenberg test +ve
- Telescopy negative

Gait

- Short limb antalgic gait +

Investigations

- X-ray Pelvis with both hips AP view – Destruction in joint space right side
- Generalised rarefaction
- Involvement of head and acetabulum

Important Points

1. Tuberculosis of hip joint is ranked next to spinal tuberculosis and it constituted 15% of all osteoarticular tuberculosis. It is always secondary
2. The initial focus of infection could either be in the : 1) acetabular roof 2) epiphysis 3) metaphyseal region 4) greater trochanter 5) synovial membrane (rare) and 6) trochanter

81b. MONOARTICULAR RHEUMATOID ARTHRITIS - HIP

38 Years - Female

- C/o. pain and limp in the right hip – 6 months duration
- H/o. night pain +
- Limp progressive
- Not a known Tuberculosis patient. No H/o. small joint involvement / Early morning stiffness

Right Hip Joint

- Attitude of the right lower limb :- Extension at hip and knee, neutral at the ankle and externally rotated. Wasting of thigh and calf muscles +. Exaggerated lumbar lordosis +. Right ASIS is at a lower level than the left. No scars/sinuses seen. Trochanter not made out

Palpation

- Exaggerated lumbar lordosis +
- Right ASIS at a lower level
- No warmth. Scarpa's triangle tenderness +
- Vascular sign of Narath-ve
- Trochanter is elevated, regular, not thickened
- Per trochanteric and bitrochanteric tendereness +
- No mass palpable posteriorly.
- Fixed flexion, abduction and external rotation deformity +

Movements

- Fixed flexion deformity of 30 degree. Further flexion upto 60 degree associated with pain
- Fixed abduction deformity of 10 degree. Further abduction of 20 degree associated with pain
- Fixed external rotation deformity of 5 degree. Further external rotation upto 15 degree associated with pain

Measurements

- Apparent shortening of 1 cms and true shortening of upto 1.5 cms confined to the supra trochanteric region as confirmed by Bryant's triangle
- Special tests :- Trendelenberg's test +ve. Telescopy negative
- Gait : Antalgic gait

Investigations

- X-ray Pelvis with both hips AP view :
  Joint space right hip decreased
  Erosion of joint margins
  Juxta articular osteoporosis seen
  Sub-chondral erosions and cyst formation seen

Important Points

1. Hip joint is frequently affected in rheumatoid arthritis; occasionally the disease remains monoarticular for several years, but eventually other sites are affected

82. SEQUELAE OF SEPTIC ARTHRITIS - HIP

35 Years - Female

- C/o. pain (L) hip for the past 2 years, pain is dull aching, constant, radiating to (L) knee. Increased on walking. Relieved by analgesics
- H/o. night pain / cries
- H/o. unable to sit cross legged / squat
- H/o. (L) hip pain and swelling associated with fever at the age of 15. She was treated as inpatient with antibiotics and skin traction

O/E : (L) Lower Limb

Attitude

- Mild Flexion, Adduction and Internal Rotation

Inspection

- (L) Hip – Healed scar at medial side
- Mild fullness
- Lumbar lordosis exaggerated
- (L) ASIS lower level
- Limb appear short

Palpation

- Tenderness (+) in Scarpa's triangle
- Bitrochanteric compression / per trochanteric compression test positive
- No warmth
- ASIS depressed on (L) side
- Vascular sign of Narath – Negative

Deformity

- FFD – 10°
- Fixed Adduction deformity – 10°
- Fixed internal rotation deformity - 5°

Movement

- All movements are painful and restricted

X-ray

- Decreased joint space
- Sclerosis (+)

83. IDIOPATHIC CHONDROLYSIS OF HIP

12 Years - Asian Female

- With insidious onset of left hip pain 4 months in duration
- She could not bear weight and had to be picked up from school
- Denies trauma to the hip
- Complains of no other joint symptomatology
- Previous medical history is negative

Physical Examination

- Afebrile
- Tenderness over anterior Scarpa's triangle
- Warmth +
- Left Hip Movements : 15 degrees abduction, 10 degrees adduction, 10 degrees external rotation, 0 degrees internal rotation
- Pain on range of motion, left hip
- Left lower extremity was 1.5 cm longer than the right lower extremity
- Antalgic gait

Investigations

- Joint space narrowing left hip to 2 mm
- An arthrogram performed was also negative
- Bone scan with increased uptake left hip on both sides of joint
- ESR mildly elevated at 31 mm / hr

Idiopathic Chrondolysis

- Characterized by progressive destruction of articular cartilage resulting in secondary joint space narrowing and stiffness
- May follow infection, trauma, prolonged immobilization, complication of slipped capital femoral epiphysis
- Idiopathic type is characterized by an acute form of rapidly progressive chondrolysis occurring most frequently during adolescence with isolated involvement of the hip joint, but without a demonstrable cause
- Hallmark is narrowing of the joint space from normal 3 – 5 mm to values < 3 mm
- Associated osteopenia of the periarticular osseous structures
- Mild coxa magna and femoral neck widening and frequently a premature closure of the proximal femoral physis and trochanteric apophysis
- Conservative treatment includes NSAIDS, aggressive physiotherapy, periodic traction and bed rest, prolonged non-weight bearing or limited weight bearing, CPM, prolonged spica cast treatment until fibrous ankylosis is achieved
- Corrective osteotomy, bony fusion, or joint arthroplasty is advocated

84. AVASCULAR NECROSIS OF HIP

34 Years - Female

- C/o. pain in the left groin, progressively restricted movements with limp in (L) hip for past 6 months
- H/o. known case of skin disease for which she is on steroid therapy for the past 1 year

History

- Pain : Gradual in onset, progressive, deep throbbing, worse on ambulation
- No H/o. trauma/constitutional symptoms
- Not a smoker/alcoholic
- No H/o. renal/liver disease
- On intermittent high dose steroid therapy for skin disease for the past 1 year

O/E

- Tenderness in Scarpa's triangle
- ROM-restricted in all directions with pain more in abduction and internal rotation
- No limb length discrepancy / distal neurovascular deficit
- Trendelenberg gait ⊕

Investigations

X-Ray (L) Hip

- increase in density in the superior portion of (L) femoral head with crescent shaped radiodense zone in subchondral area
- decreased joint space

Important Points

1. Uncommon condition; 3rd/4th decade; M:F: 4:1, often B/L
2. Characterized by development of an area of bone necrosis in wt. bearing portion of femoral head
3. Cause is unknown (idiopathic) in most cases, but they may be seen in association with gouty arthritis, chronic alcoholism, chronic renal disease and long term steroid therapy
4. After initial infarction, collapse and fragmentation may be seen, which leads to deformity of the femoral head and degenerative arthritis
5. Radiographic staging (Ficat and Arlet)
   Stage 1 : Trabeculae normal
   Stage 2 : Sclerosis of trabeculae
   Stage 3 : Loss of spherical shape of femoral head
   Stage 4 : Collapse and cartilage destruction

Treatment

- Depends on stage and cause of disease
- Ranges from core decompression to arthroplasty

85. ANKYLOSIS OF HIP

85a. ANKYLOSIS OF HIP (TUBERCULOSIS)

36 Years - Male

C/o. difficulty in squatting and sitting cross legged past 1 year

History

- Had pain in Rt hip 1 year back
- Continuous, dull aching, non radiating
- Was treated natively
- The pain gradually got relieved, but developed limitation of movements at Rt hip – gradually progressive
- Now could not bend at hip – could not squat / sit on floor
- No H/o. significant trauma
- No H/o. other joint pain / swelling / small joint pains

O/E

Inspection

- Exaggerated lumbar lordosis +
- Rt ASIS at lower level
- Rt limb flexed, adducted and internally rotated
- Shortening and wasting +
- No scars / sinuses / swelling around Rt hip

Palpation

- Exaggerated lumbar lordosis + (FFD - 40^0)
- Rt greater trochanter thickened, elevated and internally rotated, not tender, not warm
- Scarpa's triangle – not tender / warm
- Vascular sign of narath (-ve)

Movements

- Rt limb – fixed flexion - 40^0, fixed adduction of 20^0 and fixed internal rotation 20^0
- Further movements painful / and absent
- Shortening of base of Bryant's triangle +
- No telescopy
- Trendelenberg's test +ve

Measurements

- Apparent shortening 2 cm
- True shortening 3 cm confined to supratrochanteric region
- Gait – antalgic hip gait with short stance

Diagnosis

- Fibrous ankylosis of Rt hip probably tuberculosis

Xray Pelvis with Both Hips

- Loss of joint space of Rt hip with erosions and osteophytes

Important Points

1. TB of hip is always secondary and ranked next to spinal tuberculosis
2. The three stages are
   i. Stage of synovitis
   ii. Stage of early arthritis
   iii. Stage of advanced arthritis
3. Shanmugasundaram radiological types of TB hip
   - Normal
   - Travelling Acetabulum
   - Dislocated
   - Pertheoid
   - Protrusio acetabule
   - Mortar and pestle
   - Atrophic

85b. ANKYLOSIS OF HIP (RHEUMATOID ARTHRITIS)

32 Years - Male

- C/o. pain in Rt hip with difficulty in squatting and sitting cross legged – past 2 years

History

- H/o. repeated pain in Rt hip, associated with swelling, on and off for the past 4 years with seasonal variations
- Gradual limitation of movements of Rt hip which has progressed now to a limp – causing limitation of ADL
- Known case of rheumatoid arthritis on Rt hip for the past 6 years

O/E

Inspection

- Exaggerated lumbar lordosis +
- Rt ASIS at a lower level
- Rt limb flexed and adducted, shortening +
- No scars / sinuses / swellings around Rt hip

Palpation

- Anterior Scarpa's triangle tenderness (+)
- Exaggerated lumbar lordosis – confirmed
- Rt greater trochanter, elevated
- Vascular sign of Narath (-ve)

Movements

Rt. Hip - fixed flexion 30^0
Fixed adduction 20^0
IR – $0\text{-}5^0$
ER – $0\text{-}5^0$ - No abnormal mobility / telescopy

Measurement

- Apparent shortening 1 cm
- True shortening 2 cm (Base of Bryant triangle)
- X ray Rt hip (AP) – juxta articular osteoporosis with erosion of joint margins, decreased joint spaces

Diagnosis

Fibrous ankylosis rt hip – rheumatoid arthritis

Important Points

1. RA can affect any joint in the body – can be monoarticular / polyarticular
2. Large joints are involved in 50% of patients
3. Exact cause is not known
4. RA factor is positive in 70% of patients and extra articular features are present in 75%
5. The aims of treatment includes keeping the inflammatory process to a minimum, preserving joint motion, preventing secondary joint stiffness and deformity

86. NEGLECTED DEVELOPMENTAL DYSPLASIA OF HIP

16 Years - Female

- C/o. difficulty in using Rt hip – for sitting / squatting since childhood

History

- C/o. difficulty in using Rt hip since childhood
- Also with shortening of Rt leg and unsteady gait
- Not progressive or painful
- Serious limitation of activities of daily living and concerned about appearance
- No H/o. fever / constitutional symptoms / trauma
- No H/o. suggestive of polio / CP

O/E

Inspection

Right hip

- Exaggerated lumbar lordosis +
- Rt ASIS at lower level
- Rt hip adducted and flexed, knee flexed
- Shortening+, wasting of thigh and leg muscles
- No scars / sinuses around hip

Palpation

- No warmth / tenderness/ mass felt around the hip
- Greater trochanter is not well defined, elevated
- Vascular sign of Narath +
- Telescopy +, Galeazzi sign +

Movements

Rt hip fixed flexion 20^0 - 110^0
Abduction – 10^0
Internal rotation – 30^0
Ext. rotation – 5^0
Adduction - 30^0

Measurement

- Apparent shortening of 2 cm
- True shortening of 3 cm (supratrochanteric as revealed by Bryant's triangle)

Trendelenberg test

- Positive

Gait

- Trendelenberg gait

Xray Rt Hip

- Dysplastic acetabulum with dislocation of small, atropic, malformed head

Diagnosis

- Neglected DDH

Important Points

1. Partial / complete displacement of the femoral head from the acetabular cavity since birth is called DDH
2. Clinical features vary in infants, children and adults
3. Perkin's line and CE angle of Weiberg are some of radiological markers in children
4. The aim of treatment in DDH is to achieve and maintain an early concentric reduction to prevent future degenerative joint disease

87. SECONDARY OA OF HIP

34 Years - Male

- C/o. progressively worsening pain and limp, with increasing stiffness and restriction of (L) hip motion past 6 years (squatting and sitting cross-legged)

History

- Apparently normal 6yrs back
- Started having repeated attacks of pain in (L) hip initiated by weight bearing which became progressively worse with limp and stiffness – following a fall into a well and injury to (L) hip which was natively treated with bandages
- Pain was progressive in degree and duration, resulting in restriction of hip motion
- No H/o. constitutional symptoms/loss of weight /appetite
- No H/o. symmetrical small joints pain with early morning stiffness
- Not a smoker or alcoholic /asthmatic
- No exposure to pulmonary tuberculosis

Inspection

- (L) thigh is adducted flexed and externally rotated
- (L) ASIS at higher level
- Shortening and wasting of (L) Lower Limb +

Palpation

- Tenderness + in Scarpa's triangle
- Shortening of base of Bryant's Triangle = by 1 cm
- FFD of (L) Hip - 15° – further flexion to 100°
- Fixed adduction deformity of 20° ER of 5°-10°
- All movements were painful
- No abnormal mobility
- Trendelenberg's test +ve
- Antalgic stable gait

Investigation

X- Ray
- (L) Hip joint space narrowing+
- Old healed fracture of (L) acetabulum +
- Cartilage destruction with subchondral sclerosis and cysts ⊕
- Osteophytes in joint margin +

Important Points

1. OA of hip may be primary occurring in 40%of population over 60 year of age or secondary to variety of causes including incongruity of articular surfaces, instability, AVN , direct cartilage injury due to infection or degeneration or idiopathic cause
2. Pain arises from inflammed and thickened synovial membrane and capsule aggravated by irregular, eburnated joint surfaces and tears in capsule
3. The characteristic deformities of flexion, adduction and external rotation are due to spasm and later rendered permanent by capsular contracture
4. Conservative treatment frequently can eliminate symptoms and result in acceptable function
5. When the pathologic process makes degeneration of hip joint inevitable, surgical intervention is indicated, the selection of which is dictated by needs of patients ranging from various osteotomies to THR

88. OLD UNREDUCED ANTERIOR DISLOCATION OF HIP

29 Years - Male

- C/o. pain (R) hip for past 9 months
- H/o. difficulty in walking and squatting for the past 9 months
- H/o. road traffic accident 9 months ago. The pt. was riding a bullock cart which was hit by a bus
- He sustained injury to (R) hip. He underwent native bandaging 5 times

O/E : (R) Lower Limb

Attitude

- Flexion
- Abduction
- External rotation at hip joint

Inspection : (R) Hip

- Fullness anterior aspect
- Skin – normal
- ASIS – at lower level
- Limb appears lengthened

Palpation

- Head of femur palpable at the inferior aspect below the pelvic tubercle
- No tenderness
- Transmitted movement positive

Movement

- Flexion: 10° to 90°
- Abduction: 10° to 45°
- Ext Rotation: Jog of movement
- Measurement 3cm lengthening +ve

X-ray

- Femoral head dislocated in the infra pelvic region

Complications

1) Stiffness
2) Myositis Ossificans
3) Avascular Necrosis
4) Degenerative Arthrosis
5) Vascular and Nerve Injuries

Important Points

Two types 1) Low Type: Marked abduction and external rotation, some flexion

2) High Type: Some abduction and some external rotation and full extension

89. PARALYTIC DISLOCATION OF HIP (POLIO)

30 Years - Male

- C/o. difficulty using (R) lower limb – 29 years duration
- Weakness of (R) lower limb – 29 years
- Painless, clicking sensation of (R) hip

Past History

- H/o. fever in childhood in the 5th month following which he developed weakness of both lower limbs especially (R) lower limb

Immunisation History

- Not very clear
- Milestones – Normal – Full term normal delivery with no complications
- O/E: Patient moderately built and nourished
- No neurocutaneous markers

L/E (R) Hip

- Exaggerated lumbar lordosis
- (R) ASIS at a higher level
- Wasting of thigh and calf muscles
- Attitude of (R) hip : flexion, adduction, external rotation

Deformity

- No Fixed Deformity

Movements

	Active ®	(L)	Passive ®
Flexion	$30^0 - 140^0$	$0^0 - 140$	$0^0 - 140^0$
Extension	-	$0^0 - 10^0$	$0^0 - 10^0$
Abduction	-	$0^0 - 45^0$	$0^0 - 30^0$
Rotation			
Internal	$0^0 - 45^0$	$0^0 - 45^0$	
External	$0^0 - 45^0$	$0^0 - 45^0$	

Abnormal Movements

- Telescopy test positive (R) side

Measurements

- Apparent shortening – 4 cm
- Real shortening – 2cm (R) side
- Trendlenberg test – Assisted test positive (R) side
- Gait – unstable Trendelenberg gait

Neurological Examination

		R	L
Nutrition		↓ (Wasting)	+
Tone		Hypotonia	Hypotonia
Power			
Hip	Flexion	4/5	4/5
	Extension	0/5	3/5
	Abduction	0/5	3/5
	Adduction	4/5	4/5
Knee flexion		4/5	4/5
Extension		3/5	4/5
Ankle	DF	0/5	0/5
	PF	3/5	3/5

Reflexes

KJ	+	++
AJ	++	++
Plantar	Flexion	Flexion
Sensation	N	N

Important Points

1. Paralytic subluxation / dislocation of hip occurs due to weakness of abductors in the presence of strong hip flexors and adductors. This leads to progressive flexion and adduction deformity, leading to dislocation
2.. Treatment : Lengthening of flexors and adductors of the hip with anterior lateral transfer of the ilio-psoas will restore the balance
3. Global paralysis of all muscles of one side of hip will lead to dislocation only in the presence of fixed abduction contracture of the opposite hip
4. IT Tibial band contracture of the opposite hip produces an abduction contracture on the opposite side, so the affected hip is brought into adduction and dislocation. Ober's test of the opposite hip is positive

90. PARALYTIC DISLOCATION - HIP (CP)

10 Years - Male

- Informant mother
- C/o. difficult in walking since childhood

H/o. Presenting Illness

- Child started walking at a late age of 2 1/2 years. Has had difficulty in walking which is more severe on the right side, for the past 2 years.

Birth History

- First child of the mother; had history of difficult labour, child was delivered 10 hours after the rupture of membranes

Other relevant histories

- H/o. Prematurity
- H/o. Antepartum haemorrhage
- H/o. Toxaemia
- H/o. Cyanotic attacks or convulsions

Milestones

- Delayed

Family History

- Other siblings normal

General Examination

- Mild mental retardation +, squint +
- **Lower Limb :** Flexion, adduction and internal rotation at the hip
- Flexion at the knee
- Achilles tendon tightness with valgus of foot and in toes
- Upper limb – shoulder adducted, internally rotated; elbow in flexion, forearm pronated, flexion and ulnar deviation of wrist with fanning out of fingers and thumb in palm deformity

Examination of Hip

- Exaggerated lumbar lordosis present
- ASIS right side at a high level
- Attitude flexion, adduction and medial rotation of both limbs

Passive Movements

	R	L
Abduction with hip & knee extended	0 - 20^0	0 – 30^0
Hip flexed, knee extended	0 – 10^0	0^0 – 20^0
Fixed flexion deformity	20^0	20^0
Thomas test	positive	positive
Prone rectus test	positive	positive
Flexion with knee flexed	20^0 – 140^0	20^0 – 140^0
With knee extended	20^0 – 100^0	20^0 - 100^0

Spasticity

Hypertonia of hip adductors, hip flexors and hamstring muscles present

Muscle Power

	R	L
Hip		
Flexion	5/5	5/5
Extension	2/5	3/5
Abduction	2/5	3/5
Adduction	5/5	5/5

Telescopy – positive right side

Measurements

- True shortening – 2cm present in Rt side
- **Gait :** Unstable Trendlenberg gait

Radiography

- Break in Shenton's line
- Progressive ↑ in lateral migration of the hip

Other findings

- Valgus deformity
- ↑ Anteversion of the femoral neck

Diagnosis

- Spastic diplegia due to cerebral palsy with dislocation of (R) hip

91. NON-UNION FRACTURE SHAFT OF FEMUR

30 Years - Male

- C/o. inability to use right lower limb and dangling of the right lower limb – 6 months duration
- Patient sustained trauma to right thigh in a road traffic accident 8 months back. Patient now unable to use right lower limb after 2 months of native splinting

O/E

- Right Lower Limb

Inspection

- Attitude of the right lower limb. – Extension at the hip and knee, neutral at ankle and externally rotated
- Deformity of the thigh in the M/3rd region
- Right lower limb appears shortened
- No scars/sinuses

Palpation

- There is a discontinuity in the right femur in the M/3rd region with over riding of segments
- No bony thickening. Abnormal mobility in both the antero-posterior and medio-lateral planes
- No distal neuro-vascular deficit

Movements

- Hip joint : Movements full and free
- Knee joint : Flexion 0 – 60 degree
  Extension 0 – 60 degree Extra articular stiffness +

Measurements

- There is a true shortening of 2 cms confined to the infra trochanteric region

Investigations

- X-ray right femur AP/Lateral – Fracture nonunion of right femur M/3rd

Important Points

Most nonunions of the femoral shaft can be treated successfully by open reduction and internal fixation with intramedullary nailing / plating with bone grafting

92. MALUNITED FRACTURE SHAFT OF FEMUR

34 Years - Male

- C/o. deformity and shortening of (L) thigh following native treatment of fracture of (L) thigh bone 12 months back
- Difficulty in flexion of (L) knee and squatting for past 8 months

History

- Sustained injury to (L) thigh 12 months back following a fall – treated natively with bandage for 4 months
- Now has found that (L) leg is shorter than right and is externally rotated- with difficulty in flexion and squatting
- No H/o. instability
- No H/o. swelling or sinus with discharge

O/E : Inspection

- (L) Thigh – wasting, (L) leg, and patella externally rotated than right
- (L) Lower limb shortening +
- No sinus or scar

Palpation

- Bony swelling and irregularity in M/3 (L) femur
- No abnormal mobility or crepitus
- External rotation deformity of (L) leg - 15°
- Shortening of 4 cm + in femoral component
- Movements flexion : 0°- 110°
  IR: 15° - further rotation of 10°
  IR: Correctable to neutral position
- Gait : Short Leg Gait

Investigations

- X –Ray : Malunited # Shaft of femur M/3

Important Points

1. Malunions of femoral shaft are not uncommon
2. Most often occurs after treatment with cast braces or treatment of unstable open # with small intramedullary nails
3. Almost all malunions of shaft show combined deformities of malrotation, angulation and shortening
4. Shortening more than 2.5 cm , malrotation of 10°-15° and angulation of 15° requires correction in active patients
5. The type of surgical procedure indicated for correction of malunion of the femur depends on the degree of deformity, the alignment of medullary canal and the location of deformity

93. SUPRACONDYLAR AND INTER CONDYLAR FRACTURE OF FEMUR WITH KNEE STIFFNESS

35 Years - Male

History

- Patient sustained H/o. RTA to right leg and patient had inability to move the right lower limb after the incident. Patient gives H/o. pain and tenderness in the lower thigh region
- Patient was treated by native splinting for 6 months. Now C/o. pain right thigh with knee stiffness

O/E

- Right Thigh and Knee

Inspection

- Attitude – hip in extension, knee in extension and ankle in neutral position
- Gross muscle wasting in right thigh and leg segment, No scars/sinuses seen

Palpation

- No warmth
- Tenderness over the region of the supracondylar and condylar region.
- Supracondylar and femoral condyles (both medial and lateral) are irregular and thickened. No discontinuity in the shaft of femur, but thickening of lower shaft made out
- No abnormal mobility
- No distal neurovascular deficit

Movements

- Knee flexion : 0-30 degree beyond which it is not possible

Measuremnts

- Shortening of the thigh segment by 1.5 cms on Rt side
- Special Tests
- Valgus/Varus test Positive
- Anterior Drawer test Positive

Investigations

- X-ray right knee with thigh AP/Lateral – shows malunited supracondylar fracture with intercondylar extension

Important Points

1. Malunion of one or both femoral condyles as of the tibial condyles, distorts the articular surface of the knee; frequently however, it produces a much more servere disability than one does of a tibial condyle. Malunion of the lateral femoral condyle can produce external rotation, flexion and valgus deformities of the knee; malunion of the medial condyle produces internal rotation, flexion and varus deformities
2. Malunion of fractures of both condyles with marked displacement rarely should be corrected by open reduction of each condyle as just described unless it is of a short duration and is in a young patient. When there is a varus or valgus deformity, the extremity should be realigned by an osteotomy through the metaphysis

94. OSTEOMYELITIS OF FEMUR

18 Years - Male

- C/o. pain, swelling and discharge from a sinus on (L) thigh for past 8 months

History

- Apparently normal till 8 months back
- Developed recurrent episodes of fever with swelling, acute pain over (L) thigh associated with severe pain on weight bearing and walking
- Took native treatment in the form of bandages
- During one of the episodes, swelling developed over the lateral aspect of (L) thigh, which broke to discharge pus after which the pain decreased
- From then on he has recurrent episodes of pain and discharge of pus from the sinus

O/E

Inspection

- Gross wasting of the left thigh +
- 2 sinuses on M/3 of lateral aspect with bluish borders with active pus discharge +
- No limb length discrepancy

Palpation

- (L) thigh warmth +, deep tenderness +
- Sinus fixed to underlying bone
- Puckering + on flexion of (L) thigh

Movements

- (L) Hip and (L) knee movements are restricted
- (L) Hip Extension - 0^0 - 5^0 (L) Knee – Flexion – 0^0 – 110^0
  Flexion 0^0 – 90^0 Extension – 0^0 – 5^0

X-ray

- Diffuse sclerosis of (L) femur M / 3 +
- Sequestrum +, deformed cortex +
- **Pus c/s:** Staphylococcus aureus +, Proteus +

Important Points

1. Femur is one of the most common sites of chronic osteomyelitis
2. Chronic stage is marked by persistence of sinuses and repeated breaking wounds apparently healed, which is due to presence of unabsorbed (or) retained sequestra, unobliterated cavities and mixed bacterial infection
3. The treatment is aimed at eradication of these conditions and prevention of further complications

95. INFANTILE QUADRICEPS FIBROSIS WITH KNEE STIFFNESS

6 Years - Male

- C/o. difficulty to squat and inability to flex the right knee since childhood

History

- First born male child of non consanguinous marriage
- Had severe neonatal jaundice and septicemia at infancy, treated with injections and ICU care
- Noticed to have difficulty in squatting 3 years back; progressively worsening
- Now walks with limp due to straight right knee
- No H/o. trauma

O/E

Inspection

- Gross wasting of (R) thigh muscles +
- Absence of creases over (R) knee

Palpation

- (R) Patella smaller than left and migrated proximally
- No limb length discrepancy

Movements

- Flexion - $0^0 - 30^0$
- Extension $0^0 - 10^0$
- No abnormal mobility / instability

Investigations

X-Ray Rt. Knee – AP & Lat :

- Smaller patella
- Flattening of femoral condyle

Infantile Quadriceps Fibrosis

- Acquired extension of knee in children is the result of repeated intramuscular injections into thigh muscles
- In infancy this combined with poor nutrition and severe underlying disease leads to muscle necrosis followed by fibrosis and adhesion to underlying structures and covering deep fascia with failure of muscle development
- Physiotherapy and passive stretching is unlikely to lengthen the contracted tissues
- Surgical lengthening of the extension apparatus is always necessary which is achieved by lengthening the quadriceps tendon distally or by releasing the shortened muscles from their proximal attachments

96. NON-UNION FRACTURE PATELLA

40 Years - Male

- C/o. inability to use the right knee joint freely for the past 8 months. Patient sustained injury to the right knee joint 8 months back. Took native treatment by splinting. After removal of the splint, patient has given h/o. inability to walk freely

(Rt) Lower Limb

- Attitude of the right lower limb. Extension at the hip, extension at the knee and neutral at ankle

Inspection

- Gross muscle wasting in the thigh and leg segment
- No scars/sinuses
- No obvious swelling/deformity

Palpation

- No warmth
- No tenderness of the tibial/femoral condyles/patella
- No joint line tenderness
- No effusion
- Patella is discontinuous in the middle
- Two halves of the patella are made out with discontinuity. Abnormal mobility +
- No distal neuro vascular deficit

Movements

- Flexion	0 – 100 degree without pain
- Extension	Extensor lag for the last 20 degree present

Investigations

- X-ray Right knee joint – AP / Lateral – Transverse # nonunion of right patella

Important Points

1. Nonunions of patella are rare. When fresh fracture is comminuted, the treatment is excision of the fragments which eliminates the possibility of nonunion; when internal fixation is done, it usually results in union

2. When the fragments of a nonunion are in good position, fibrous union may be compatible with satisfactory function; the severity of later arthritic changes is proportional to the irregularity of the articular surface of the patella. When the fragments are separated, partial or complete excision of the patella, as for a fresh fracture is indicated

97. DISLOCATION OF PATELLA (RECURRENT)

40 Years - Male

- C/o. pain in the right knee joint with feeling of giving way
- Patient sustained a violent dislocation of the right patella – 2 years back following which patient has had 4 episodes of dislocation associated with pain

O/E

- Attitude at Rt. Lower Limb. Extension at hip and knee and neutral at ankle joint

Inspection

- Muscle wasting of the right thigh
- No scars/sinuses
- No deformity

Palpation

- No warmth
- No bony / soft tissue tenderness
- No joint line tenderness
- Apprehension test (+ve) (Examiner holds the relaxed knee in 20 – 30 degrees of flexion and manually subluxes the patella laterally. When the test is positive, the patient suddenly complains of pain and resists any further lateral motion of the patella)
- Patellar maltracking +
- Q – angle 15 degree (increased)
- No distal neuro vascular deficit

Movements

- Flexion 0 – 100 degree - no pain
- Extension : Full but extensor lag for the last 10 degree (+)
- Measurements : no shortening
- X-ray Right knee with AP/Lateral – No bony abnormality
- Insall index- normal (length of patellar tendon (LT) and the diagonal length of the patella (LP) have a ratio of 1:0. Patella alta is likely to be present if LT exceeds LP by more than 20%)
- Axial view of Patella – subluxation of right patella

Important Points

1. Recurrent dislocation of the patella can follow a violent initial dislocation, but it occurs more often in knees with one or more underlying anatomical abnormalities that predispose the patella to dislocation or subluxation
2. Q – angle is usually increased. It is the angle represented by the intersection of the patella with a second line drawn from the center of the tibial tuberosity to the center of the patella. In males the Q angle is normally 8 – 10 degree, in females the normal angle is 15 degree
3. Numerous surgeries have been described for the treatment of recurrent subluxation or dislocation of patella. These procedures can be generally directed into five categories :
   a. Release of tightened lateral retinaculum
   b. Proximal realignment of the extensor mechanism
   c. Distal realignment of the extensor mechanism
   d. Combined proximal and distal realignment of the extensor mechanism
   e. Patellectomy combined with realignmentof the extensor mechanism

98. SYNOVITIS - KNEE

98a. TUBERCULOUS SYNOVITIS KNEE

30 Years - Male

- C/o. pain right knee joint – 3 months duration. Pain insidious, no night pain, increases on walking and relieved by rest. Patient gives H/o. on and off fever, loss of weight and appetite. Patient was diagnosed as having Pulmonary Tuberculosis 3 years back. Patient had irregular therapy

Inspection

- Attitude of the limb is extension at hip, mild flexion of the knee and neutral at ankle
- Mild muscle wasting of the thigh
- Swelling of the knee joint - 4 x 3 cms
- Skin stretched
- No scars/sinuses

Palpation

- Warmth +. Swelling 4 x 3 cms due to effusion and synovial thickening
- Joint line tenderness and synovial tenderness ++
- Synovial thickening +, doughy feel +
- Patellar tap +
- No distal neuro vascular deficit
- No fixed deformities

Movements

- Flexion and Extension – 0 – 110 degree – last 10 degree associated with pain
- Measurements :- No shortening

Investigations

- X-ray Right knee joint – AP/lateral – Soft tissue swelling
- Generalized osteoporosis +
- No joint line erosion / decrease in joint space

Important Points

1. In the stage of synovitis non-operative treatment often results in complete healing with an excellent range of movements
2. Traction is applied to prevent flexion and subluxation
3. With quiescence of acute local signs, gentle active and assisted knee bending exercises should be carried out intermittently for 5-10 minutes, half to one hourly

98b. VILLONODULAR SYNOVITIS (KNEE)

23 Years - Female

- C/o. pain and swelling of (R) knee past 3 months

History

- Apparently normal 3 months back
- Developed pain and swelling of (R) knee which was gradually progressive with limp and snapping sensation at limb
- Denies H/o. other joint involvement / similar episodes before

O/E

- Swelling +, warmth +
- Patellar tap +
- Synovial thickening +
- Movements – at the extremes of movements, it is painful

Investigations

- (R) Knee AP - Lat : fluffy flocculent soft tissue density +
- Minimal bony erosion +
- Aspiration - A thick orange brown fluid containing cholesterol and hemosiderin was aspirated
- C/s. No growth

Important Points

1. Idiopathic lesion involving exuberant proliferation of synovial membrane of joints, tendon sheaths or bursae which may invade locally without metastases or malignant histology
2. May be localized or diffuse
3. Classified by Jaffe into 3 stages
4. Surgical excision is indicated
5. Recurrences are common and are treated by irradiation

99. HAEMOPHILIC ARTHRITIS - KNEE

17 Years - Male

- C/o. pain and inability to extend the right knee joint – 6 months duration.
- Patient gives on and off swelling of the right knee joint over 7 years following trivial trauma. Patient born of consanguinous marriage, sibling history of similar episodes +

O/E :

Inspection

- Attitude of limb is extension at hip, flexion at knee and neutral at ankle
- Right knee joint : Skin over the right knee stretched swelling of 4 x 3 cms in size
- No scars/sinuses
- Muscle wasting of thigh and leg

Palpation

- No warmth
- Joint line tenderness +
- Swelling 4 x 3 cms confined to the knee
- No patellar tap
- Synovial thickening +
- Fixed flexion deformity of 20 degree
- No distal neuro vascular deficit

Movements

- Fixed flexion deformity of 20 degree
- Further flexion from 20 – 90 degree associated with pain

X-ray Right knee AP/Lateral

- Persistent boggy swelling
- Osteoporosis of epiphysis
- Joint interval mildly decreased
- Subchondral cysts present
- Squaring of the patella
- Intercondylar notch of femur and trochlear notch widened

Important Points

1. Haemophilic arthritis (Bleeder's joints) is hereditary coagulative disorder characterized by haemorrhages which is spontaneous and is due to trivial trauma. It is x-linked, carried by female, manifest in male, cause being prolonged clotting time
2. The blood interacts with the synovial fluid and causes irritation to the synovial membrane. Due to the proliferation of the macrophages, there is synovial hyperplasia and pannus formation which causes destruction of the articular cartilage of the joint

100. TUBERCULOUS ARTHRITIS - KNEE

80 Years - Male

- C/o. pain right knee joint – 4 months duration
- C/o. inability to use right lower limb freely. Pain started insidiously and was progressive
- H/o. constitutional symptoms +
- Patient was diagnosed with pulmonary tuberculosis – 3 years back and was treated irregularly

O/E : Right Knee Joint

Inspection

- Attitude of the right lower limb is extension at the hip, flexion and lateral rotation knee and neutral at ankle
- Gross muscle wasting +
- No scars/sinuses
- Swelling of 4 x 3 cms in Rt. knee joint

Palpation

- Warmth +
- Tenderness + joint line
- Synovial thickening +
- Knee joint is in an attitude of flexion, posterior subluxation, lateral subluxation, lateral rotation and abduction of tibia
- Fixed flexion deformity + with posterior subluxation of tibia on femur +
- No distal neuro vascular deficit

lovements

- Fixed flexion deformity of 30 degree. Further flexion of 30 – 70 degree associated with severe pain

Measurements

- Shortening of 0.5 cms
- X-ray right knee joint – AP/Lateral – Loss of definition of articular surfaces +, marginal erosions, diminution of joint space and destruction of bones forming the joint, with triple deformity

Important Points

In adults with advanced arthritis or in cases which resulted in painful fibrous ankylosis during the process of healing, the knee joint requires arthrodesis. The operation provides a painless stable knee, prevents recurrence, corrects deformity and patients can do long hours of standing and walking

101. RHEUMATOID ARTHRITIS - KNEE

32 Years - Female

- Housewife. C/o. pain (L) knee past 6 months

History

- Pain started insidiously, gradually progressive
- Now associated with stiffness, limp and swelling of (L) knee with restriction of movements for past 2 months
- H/o. general lack of well being with early morning stiffness of fingers and evening rise of temperature past 2 months
- No H/o. trauma, skin lesions, diarrhoea or eye problems
- No H/o. deformity / swelling anywhere in the body

O/E

Inspection

- Swelling of left knee +
- Wasting of Quadriceps +
- No other swellings / deformity of fingers or toes

Palpation

- Knee joint effusion with synovial thickening +
- Medial and lateral joint line tenderness +
- No instability / crepitus. Popliteal fossa – free and normal

Movements

- Knee : flexion 0^0 - 120^0 – terminal restriction with pain + extension 0^0 – 5^0 terminal restriction pain +

Measurement

- No limb length inequality, thigh muscle wasting of 3cm +

Radiography

- X-ray (L) Knee AP & Lat : Loss of joint space+
  Marginal erosions +
  Periarticular osteoporosis +
  No subchondral cysts / osteophytes

Discussion

- RA is the commonest cause of chronic inflammatory joint disease
- Occasionally it starts in the knee as chronic mono articular synovitis and later other joints are involved
- Typically progresses from stage – I (synovitis) to stage II (destruction) to stage III (deformity). Triple deformity may occur
- Radiographic changes are classical with joint space narrowing, erosions and periarticular osteoporosis with bone destruction
- Majority of patients may be managed conservatively with DMARDS and NSAIDS and splinting
- Operative management includes synovectomy, realignment osteotomy and arthroplasty

102. ANKYLOSIS KNEE - SEPTIC ARTHRITIS SEQUALAE

40 Years - Male

- C/o. inability to bend (R) knee – past 8 months

History

- Gives H/o. painful (R) knee with gradual restriction of flexion since past 8 months
- Pain gradually subsided with increasing inability to bend (R) knee
- Now cannot bend the knee which limits his daily activities
- No H/o. trauma

O/E : (R) Knee

Inspection

- No swelling / sinus / scars
- Atrophy of muscle of thigh & leg
- No limb length discrepancy
- Deformity (+) 10^0 flexion and ext rotation

Palpation & Movements

- Not tender / or warm
- Deformity – fixed flexion – 10^0
- Further flexion – 5^0 – 10^0
- No other movements possible
- Movements elicit pain
- No distal neurovascular deficit
- X-ray (R) Knee – AP / Lat - decreased joint space with erosion of articular surface

Important Points

1. Bony / fibrous ankylosis is a complication of septic arthritis due to cartilage destruction
2. If the ankylosis is sound with no pain and in functional position (10^0 flexion 10^0 ext. rotation) it can be left alone
3. Unsound ankylosis / in unsound position will require surgical arthrodesis

103. OA - KNEE

60 Years - Female

- C/o. pain (R) knee for the past 3 months
- Pain increased on walking and straining
- Unable to sit cross leg / unable to squat
- H/o. swelling (R) knee on and off
- H/o. night cries +

O/E - (R) Lower Limb

Inspection

- Attitude : (R) hip - neutral - (R) knee - mild flexion, varus +
- (R) ankle - neutral
- Skin over the knee normal
- Swelling + supra patellar region, FFD of 50 degree

Palpation

- Swelling + supra patellar region confirmed - Joint line tenderness +
- Crepitations +

Movement

- Flexion 5^0 to 90^0 - further flexion painful
- Extensor lag +. No distal neuro vascular deficit

X-ray

- Joint space decreased - Tibial plateau deficit
- Loose bodies, osteophytes +

Treatment

- Conservative : Analgesics / Physiotherapy
- Surgery: Total Knee Replacement

Discussion

- Osteoarthrosis is a degenerative condition of the joints
- Can be broadly classified as a) Primary b) Secondary
- The earliest radiological change is narrowing of the joint space and subchondral sclerosis in the medial compartment of the joint
- Treatment may be conservative - physiotherapy with SWD, IFT
- Surgical treatment includes high tibial osteotomy, unicompartmental / total knee replacement

104. GENU VALGUM (KNOCK KNEES)

10 Years - Female

- C/o. deformity B/L knees causing disturbance in gait and difficulty in running
- Was present since childhood which was not treated
- Now has cosmetic concerns with occasional pain in B/L knee after exertion
- No H/o. trauma to knees
- No H/o. other deformity of bones or history suggestive of chronic renal disease

O/E

Inspection

- Medial angulation of B/L knee with outward deviation of longitudinal axis of both tibia and femur
- No scars/sinuses/atrophy or limb length discrepancy
- Deformity persists on flexion of knee

Palpation

- B/L medial tenderness +
- No varus/valgus instability/ patellar instability

Measurement

- 11cm between B/L malleoli in standing position

Investigations

- Xray B/L knee: AP / Lateral
- No evidence of epiphyseal growth disturbance or trauma
- Frontal radiograph of weight bearing knee joint with legs – B/L lateral distal femoral angle 90°

Important Points

1. Valgus alignment of the lower extremities is normal in children between 2 and 8 years of age
2. This physiological genu valgum of childhood is aggravated by laxity of medial collateral ligament and resolves spontaneously by the age of 7-8yrs without treatment
3. Causes include endocrinal and metabolic disorders like rickets, renal osteodystrophy, Fanconi's syndrome, trauma, osteomyelitis
4. Knock knee in toddlers can usually be ignored
5. Unilateral or severe bilateral genu valgum, where the intermalleolar distance exceeds 10cm, particularly beyond the age of six, should be examined radiologically to determine any disturbance of physical growth
6. Treatment of underlying cause and surgical correction of deformity is required after examination and determination of angles especially after the age of 10 years

105. GENU VARUM (BOW LEGS)

8 Years - Male

- C/o. B/L lateral curvature of legs since childhood

History

- Bilateral leg lateral curvature since childhood
- Has difficulty in running and playing activities
- No H/o. trauma/other deformity of skeletal system
- No H/o. chronic drug intake

O/E Inspection

- Outward angulation of knee joint with medial deviation of longitudinal axis of femur +, tibia +
- B/L intoeing of feet+
- No scars/swelling of knee / limb length discrepancy

Palpation

- Minimal joint line tenderness
- No effusion, no valgus/varus instability
- Deformity persists on flexion of knee. ROM-full
- Intercondylar distance : 7cm

  Xray B/L Knee: Antero Lateral flare of medial distal femoral epiphysis+, normal physis +

Important Points

1. Genu varum or bow leg is a lateral curvature of leg which can involve either the tibia/femur or both
2. Physiologic genu varum is common till 3 yrs of age and persistent genu varum beyond this age should be investigated. If bowing of the knee is >5 cm (or) if it is unilateral, an underlying cause must be considered and appropriate investigations carried out
3. Endocrine disturbance like rickets, metabolic disorders, kidney diseases, trauma, infantile tibia varum are some of known causes
4. Treatment of underlying cause and surgical correction of the mechanical axis is indicated

106. GENU RECURVATUM

17 Years - Female

C/o. difficulty in using (R) knee with deformity for the past 5 years

History

- Difficulty in using (R) knee since childhood
- H/o. fever, following which she developed weakness of (R) lower limb which gradually improved
- Now has deformity of (R) knee – 5 years duration
- Curving backwards during walking
- Sense of giving way during flexion
- Progressive
- Birth and immunization history were normal

O/E

(R) Limb : Inspection

- Normal lumbar lordosis
- Both ASIS at same level
- Atrophy of (R) thigh and calf muscle (+)

Palpation

- No bony tenderness
- No fixed deformities
- No instabilities
- Hyperextension of knee on standing (+)
- No DNVD

Movements	**N/E**	
		Hip R 5/5
Flexion -	$0^0 - 140^0$	Knee Flexion – 5/5
Extension -	$0^0 - 30^0$	Extension 4/5
		Ankle 5/5

Gait: Recurvatum gait

X-ray (R) knee : AP & Lat: no bony abnormality

Diagnosis

- APM III with weakness of quadriceps producing Genu Recurvatum

Important Points

1. There are 2 important paralytic causes of Genu recurvatum
2. Paralysis of quadriceps in the presence of strong hip extension and ankle plantar flexion
3. Paralysis of all muscles around knee
4.. Other causes include congenital recurvatum, lax ligaments, growth plate injuries and malunited fracture
5. Management is either conservative or surgical corrective osteotomy

107. SEMI MEMBRANOSUS BURSITIS

40 Years - Male

- Farmer by occupation
- C/o. pain and swelling in the inner posterior aspect of (R) knee joint for the past 6 months

History

- Swelling noticed in the medial and posterior aspect of knee 6m back, gradually increasing in size
- Associated with vague pain and limitation of extension
- No H/o. trauma / constitutional symptoms
- No H/o. other joint involvement / regional lymphadenopathy

O/E

Inspection

- Diffuse 2x4cm swelling+in postero medial aspect of (R) knee just above the joint crease
- More prominent on extension of knee, flaccid on flexion
- No superficial dilated veins/scars

Palpation

- No tenderness, fluctuant tense swelling which is mobile
- Overlying skin is not adherent
- Not pulsatile
- No regional lymphdenopathy
- Flexion 0 – 120^0 / Extension 0 - 5^0 / Extension painful

Important Points

1. Bursae are sacs lined with membrane similar to synovium located over joints and bony prominences which function to reduce friction and protect delicate structures from pressure
2. Numerous bursae have been described in relation to hamstrings and medial gastrocnemius, the most important of which is situated between the medial head and semimembranosus muscle
3. These bursae often form a composite bursa designated the gastrocnemio-semi membranosus bursa which often communicate with the knee joint through an opening in the posterior capsule
4. It becomes inflammed especially in males who are active labourers such as game keepers, shepards and farmers
5. The bursa is superficially based and is attached to areolar tissue. Deeply it fuses intimately with semi membransus tendon
6. Important DD include Hemangioma, neoplasms and popliteal cyst (Morant Bakers)
7. The treatment when the patient has symptoms is surgical excision of the sac

108. PREPATELLAR BURSITIS (HOUSEMAID'S KNEE)

33 Years - Male

- Unskilled labourer
- C/o. pain over the left knee, past 3 months

History

- Pain and occasional swelling on and off for the past 3 months over (L) knee
- No H/o. trauma/constitutional symptoms
- Pain aggravated by working, by kneeling down (as in cleaning the floor) and relieved by rest and tablets
- No H/o. similar episodes before
- No H/o. other joint involvement

O/E

- Swelling + in the (L) knee – upper half of patellar tendon
- Tender, fluctuant, no warmth
- Skin not adherent
- Becomes more prominent on bending the knee
- ROM – full / painful at extreme flexion

Investigations

- X-ray (L) knee : No abnormality
- Aspiration : Clear, straw coloured, viscous fluid +

Important Points

1. Bursae are sacs lined with membrane similar to synovium located over joints and bone prominences to reduce friction and protect delicate structures from pressure
2. Prepatellar bursa is subcutaneous, present in 90% of people covering lower half of patella and upper half of patellar tendon
3. Chronic inflammation of their bursa occurs as a result of repeated trauma as in kneeling – eg housemaid, carpet layers
4. The walls becomes thickened and the interior is loculated by irregular adhesions and septa with occasional loose bodies
5. Important DD include jumper's knee and rarely osteomyelitis and tuberculosis of patella
6. The treatment of acute bursitis is rest . The fluid may be aspirated and in small non infected bursitis 1 or 2ml of local hydrocortisone may be injected to relieve inflammation
7. Chronic inflammation requires complete excision of the sac through a transverse incision

109. POPLITEAL CYST (MORANT BAKER'S CYST)

52 Years - Male

- Known patient of B/L OA knee
- C/o. pain and swelling in the posterior aspect of (R) knee -> past 4 months

History

- Known case of B/L OA knees, on conservative management
- Noticed a swelling in the posterior aspect of (R) knee 4 months ago – gradually increasing in size
- Accompanied by pain and limitation of movement at the knee joint especially on walking
- No H/o. trauma / constitutional symptoms

O/E

Inspection

- 5x4cm spherical swelling in the (R) Popliteal space
- More prominent on extension
- No scars/redness

Palpation

- Not warm / tender
- Cystic, tense painless mobile swelling which becomes tense on extension and flaccid on flexion
- Features of OA Knee+
- No regional lymphadenopathy
- ROM full, extremes are painful

Investigations

- X ray (R) knee : features of OA Knee

Important Points

1. Descibed by William Morrant Baker in 1877 in a tuberculosis of knee joint
2. Any condition that produces effusion within the knee joint may cause herniation of the synovial membrane through posterior part of the capsule due to gradual build up of intra synovial pressure
3. May also occur due to distension of the semimembranosus bursa when a communication between the joint and bursal cavities exists
4. The commonest cause is that of RA where there is synovitis with cyst formation and effusion
5. Other causes include Charcot's, TB Knee, OA Knee villondular synovitis and in younger individuals lesion in the posterior horn of medial meniscus is a common offender
6. Simple removal of cyst may result in recurrence
7. Treatment requires correction of the intra articular condition, removal of cyst, closure of the capsular opening

110. MENISCAL CYST

20 Years - Male

- C/o. pain and swelling in the outer side of (L)knee for the past 6 months

History

- Apparently normal 6 months back, when he sustained an injury to (L) knee while playing
- Noticed a swelling in the outer side of (L) knee, accompanied by aching pain, aggravated by knee bending
- No H/o. instability/giving way of knee joint
- No H/o. other joint pains/ fever

O/E

Inspection

- Small 1x1cm swelling in lateral side of (L) knee
- No associated swellings/scars/sinus
- Becomes more prominent when the knee is flexed at 45^0-50^0

Palpation

- No joint line tenderness / effusion
- Firm tender swelling 1x1.5cm, disappearing on flexion of knee
- No instability of knee
- Mc Murray test (Lt) ⊕
- No regional lymphadenopathy

Movements

- ROM of (L) knee are full but with pain during middle range

Investigations

- X-ray (L) Knee: Increased joint space in lateral compartment
- MRI (L) Knee: Cyst of the lateral meniscus

Important Points

1. Cystic swellings in relation to lateral meniscus are not uncommon but are rare in medial meniscus
2. Their etiology is disputed but trauma and degeneration is often implicated
3. They may remain entirely within the capsule or project through collateral ligament. There may be associated meniscal tear
4. Treatment ranges from arthroscopic excision of cyst alone to partial meniscal excision and repair and open total meniscectomy

111. INSTABILITY OF KNEE

111a. MENISCAL TEAR

18 Years - Male

- Presented with left knee pain after sustaining an injury while playing, three months prior to this visit
- Sustained injury to left knee while playing football
- His left knee was in a hyper flexed position when it was twisted
- Felt a "pop" associated with pain on the lateral aspect of his knee
- Had minimal knee swelling which had resolved, but his pain persisted

O/E: Inspection

- No swelling / effusion
- No scars / sinuses / wasting of muscles

Palpation

- Minimal effusion +
- Medial joint line tenderness +
- Catchy pain as his knee was brought into extension from hyper flexed position
- There was a negative Lachman test
- No instability to varus or valgus stress
- Full range of motion of his left knee

Imaging Studies

- X-ray Left Knee : No Bony Injury
- MRI left knee : Medical meniscus tear +

Important Points

1. Associated with high energy activities such as football, soccer, and basketball
2. Pain, intermittent swelling, locking, limping, and clicking
3. Most common signs – joint tenderness and effusion
5. Chronic tears – often have quadriceps wasting
6. Ligamentous laxity in children can cause false positive McMurray's test
7. Most common meniscal lesions – longitudinal, vertical and peripheral tears
8. Bucket handle tears are common in older adolescents
9. Radiographs helpful to rule out OCD, bony tumour, or osseous loose body
10. MRI is the study of choice in detecting meniscal pathology
11. Meniscectomy mainly of historical importance
12. Partial Meniscectomy : Principle is to preserve as much of functioning rim of meniscus as possible. Indications – Tear patterns not amenable to repair – tears in avascular zone, small radial tears, and parrot – beak tears
13. Meniscal repair and healing is possible in capsular third of meniscus – area where most meniscal injuries occur in children

111b. ANTERIOR CRUCIATE LIGAMENT TEAR

18 Years - Male

- Complains of right knee pain, swelling, and decreased range of motion after having his knee slammed in a car door 5 weeks prior to presentation

History

- At the time of injury, the patient was seen in hospital where X-rays were negative, and the patient was told he had a contusion of the knee
- Denies locking of the knee, but gives a history of "giving way" of the knee
- No significant past medical history

O/E : Inspection

- Mild swelling of right knee joint +
- Effusion +

Palpation and Movements

- Patellar Tap +
- No medial or lateral joint line tenderness
- No tenderness around the collateral ligaments
- Range of motion is 30 –90 degrees
- There is no instability to varus or valgus stressing at 0 degrees and 30 degrees McMurray test is negative
- Lachman test shows a increase in laxity compared to the contralateral side, Anterior drawer test also +
- Posterior drawer is negative

Investigation

- X-ray Right knee : no bony injury
- MRI : anterior cruciate ligament tear and small medial meniscal tear

Incidence

1. The cruciate ligaments provide both anteroposterior and rotatory stability to knee
2. Vigorous sports, trauma with hyperextension, sudden twisting in open field can cause ligament injury from simple sprain to complete rupture
3. ACL is the most commonly affected ligament and solitary ACL injury result in instability in sagittal plane
4. Early operative reconstruction is recommended in professional sportsman and also tibial spine #
5. In all others cases conservative treatment with cast / brace and muscular strengthening exercises are recommended
6. Failure of conservative Rx and chronic instability requires reconstruction with tendons

112. LOOSE BODIES IN THE KNEE

22 Years - Athlete

- C/o. recurrent momentary locking of (R) knee followed by swelling – past 3 months

History

- Apparently normal 3 months back
- Started to have pain with swelling of ® knee which subsided on rest
- Now past 1 month had 3 episodes of sudden locking of the joint, accompanied by sharp pain and followed by effusion

O/E

Inspection

- Right knee held in mild flexion
- Swelling (+)

Palpation

- No specific area of tenderness
- Moderate effusion (+)
- No ligamentous instability

Movements

- Flexion 5 to 110 degree
- Extensor lag (+)

Investigation

- X-ray (R) Knee : ® Knee effusion with multiple loose bodies (intraarticular)

The commonest causes are

1. Osteochondritis dissecans (1 to 3 loose bodies)
2. Osteoarthritis (1 to 10 loose bodies)
3. Chip fracture of bone (1 to 3 loose bodies)
4. Synovial chondromatosis (50 to 100 loose bodies)

Treatment is surgical removal and subtotal synovectomy depending upon the cause

Important Points

Intraarticular loose bodies may be derived from bone, cartilage or synovial membrane. They may be entirely free within the joint or they may retain a pedicle of soft tissue

113. OSGOOD SCHLATTER'S DISEASE

15 Years - Male

- C/o. pain (L) knee for the past 1 month
- Pain increases on running, climbing down the stairs, the boy is a athlete by profession
- No H/o. injury

O/E

- (L) Lower limb

Inspection:

- Attitude : Hip - neutral Knee - neutral, ankle - neutral
- Mild swelling infra patellar region
- Signs of Inflammation may be / may not be present
- No deformity

Palpation

- Swelling in tibial tuberosity region, tenderness + tibial tuberosity

Movement

- Flexion 0^0 to 135^0 , no extensor lag. No distal neuro vascular deficits

Treatment

- Conservative , Analgesics, physiotherapy, rarely surgery

Discussion

- Osteochondritis dissecans of the tibial luberosity is called Osgood-Schlatter's disease
- Occurs commonly in adolescent; Usually bilateral; a traction apophysitis
- Treatment includes rest, analgesics and tube cast and immobilisation if necessary
- Rarely surgical fusion is indicated

114. PSEUDO HYPERTROPHIC MUSCULAR DYSTROPHY

10 Years - Male

- C/o. progressive weakness of lower limbs past 3 years

History

- Apparently normal birth history with normal developmental milestones
- C/o. weakness of B/L lower limbs past 3 years, gradually progressive
- Difficulty in walking, climbing and restricting his activities
- H/o. frequent falls (+) with altered gait
- No H/o. constitutional symptoms / family h/o similar complaints

O/E

Inspection

- Moderately built and nourished child
- No obvious deformity other than gross hypertrophy of calf mscles and postural lordosis

Palpation

	R	L
Tone - Upper limb	N	N
Lower limb	N	N
Power - Upper limb		
Shoulder	5/5	5/5
Elbow	5/5	5/5
Wrist	5/5	5/5
Fingers	5/5	5/5
Lower limbs		
Hip	4/5	4/5
Knee	4/5	4/5
Ankle	4/5	4/5
FHL / EHL	4/5	4/5

- No sensory deficit
- Gower's sign positive
- Waddling gait

Investigations

- Serum CK : Increased
- Muscle biopsy : features of muscle dystrophy

Important Points

1. Progressive disease of X-linked inheritance
2. Defective gene at locus P21 on X chromosome – fails to produce normal levels of dystrophin
3. By age 10, the child is unable to walk and by 20 death results due to cardiac or respiratory failure
4. No specific treatment is available. Supportive care includes physiotherapy, splintage and correction of joint deformities.

115. NON-UNION FRACTURE BOTH BONES LEG

115a. NON-UNION FRACTURE BB (R) LEG - ASEPTIC

28 Years - Male

C/o. abnormal mobility in M/3 of (R) leg following a trauma 1 year back

History

- Sustained injury to the (R) leg following a RTA (Pedestrian vs 2 wheeler)
- Took treatment in the form of native splints for past 7 months
- Now C/o. abnormal mobility and instability of (R) leg which prevents him from weight bearing and walking
- No H/o. sinus / discharge

O/E

Inspection

(R) Leg

- Gross atrophy of the (R) leg +
- No sinus / scars

Palpation

- No swelling / warmth / tenderness
- Abnormal mobility + M/3 (R) leg in both planes
- Shortening of 2 cm +
- No distal neurovascular deficit
- ROM : (R) Knee : Extension - $0^0 - 5^0$ (R) Ankle:DF: 20^0
  Flexion - $0^0 - 100^0$ PF : 30^0

X-ray

(R) AP – Lat: Atrophic non-union BB (R) leg

Important Points

1. Incidence of tibial non-union is 2.5%
2. Important factors contributing to non-union or delayed union include fracture with displacement, bone loss, open fractures, and infection
3. Classification (Judet and Judet)

Hypertrophic (biological)	Atrophic (avascular)
a. Elephant foot	a. Gap
b. Horse hoof	b. Torsion wedge
c. Oligotrophic	c. Communited
	d. Atrophic type

4. Closed non-union requires intervention for union like postero lateral bone graft, closed reamed I.M nail or compression plate after alignment and adequate decortication of the nonunion site

115b. INFECTED NON-UNION BB (R) LEG

28 Years - Male

- C/o. abnormal mobility and sinus and discharge of pus from anterior aspect of (R) leg past 6 months

History

- Sustained a trauma by RTA to (R) leg, had a open fracture which was managed in a nearby hospital – 6 months back
- Initially had external fixator inserted in to (R) leg which was later removed and plaster was applied
- Now has C/o. pus discharge from a sinus in the ant.aspect of (R) leg and abnormal mobility and instability due to which he is unable to bear weight

O/E

Inspection

- (R) leg gross muscle atrophy
- 1 x 1 cm sinus with discharging pus from ant.aspect m/3 of (R) leg / scar of 3 x 5 cm +
- No apparent limb length discrepancy

Palpation

- Warmth +
- Tenderness +
- pus d/s from sinus +
- Abnormal mobility +
- Crepitus +
- No DNVD
- ROM (R) knee $0^0 - 70^0$ (R) ankle PF $- 0^0 - 10^0$
  DF $- 0^0 - 10^0$
- X-ray (R) leg AP & Lat : atrophic non-union (R) leg

Important Points

1. The incidence of infected non-union increase with the severity of open fracture
2. They pose greatest challenges in treatment
3. Acceptable approaches to infected non-union include adequate debridement and soft tissue coverage, in addition to bone stabilization and bone grafting
4. Apart from conventional treatment, Ilizarov frames may be required to achieve union

116. MALUNION FRACTURE OF BOTH BONES LEG

34 Years - Male

- C/o. deformity of (R) leg following a trauma – 18 months back

History

- Sustained a trauma to (R) leg, following a fall 2 years back
- Treated by native splints for 8 months
- Now has a bend in the leg with the foot pointing outwards and shortening
- No H/o. sinus with discharge / abnormal mobility
- Has difficulty in walking and squatting

O/E : Inspection

- Deformity in M/3 of (R) leg with angulation medially (25^0)
- (R) foot externally rotated
- No scars / sinus at the deformity site / skin normal

Palpation

- No tenderness / crepitus / abnormal mobility
- No distal neurovascular deficit

Movements

- Knee : Flexion : 0^0 - 110^0 Ankle : Dorsiflexion - 20^0
- Extension : 0^0 Plantarflexion – 10^0

Investigations

- X-ray : BB (R) leg AP – Lat : malunited # BB (R) leg m/3

Important Points

1. Malunion of tibial shaft fracture refers to healing of the fracture in an non-anatomical position. Functional malposition rather than cosmetic deformity constitutes one indication for surgical intervention
2. Most frequently encountered complication of malunion is shortening
3. Shortening of < 1cm, varus and valgus angulation < 10^0, anterior bowing <10^0, IR < 5^0 and ER < 15^0 are acceptable
4. Some degree of malalignment is common following tibial fractures treated nonoperatively
5. Osteotomy and fixation is rarely indicated

117. BRODIE'S ABSCESS - TIBIA

14 Years - Female

- C/o. pain near (L) knee joint for past 3 months

History

- Pain + below (L) knee past 3 months
- Insidious onset, gradually progressive
- Past 3 weeks, there is a small swelling below (L) knee, associated with limp
- No H/o trauma. No H/o. constitutional symptoms

O/E

Inspection:

- Diffuse Swelling + in (L) leg 8 cm below joint line
- Muscle wasting +

Palpation

- Tenderness +, warmth +
- No abnormal mobility
- Diffuse swelling with indistinct margins

Movements

- Terminal flexion restricted due to pain
- No limb length inequality

Radiography

- Circumscribed, oval cavity 2 cm diameter, in upper tibial metaphysis. Surrounding halo of sclerosis +

Discussion

- Brodie's abscess is a subacute osteomyelitis due to less virulent organism or more resistant patient
- More variable skeletal distribution than acute osteomyelitis but distal femur and proximal and distal tibia are the favourite sites
- There is a well defined cavity in the cancellous bone, containing seropurulent fluid, lined by granulation tissue with surrounding bony trabecular thickening
- The diagnosis often remains in doubt until a biopsy is performed. In 50 % of cases, staphylococcus is the causative organism
- Treatment may be conservative with immobilization and antibiotics, curettage is indicated if lesion is large or diagnosis is doubtful

118. PAGET'S DISEASE WITH DEFORMITY OF LEG

54 Years - Male

- C/o. pain and deformity of left leg past 6 months

History

- Pain dull constant ache, worse in bed, aggravated by activity
- Associated with bending of left leg inwards and increased thickness
- No H/o. trauma / constitutional symptoms
- No H/o. joint pain / swellings

O/E. Left leg

- Inspection
- Thickened left leg with inward bending (Varum) +
- No dilated veins / scars

Palpation

- Warmth + , non-tender
- Thickening +
- No abnormal mobility / instability of knee
- No DNVD

Movement

- ROM – full

Measurement

- Increase in girth of (Lt) leg by 1 cm
- X-ray left leg - AP } a) Thick sclerotic cortex with coarse trabeculations +
  - Lat } b) Localised area of osteolysis +

Skeletal Survey

- Normal

Diagnosis

- Mono ostotic paget's disease

Important Points

1. Osteitis deformans – characterised by enlargement and thickening of bone
2. Internal architecture is abnormal and the bone is unusually brittle
3. Cause is unknown – the disease may be localised (monoostotic) or generalised (Polyostotic)
4. Complications include fractures, 2^0 osteoarthritis, nerve compression, bone sarcoma, high output cardiac failure and hyper calcemia

119. CONGENITAL PSEUDOARTHROSIS - TIBIA

6 Years - Male

- Present with C/o. short and deformed left leg since birth

History

- 1st born, male, non-consanguinous marriage, uneventful normal delivery
- In early infancy, noted to have small left leg with abnormal mobility
- Managed conservatively initially and by surgery for 2 times
- Now has anterior bowed left leg with shortening, not able to bear weight or walk
- No H/o. any other deformity / abnormality in the body

O/E

Inspection

- Short (L) leg with healed scars in distal ½ anterior and medial aspect
- Bowed anteriorly. No sinuses. Foot normal

Palpation

- Not tender
- Abnormal mobility + in AP direction in D/3 M/3 (L) Leg
- Medial angulation + at D/3 M/3 (L) Leg
- No distal neurovascular deficit

Movements

- Knee : 0^0 - 110^0 flexion, $0 - 5^0$ extension
- Ankle : DF : $0^0 - 10^0$, PF : $0^0 - 10^0$

Measurement

- 6 cm shortening in the leg segment of left lower limb

Radiagraphy

- X-ray : (L) AP/Lateral – marked thinning of tibial shaft with gap in M/3 D/3 jn. Fibular sclerosis

Discussion

- Congenital pseudoarthrosis of tibia is a rare condition with incidence 1 in 2.5 lakh births
- 50 – 90% cases have neurofibroma
- Boyd classified into six types – bowing with defect, bowing with hourglass constriction, cyst, sclerotic segment, dysplasia and intraosseus neurofibroma
- Treatment depends on age and type : one of most difficult conditions to treat
- Surgical options available are bone grafting with internal fixation, Ilizarov's methods and resection and replacement by vascularised fibular graft

120. BLOUNT'S DISEASE (TIBIA VARUM)

14 Years - Male

- C/o. B/L lateral curvature of legs since past 5 years

History

- Bilateral leg lateral curvature since 5 years, progressive
- C/o. difficulty in running and playing
- No H/o. trauma / other deformity of skeletal system
- No H/o. past medical illness / drug intake

O/E

Inspection

- Obese kid
- Outward angulation of B/L Knee with medial deviation of longitudinal axis of femur and tibia
- No scars / swellings / limb length discrepancy

Palpation

- No effusion / tenderness
- No valgus / varus instability
- Deformity persists on flexion of knee
- ROM – full

Measurement

- No limb length discrepancy
- Intercondylar distance : femur > 6 cm

Investigations

- X-Ray B/L knee – AP / Lat :
  a) Flattened medial tibial epicondyle
  b) Beak shaped metaphysis
  c) Metaphysio – diaphyseal angle > 15^0

Important Points

1. Bow leg can be physiological / pathological
2. Disorders which can distort epiphysis or physeal growth gives rise to bow legs – skeletal dysplasias and injuries
3. Blount's disease is a progressive bow leg deformity associated with abnormal growth of the posterior medial part of the proximal tibia
4. Deformity is noticeable more than physiological bow legs
5. X-ray shows the proximal tibial epiphysis is flattened moderately and the adjacent metaphysis is beak shaped
6. Osteotomy addressing both the varus and rotational components should be done

121. HEMIMELIA

121a. HEMIMELIA TIBIA

4 Years - Male

- Brought with C/o. shortening and deformity of (L) leg with inward deviation of foot – since birth

History

- Second born, non-consanguinous marriage, male baby of normal delivery
- Noticed to have short (L) leg at birth than (R) leg
- Shortening progressively increased, associated with medial deviation of (L) foot and wasting
- Associated with small non functional stiff (L) knee
- Has inability to bear weight
- No other H/o. deformity elsewhere

O/E

Inspection (L) leg

- Under developed and short (L) leg (+)
- Smooth, underdeveloped (L) knee (+)
- Medial deviation of atrophic (L) Foot (+)
- Absence of great toe (+)

Palpation

- Single bone is palpable on lateral aspect of (L) leg extending from knee and foot subluxed medially on its distal end
- Tarsal bones could not be made out
- Distal pulses (+)

Measurement & Movements

- Shortening of 5 cm
- Movements : Knee : nil Ankle : Supple, Passive movements (+)
- Ipsilateral hip and thigh normal

Investigations

- X-ray (L) leg : absence of tibia and 1st ray with medial subluxation of foot

Important Points

1. Congenital absence of tibia or pre-axial tibial hemimelia is an unusual deformity with associated with CDH, PFFD and hypoplasia of limbs
2. Varying degress of tibial absence with tarsal anomalies
3. Treatment complicated by further shortening as the child matures – varies from amputation to tibialisation of fibula by complex reconstructive procedures

121b. HEMIMELIA FIBULA

4 Years - Male

- Brought with C/o. shortening, deformity of (L) leg with outward deviation of foot – since birth

History

- First born, non-consanguinous marriage, male baby of normal delivery.
- Noted to have short (L) leg at birth and absence of lateral 2 rays of foot
- Shortening progressively increased as the child grows, associated with bowing and skin dimpling
- No other H/o. deformity

O/E : Inspection

- Dysplasia of (L) leg (+) with anteromedial bowing and shortening
- Foot in equinovalgus with absent fourth and fifth rays

Palpation

- Single bone with anteromedial bow in medial aspect of (L) leg
- Lateral subluxation of (L) foot (+)

Measurement

- Shortening in Leg Segment +

Movements

- Knee – Flexion 0^0 - 60^0
- Ankle – Supple, passive movements possible

Investigations

- X-ray (L) Leg AP & Lat : Type I paraxial fibular hemimelia (L) - partial absence of fibula with absent fourth and fifth ray

Important Points

1. Hemimelia is defined as absence of large part of limb which can be preaxial or postaxial
2. Congenital absence of fibula or preaxial fibular hemimelia is a more common lesion than tibial hemimelia
3. Described and classified into 4 types by Coventry and Johnson
4. Treatment is directed towards achieving a normal weight bearing position for the foot

122. OSTEOMYELITIS OF TIBIA & FIBULA

32 Years - Male

- C/o. pain, swelling and discharge from sinus in the lower end of (L) leg - past 4 months

History

- Alleged H/o. RTA 8 months back, treated initially by external fixators and then given a plaster slab
- Developed small sinus in the lower aspect of (L) leg following an episode of fever, swelling of leg
- From then on continues to have discharge with occasional bony chips from the sinus

O/E : Inspection

- Leg swollen with healed puckered scars with sinus discharging pus
- Diffuse swelling (+)
- Limb length discrepancy (+)

Palpation

- Tenderness ⊕, warmth ⊕
- Sinus fixed to underlying bone
- Abnormal mobility (+) at D/3 M/3 junction
- No distal neuro vascular deficit

Movements

Knee – Flexion	-	0^0 - 70^0
Extension	-	0^0
Ankle – Flexion	-	10^0
Extension	-	10^0

Measurement

- Decreased circumferential girth of 2 cm in (L) leg

Investigations

- X-ray (L) Leg AP – Diffuse osteopenia with E/o. sequestrum and involucrum
- Pus C/s : Staph aureus and pseudomonas

Important Points

1. Chronic osteomyelitis is most often due to trauma and generally has a protracted, indolent clinical course
2. The principles of management are surgical debridement, skeletal stabilisation, dead space management, soft tissue coverage and antibiotic therapy

123. MALUNITED FRACTURE DISLOCATION - ANKLE

22 Years - Male

- C/o. pain, deformity and limp of (L) foot for past 1 year

History

- Sustained injury to (L) foot, by a fall 1 year back
- Treated natively in the form of bandages and splint
- Has pain on bearing weight and walking since then
- Noticed to have prominence of (L) lateral border of foot
- Pain has progressed now, causing a limp on walking
- No H/o. constitutional symptoms / deformity of other joints

O/E (L) Foot

Inspection

- Gross atrophy of (L) foot (+)
- Prominent lateral malleolus (+) with broadening of hind foot
- Flat foot (+)
- No swelling, sinus with discharge

Palpation

- Tenderness (+) on medial malleolus
- Prominent lateral malleolus with thickening
- Medial malleolus lower than lateral malleolus
- Loss of arches of foot
- No DNVD

Measurement

- 1.5 cm shortening of the calcaneo malleolar distance when compared with other foot

Movement

Inversion	-	nil	Dorsiflexion	–	0^0 - 15^0
Eversion	-	nil	Plantarflexion	–	0^0 – 20^0

- X-ray (L) ankle AP – Lat : Tibiofibular diastasis with lateral subluxation of (L) subtalar joint

Important Points

1. Major cause of malunited ankle fracture is shortened, externally rotated fibula, resulting from either operative or non-operative treatment
2. Radiograph – increased valgus talar tilt
3. Treatment – osteotomy, lengthening by distraction and bone grafting with the aim to restore the normal ankle mortice

124. AVASCULAR NECROSIS OF TALUS

32 Years - Male

- C/o. pain, swelling around the ankle and inability to bear weight for past 6 months

History

- Sustained trauma to (L) ankle 6 months back, treated natively with plasters / splints for 4 months
- Now has pain and swelling of (L) ankle, associated with inability to bear weight
- Movements of the ankle are painfully limited

O/E

Inspection

- Gross swelling of the (L) ankle (+)
- Fullness (+) in the sinus tarsi region
- No scars or sinuses

Palpation

- Tenderness + in sinus tarsi
- Ankle movements – terminally restricted due to pain
- No DNVD

X-Ray

- (L) Ankle AP & Lat : Sclerosis of the talar body (+); undisplaced # of the talar body (+)

Important Points

1. Talus is the second most common of the tarsal bones to sustain a fracture
2. Occur due to indirect violence
3. Types : # Neck (30%), Body (20%), Head (10%)
4. AVN of talus occurs more after fracture of body than neck and head – in displaced fractures
5. Viability is assessed by Hawkin's sign – if there is subchondral atrophy in the dome of talus, it excludes avascualr necrosis
6. Fractures usually unite even in presence of AVN
7. Management – ranges from strict non weight bearing till revascularisation or arthrodesis / total joint replacement

125. MALUNITED FRACTURE - CALCANEUM

34 Years - Male

- C/o. pain in (R) foot following a injury due to fall past 6 months

History

- Sustained injury to (R) foot due to a fall
- Native treatment with bandages
- Now has pain in (R) foot, more on walking and weight bearing
- No H/o. constitutional symptoms / pain in any other joint

O/E (R) Foot

Inspection

- Broadening of (R) heel when compared to (L)
- No scars, sinus, flattening of arches (+)

Palpation

- Deep tenderness (+) in medial aspect of hindfoot
- Pain increased on movements of (R) foot

Measurement

- Broadening of (R) heel by 1 cm when compared to (L)

Movements

Ankle

Dorsiflexion – 0^0 - 40^0	Inversion	-	0^0 - 10^0 with pain
Plantarflexion – 0^0 – 30^0	Eversion	-	0^0 - 10^0

Investigations

- X-ray (R) foot AP – Increased tuber joint angle
- Discontinuity in the trabeculation of calcaneum with sclerosis (+)

Important Points

1. Intra articular # of the calcaneum, if treated by non-operative methods, may lead to malunion
2. There will be incongruity of the subtalar joint
3. Bohler's angle and the crucial angle of Gissane will be disturbed
4. May lead to osteoarthrosis, impingement of tendons and nerve entrapment
5. Most cases are treated non operatively with physiotherapy
6. Severe pain requires surgical intervention

126. SUBTALAR ARTHRITIS

46 Years - Male

- Manual labourer C/o. pain, and inability to bear weight and walk in (R) foot – past 6 months

History

- Fall from height 1 year back, sustained injury to (R) foot 1 year back
- Treated by native plaster splintages for 4 months
- Now for past 6 months has pain in (R) foot which has gradually progressed to the level of inability to bear weight and walk
- No H/o. constitutional symptoms / other joint pains

O/E

Inspection : (R) Foot

- Loss of medial arch of foot (+)
- Reduction in the height of the foot (+)
- No sinus / discharges

Palpation

- Tenderness (+) in sinus tarsi region
- Crepitus on movements (+)
- No DNVD

Movements

- Ankle DF 0 – 10 degree
- PF 0 – 10 degree – Painful at extremes

Measurements

(R) foot 1) Reduction in height of (R) foot (malleolar tip to ground 1 cm)
2) Broadening in the heel of (R) foot (1 cm) where compared with (L) foot

Investigations

- X-Ray (R) foot AP – Oblique - malunited intraarticular calcaneal #
- Sclerosis of the subtalar joint (+)

Important Points

1. Intraarticular fractures of calcaneum, which is not accurately reduced by operative/ non operative methods, leads to incongruity of joint, 2^0 osteoarthritis
2. Diagnosed clinically by decreased and painful subtalar range of motion and by sclerosis with arthritic changes of subtalar joint radiologically
3. Managed initially with conservative means, such as rest, shoe modifications and anti-inflammatory drugs
4. If this fails, subtalar or triple arthrodesis may be contemplated

127. TB - ANKLE

45 Years - Male

- C/o. swelling pain and limp of (L) foot for past 3 months aggravated for past 3 weeks

History

- Developed pain of (L) foot, more on walking, gradually progressive, associated with swelling
- Now has limp and stiffness on walking
- Known case of koch's disease treated with ATT 8 months
- No H/o. trauma / constitutional symptoms

O/E : (L) Foot

Inspection

- Swelling (+) in front of the joint, around the malleoli and either side of tendoachilles
- No scars or sinuses with discharge

Palpation

- Warmth (+), tenderness (+), diffuse swelling ankle joint +
- Limitation of all movements of ankle (+)
- Deep tenderness over calcaneum (+)

Investigation

- X-ray (L) foot AP – Oblique :
  a. Central sequestrum of calcaneum
  b. Diffuse osteoporosis (+)
- **Biopsy :** Features of caseating granuloma suggestive of tubuerculosis

Treatment

- Conservative with ATT and immobilization
- Early stages and in children – respond well
- Late stages and in fibrous ankylosis – requires arthrodesis

Important Points

1. TB ankle – relatively uncommon
2. Earlier lesion – focus of erosion in tarsal bones
3. Types : i. extra articular type
   ii. synovial type
   iii. intra articular type
4. Late stages – abscess and sinus common
5. Deformity – early – dorsiflexion of ankle joint; late – plantar flexion with equinovalgus

128. SEPTIC ARTHRITIS - ANKLE

32 Years - Female

- A diabetic. C/o. pain and swelling (L) ankle – past 2 days with fever

History

- Pain and Swelling (L) ankle
- Throbbing type, increasing in severity
- Associated with high grade fever
- H/o. some injection into (L) foot for chronic pain of (L) foot 4 days back
- No past H/o. illness other than chronic pain of (L) foot for which she is under treatment in a nearby hospital.

O/E

- Fever (+), Hydration – poor

L/E

(L) Ankle: Inspection

- Diffuse swelling (+), redness (+), no sinus

Palpation

- Warmth (+)
- Extreme tenderness
- Bony landmarks could not be palpated
- Movements of ankle are extremely painful
- Distal pulses (+)

Movements

- Restricted due to pain

Investigation

- X-ray (L) ankle AP – Lat – No abnormality other than reduced joint space

Diagnostic Aspiration

- Pus (+), C/s (grew staphylococcus aureus)

Important Points

1. Any joint can be infected by (i). Direct invasion – wound / injection (ii) direct spread from adjacent sites (iii) Haematogenous spread
2. Most common organism is staphylococcus
3. Predisposing condition include RA, intravenous drug abuse and immunocompromised states
4. Treatment principles include general supportive care, splintage, antibiotics and drainage

129. ANKYLOSIS ANKLE - TUBERCULOSIS

42 Years - Male

- C/o. pain and inability to use left foot past 11 months

History

- Apparently normal 11 months back
- Developed pain and swelling in (L) ankle, 11 months back, insidious in onset
- Associated with evening rise of temperature / malaise
- Swelling was gradually increasing in size which broke out to discharge pus and sandy material. Was treated natively, following which he had difficulty in using left ankle
- Now he is unable to flex or extend his left foot
- No H/o. trauma / swelling or other joints

O/E Left Ankle

Inspection

- Atrophic and thin left leg than right
- Foot in 10^0plantarflexion, healed scar + in lat. aspect just below the malleolus

Palpation

- No warmth / tenderness
- No Crepitus
- Synovial thickening +

Movement

- Foot fixed in 10^0 plantarflexion – further flexion or dorsiflexion not possible and painful
- Inversion - 10^0. Eversion - 15^0
- Left subtalarjoint +

Measurement

- No shortening
- Decrease in the nutrition of (L) leg muscles +

Investigation

- X-ray left ankle - AP & Lat
  a) loss of joint space with bone erosion
  b) Generalised diffuse rarefaction of tarsal bones +

Important Points

1. No joint is immune to tuberculosis
2. In neglected cases, the disease progresses to involve the articular cartilage and bone, joint is destroyed and fibrous ankylosis is the natural outcome
3. Fusion of the joint usually by surgery becomes the ultimate objective

130. ANKYLOSIS ANKLE - POST TRAUMATIC

40 Years - Male

Pain and immobility of (Rt) ankle past 11 months

History

- Sustained a trauma 11 months to the Rt foot, treated natively in the form of splintages for 3 months
- After the treatment, he was able to walk but with pain
- Pain was gradually progressive, limiting his daily activities, associated with swelling
- Now has severe pain with immobility of Rt ankle with limp

Rt Ankle

O/E. Inspection

- Foot in 10^0 - further flexion of 5^0
- Inversion and eversion possible with pain

Investigation

- X-ray Rt ankle - AP / Lat
  a) Healed malunited ankle mortice fracture with 2^0 OA
  b) Decreased joint space with subchondral sclerosis

Diagnosis

- Post traumatic ankylosis of Rt ankle

Important Points

1. Trauma is the commonest cause of 2^0 OA of ankle
2. Painful arthritis of ankle – surgical treatment is the mainstay – surgical ankylosis or in select cases, joint replacement

131. CONGENITAL VERTICAL TALUS

6 Years - Female

- Was brought with C/o. deformity of (R) foot since birth

History

- First born, full term, non-consanguinous baby, normal delivery
- Noticed to have deformed (R) foot – loss of arch of foot with bulge in the sole of (R) foot, which persisted with growth
- This deformity makes the child to walk with awkward gait and poor balance
- No H/o. any other deformity or trauma

O/E

Inspection (R) Foot

- Loss of concavity of sole (+)
- Equinovalgus heel with adduction and dorsiflexion of fore foot
- Deep crease (+) below lateral malleolus
- Relative lengthening of the medial column of the foot (+)

Palpation

- Head of talus palpable medially (+)
- Rigid foot – with no movements

Measurements

- Relative lengthening of the medial column of the (R) foot when compared with other side

Investigations

- **X-ray** (R) foot AP / Lat
  a) Talus in line with the long axis of tibia
  b) Distorted talar shape (+)
  c) Navicular dislocation (+)

Important Points

1. Congenital vertical talus or convex pes valgus essentially consists of plantar and medial dislocation of the talo caleaneonavicular joint, together with the contracture of the surrounding soft tissues
2. It is considered as a developmental anomaly, with probable arrest in development at 2nd month of IUL
3. Clinically presents with "rocker bottom foot" with awkward gait
4. X-Ray (AP) – increased angle between Os calcis and talus
5. (Lat) – Talus in line with long axis of tibia
6. Early management – reducing and retaining the talocalcaneonavicular joint by non-operative means
7. Operative intervention ranges from soft tissue releases and bony resections in single/ double planes

132. RUPTURED TENDO ACHILLES

46 Years - Male

- C/o. difficulty in running and in descending stairs while using left foot past 1 week

History

- Apparently normal 1 week back
- Gives a H/o. sudden painful snap of the (L) heel 1 week back, while at work
- The pain subsided following which the patient noticed a small swelling in the back of (L) heel associated with difficulty in running and descending stairs using (L) foot
- Known case of diabetes on treatment

O/E : Inspection

- No wounds / scars in (L) heel / foot

Palpation

- Gap felt in the Tendo Achilles, 4 cm above its insertion
- Non-tender
- Tip-toe test positive
- Thompson – "calf – squeeze test" positive
- Brien "needle " test positive

Movements

- Ankle (L) PF – 20^0, DF – 20^0. Ankle (R) PF – 40^0, DF - 20^0

Investigations

- X-Ray (L) foot – AP – Lat: No bony injury
- USG (L) Heel – defect (+) in tendo achilles (L)
- MRI (L) Foot: complete rupture of tendo Achilles 5 cm above its insertion

Important Points

1. Ruptured TA, usually presents late since the pain subsides and some active PF is maintained by TP, FDL and FHL
2. Usually rupture 2 to 6 cm proximal to its insertion in calcaneum, the site of least vascularity
3. The weakness of plantar flexion is constant finding with positive tip-toe, Thompson and Brien needle tests
4. In radiograph, Kager's Triangle and Toggar angle may be useful. Investigation of choice is MRI
5. Conservative methods for partial rupture with plaster casts in knee 40^0 flexion and in ankle equinus are usually successful
6. Fresh cases of complete rupture require immediate surgical repair and plaster cast.
7. Neglected cases require fascia lata graft or gastrocplasty techniques

133. VARUS / VALGUS / CAVUS DEFORMITY OF FOOT

12 Years - Female

- C/o. weakness and deformity of Rt leg and foot past 8 years

History

- H/o. fever followed by weakness at the age of 1 year
- Weakness of Rt leg gradually improved to attain the present strength
- Deformity of the Rt foot – foot incurved & flexed downwards – 8 years duration – progressive
- Birth history and developmental milestones normal

O/E : Inspection

- Rt. Lower Limb
- Hip, knee neutral, ankle in equinus, with hollowing of sole
- Wasting of leg muscles especially in anterior compartment
- Right leg appears shortened

Palpation

- No fixed deformity
- Neurological exam Rt leg :

Dorsiflexors	-	2/5
Plantar flexors	-	5/5
Invertors	-	0/5 (for valgus)
Evertors	-	5/5
FHL / EHL	-	2/5

Movements

		Active	*Passive*
(i) Rt Ankle	DF	0^0	0^0 - 30^0
	PF	0^0 - 40^0	0^0 - 40^0
(ii) Subtalar Joint			
	Inversion	0^0	0 - 20^0
	Eversion	0^0 – 10^0	0-10^0

- X-ray Rt Knee: No bony changes / deformity

Diagnosis

- APM III with equino valgus deformity with cavus

134. TB TARSAL BONES

12 Years - Female

- Came with C/o. pain and swelling of (Lt) foot– past 3 months

History

- C/o. pain and swelling of (Lt) foot for the past 6 months, aggravated for the past 3 months, with limp
- Swelling (+) just below ankle joint, increases on walking and weight bearing
- No H/o. fever / trauma / constitutional symptoms
- Her father is a known patient of Koch's, on treatment

O/E - Inspection (L) Foot

- 3 x 4 cm diffuse swelling (+) just below (L) ankle
- No sinus / scars
- Swelling more pronounced on plantar flexion

Palpation

- Boggy – firm effusion (swelling) overlying navicular and cuneiform
- Tenderness ⊕ over navicular bone
- No DNVD

Movements

- Ankle – plantar and dorsiflexion – normal
- Adduction and abduction – restricted with pain

Investigation

1. X-Ray (Foot) AP and Lat – Diffuse demineralization of the ankle tarsal bones (+)
   - 2 lesions
     - one in base of I metatarsal
     - other in navicular bone (+)
   - No periosteal reaction / cortical discontinuity
2. ESR – 50mm / hr
3. Mantoux – positive

Important Points

1. TB of ankle and foot – metatarsals are affected in infants
2. Tarsal bones in children, talus in adolscents
3. Synovial soft tissue infection that spreads to involve the osseous structure is the most common form
4. Localised quiescent central bone lesion – affecting the soft tissue late is the other form
5. The order of frequency is calcaneum, first metatarsal, talus and cuneiform
6. Treatment may be conservative with ATT and plaster immobilization (or) surgical – excision with or without bone grafting

135. CTEV

4 Months - Male Baby

- Brought with C/o. B/L. deformity of foot – since birth

History

- Ist born male child to non-consanguinous parents
- Normal delivery and perinatal period
- Noticed to have deformity in both feet – incurving since birth
- Corrected on treatment with plaster cast moulding

O/E

Inspection

- B/L equinovarus deformity of ankle with adduction of fore foot
- The foot is small, atrophic with a deep crease in the medial border
- Lateral malleolus is prominent
- No scars / sinuses

Palpation

- Foot is supple and all three deformities are passively correctable partially
- No bony defects in the leg / foot
- Spine, hip and back normal

Movements

- Complete dorsiflexion is met with resistance

Investigations

- X-ray AP : (in 30^0 flexion) : Talocalcaneal angle of Kite 50^0 (normal $20^0 - 40^0$)
  Lat (in forced dorsiflexion) : Talocalcaneal angle 14^0

Important Points

1. CTEV is common in boys than girls; 50% bilateral, exact cause is not known – could be genetic defect, neuromuscular (mylomeningocele / AMC) or osteogenic (hemimelia)
2. Principles of treatment
   i) Should begin in first few weeks
   ii) Different components corrected in proper sequence - adduction, varus and equinus in order
   iii) Forcible manipulation should be avoided
3. Operative treatment includes soft tissue procedures alone or in combination with bony procedure depending age of presentation and severity

136. FLAT FOOT

10 Years - Male

- Brought with C/o. pain in both feet with easy fatiguability since childhood

History

- Noticed to have flat foot with loss of normal curvatures since the child started walking
- Now has fatigue and pain especially on prolonged standing or walking which has become progressively worse
- No family H/o. similar complaints

O/E Inspection

- B/L loss of medial longitudinal arches of foot on weight bearing
- On raising the heel off the ground, the arch appear
- No atrophy / deformity

Palpation

- No swelling / tenderness
- Valgus of the heel (+)
- Tight heel (+) on dorsiflexion

Gait

- Gait is clumsy with toe raise without toe-off and push-off phase

Investigation

X-Ray (Standing) – AP & Lateral :

- Flattening of the longitudinal arch on lateral view with tilting of talus and break in talo navicular joint (+)

Important Points

1. Flat foot refers to loss of normal medial longitudinal arch
2. It may be congenital (hypermobile, rigid) or acquired (osseous, muscle imbalance, static or arthritic)
3. Pathology-valgus posture of heel with subluxation of subtalar joint with talar tilt
4. Management is controversial – ranges from conservative with various forms of arch supports to surgical osteotomy and muscle / tendon transfers)

137. PES CAVUS

8 Years - Male

- Brought with C/o. bilateral hollowing of the foot, since childhood

History

- First born, non-consanguinous parents, normal full term delivery
- Normal developmental milestones
- Noticed to have more prominent hollowing of bilateral feet
- Has lead to clumsy gait and difficulty in squatting / running
- No H/o. trauma
- No family H/o. similar complaints
- No H/o. any significant deformity

O/E

Inspection : (Both Feet) in prone position:

- Inversion of B/L heel (+) with equinus of B/L ankle joint (+)
- On weight bearing – prominent medial longitudinal arch (+)
- Clawing of toes (+)
- No other swellings / callosities

Palpation

- Moderate fixed equinus deformity of both ankles (+)
- Rigid hind foot varus (+) [Coleman test positive]
- No DNVD
- Regional examination and spinal examination – normal

Radiography

- Weight bearing AP and Lat view of both foot :
  a) Hiff's angle < 110^0
  b) Merry's angle < 45^0

Important Points

1. Pes cavus (or) claw foot (or) pes arcuatus is a complex deformity of childhood, characterized by excessively high longitudinal arches
2. Exact pathogenesis is unknown, causes include diastematomyelia, spinal dysraphism, poliomyelitis, spastic paralysis, muscular dystrophy, compartmental syndrome and idiopathic causes
3. Types include pes cavus, pes cavovarus and calcaneo cavus deformity
4. Coleman's test, Hiff's angle and Merry's angle are useful for evaluation
5. Symptomatic feet requires non-operative / operative treatment (soft tissue or bony procedure)

138. MYCETOMA FOOT

32 Years - Male

- Farmer by occupation C/o. swelling, pain and discharge from multiple sinuses in (L) foot – past 6 months

History

- Apparently normal till 6 months back
- Developed a swelling (L) foot following a thorn prick
- Gradually increased and burst to form a sinus discharging foul smelling purulent granules
- H/o. repeated swellings of (L) foot – associated with pain and fever – with multiple sinuses discharging yellow granules (+)
- No H/o. any other swelling / trauma

O/E (L) Foot

Inspection

- Gross swelling, dislocation of (L) hind foot +, multiple sinus (+) in medial, posterior, lateral and inferior aspect of (L) hind foot
- Yellowish granular foul smelling discharge (+)

Palpation

- Not warm
- Tenderness (+)
- Active discharge from sinuses (+)

Movements

- Movements of (L) ankle and foot – restricted

Investigation

- X-ray (L) foot AP / Oblique : Osteopenia (+), Osteolytic lesions (+) in tarsal bones and calcaneum
- E/o. Arthritis of tarsal bones +
- Soft tissue swelling
- **Microscopy:** "Spelndore – Hoeppli" phenomenon (+)

Important Points

1. It is a chronic fungal infection seen in Northern Africa and Indian subcontinent
2. Bones and joints are infected, local abscess form and break through the skin as multiple sinuses
3. Xray shows multiple bone cavities and progressive bone destruction
4. Organism can be identified in sinus discharge or in tissue biopsies
5. Wide debridement and i.v. amphotericin B is advocated

139. HALLUX VALGUS

28 Years - Male

- C/o. pain and deformity of the base of both great toes

History

- Noticed outward curving deformity of both great toes for past 3 years
- Now has pain and swelling at the base of both great toes
- Asso. with difficulty in walking after wearing shoes
- No H/o. trauma / constitutional symptom

O/E

Inspection

- Splaying of B/L fore foot (+) with prominent head of first metatarsal
- Great toe is deviated laterally and pronated
- Redness (+) in base of great toe

Palpation

- Tenderness (+) in base of both great toe
- ROM of great toe – restricted and painful
- No callosities / sinuses

Measurement

- Bilateral Hallux axis deviation > 15^0(+)

Movements

- Great toe – painful & restricted
- Ankle – normal

Investigation:

Radiographs:

- Angle between long axis of proximal phalanx and Ist metatarsal > 15^0
- C/o. Osteoarthritis of MTP joint of hallux (+)

Important Points

1. Hallux Valgus is a complex deformity of forefoot with lateral deviation of great toe and varying degrees of varus of the Ist metatarsal
2. Etiology is multifactorial – pointed narrow shoes, metatarsus primum varus, muscular imbalance and hereditary
3. Pain may be due to bunion buritus, OA, or callosities
4. Divided into mild (<20^0), moderate (20 - 40^0) and severe (>40^0) valgus by Mann et al.
5. Mild and early cases can be treated conservatively
6. Wide range of surgical techniques are available for severe and symptomatic hallux valgus

140. METATARSALGIA

32 Years - Male

- C/o. pain in (L) fore foot for the past 4 months

History

- Apparently normal till, 4 months back, developed pain beneath the (L) fore foot, which was gradually progressive
- More on weight bearing and walking
- No H/o. trauma / constitutional symptoms

O/E

- (L) foot inspection :-
- Dorsal edema (+)
- Atrophy of the intrinsic muscles between toes (+)
- Callosities (+) over 3rd, 4th metatasal head (+)

Palpation

- Tenderness (+) on AP compression, relieved by lateral compression
- Flat foot (+) on bearing weight
- No DNVD

Investigations

- Radiograph : (L) foot AP - Oblique : No bony changes
- Tc 99m bone scan : Normal
- RA Factor : Negative, CRP – Negative

Important Points

1. Metatarsalgia is a general term used to designate pain under the fore foot
2. It may be neurogenic, traumatic, inflammatory, and biomechanical and accordingly classifed as primary or secondary
3. Investigation should be directed to eliminate secondary inflammatory/neurogenic causes
4. Treatment should be tailored according to the cause and needs of patients and includes conservative as well as operative treatment

141. DORSAL BUNION

28 Years - Male

- C/o. swelling and pain on the dorsum of the right great toe – past 4 months

History

- Swelling noticed in dorsum of (Right) great toe, gradually increasing in size
- Initially present only on walking and weight bearing, now present at rest
- Known case of post polio residual paralysis of (Right) Leg

O/E

Inspection

- 2 x 1 cm swelling (+) in the dorsal aspect of Ist metatarsal
- No sinus / discharge
- More prominent on weight bearing

Palpation

- Tenderness +
- Weakness of the P.longus, P.brevis of (R) foot (+)
- Weakness of plantarflexion of foot (+)

Movement

- Fixed plantar flexion of (R) great toe (+)

Important Points

1. Dorsal bunion characterized by dorsiflexion of the first metatarsal and plantar flexion of great toe
2. Etiology is muscle imbalance – unopposed action of tibialis anterior (or) flexors of great toe
3. Leads to formation of painful bursa
4. Treatment includes muscle transfer to restore the balance and fusion of metatarso cuneiform and metatarso phalangeal joints

142. TROPHIC ULCER FOOT

42 Years - Male

- C/o. non-healing ulcer on the ball of (R) great toe for past 6 months

History

- Known diabetic on oral hypoglycemic drugs, sustained a thorn prick 6 months back, which lead to formation of ulcer
- Underwent a surgical procedure with skin grafting which failed 4 months back
- No H/o. significant trauma / constitutional symptoms

O/E Inspection

- 4 x 3 cm ulcer with unhealthy granulation tissue in the ball of great toe (+)
- Callosities (+) in other toes (+)
- No sinuses / discharge

Palpation

- Not warm / tender
- Peripheral pulses are felt
- Bleeding (+) on palpating base of granulation

Movements

- Ankle movements are full
- Fore foot – adduction / abduction – restricted

Investigation

- Bacterial C/s – Staph aureus grown
- X-Ray (R) foot AP and Lateral – NAD

Important Points

1. Trophic ulcer – is term given for neuropathic, nutritionless ulcer usually found on the weight bearing areas of foot
2. Treatment includes the management of underlying systemic cause, local dressing and soft tissue cover with immobilization
3. Causes include diabetes, leprosy, nerve injury and transverse myelitis

143. LOBSTER FOOT

4 Years - Male

- Brought with C/o. deformity of B/L foot (foot with 2 large toes) since birth

History

- 2nd born, Fullterm normal vaginal delivery to non-consanguinous parents
- Noticed to have bilateral foot deformity with only two abnormal and large toes (digits)
- No H/o. other associated congenital deformity

Palpation and Movements

- Functionally, movements are possible though restricted
- Joints are supple
- X-ray B/L foot - AP / Oblique : B/L IInd, IIIrd metatarsals are absent with Abnormal tarsal bones

Diagnosis

- Bilateral partial adactyly

Important Points

1. Lobster foot is an anomaly with single defect
2. The deformity varies in degree and type
3. The first and fifth ray are usually present
4. Classified on the basis of number of metatarsal bones
5. Surgery is aimed to improve function and appearance through various soft tissue and bony procedures

144. HALLUX RIGIDUS

20 Years- Female

- Athlete, C/o. pain and stiffness of both great toes for past 3 months

History

- Had intermittent acute bouts of pain of both great toes, especially after intensive exercises
- Now has chronic continuous pain of both great toes associated with stiffness, more on jumping and while wearing high heels
- No H/o. trauma / constitutional symptoms
- Also has uneven wear of shoes on lateral border

O/E Inspection

- Prominent base of both great toes (+)
- Callosity with redness (+)
- On gait examination the forefoot is inverted during the stance phase

Palpation

- Tenderness (+), warmth (+) base of great toe
- Dorsiflexion of the Ist MTP joint is markedly reduced

Investigation

- X-ray B/L Foot AP : Narrowing of joint space with flattening of the head of Ist Metatarsal, Oblique : Osteophytes +
- S.Uric Acid : within normal limits

Important Points

1. Hallux rigidius is a condition causing stiffness of metatarso phalangeal joint of great toe, characterized by absence of dorsiflexion
2. Etiology is multifactorial – Osteochondritis dissecans of Ist metatarsum elevatus, flat foot, and repeated minor trauma
3. Conservative management – over correction under anaesthesia and walking cast in early cases
4. Majority of patients require operative intervention

145. BRACHIAL PLEXUS INJURY

26 Years - Male

- C/o. inability to use ® upper limb past 1 week following an accident

History

- Sustained an injury to ® shoulder and neck due to a motor vehicle accident by fall on to the shoulder
- Subsequently found his ® upper limb to be numb and functionless
- Could not move his ® arm voluntarily
- No H/o. pain / swelling other than occasional burning sensation of ® arm

O/E Inspection

- Arm by the side, (elbow in extension) and internally rotated, forearm in pronation
- Abrasions (+) over the ® shoulder and neck
- No swellings

Palpation

- Tenderness (+) in neck and ® axilla
- No abnormal mobility / tenderness in the arm
- Passive movements of ® shoulder, elbow and hand are full
- No active movements possible
- Numbness (+) in C5 to T1 dermatomes
- Distal pulses (+)

Movements

- No active movements in ® Shoulder, ® Elbow, ® Hand

X-Ray ® Shoulder and Chest (AP)

- No bony injury

MRI Spine

- E/o.Preganglionic root avulsion of C5 to T1 – pseudomeningocele sign (+)

Important Points

1. The brachial plexus is formed by the confluence of nerve roots from C5 to T1
2. It is vulnerable to injury by RTA / stab injuries
3. The injury may affect any level or several levels within the plexus, often involving a mixture of nerve roots, trunks
4. Preganglionic are irrepairable lesions (root – avulsions)
5. Post ganglionic lesions may either recover (axonotemesis) or may be amenable to repair

146. ERB'S PALSY OF UPPER LIMB

3 Weeks - Male baby

- Informant: Mother. C/o. deformity in the Rt. upper limb since birth

History

- H/o. forceps delivery 3 weeks ago

Inspection

- Attitude of Right upper limb: Arm hangs by the side with shoulder in internal rotation, elbow in extension and forearm pronated with the palm facing backwards. (IR by lattismus dorsi/sternal head of pectoralis major, elbow extension by triceps, Forearm pronation by pronator quadratus)
- Absence of Moro embrace reflex
- Mild wasting of deltoid, supraspinatus present

Palpation

- Temperature: Right Upper limb is cold compared to Left Upper Limb
- Deltoid on right side is softer, flabbier, not contracting
- Sensation: loss of sensation on the lateral aspect of arm, forearm and thumb

Movements

- Finger movements : Active finger movements present and full

Passive Movements

- External rotation of shoulder and flexion of elbow are present initially, later lost due to contracture

Important Points

1. Occurs usually when the labour is complicated by obstetrical difficulties which necessitates forcible manipulation, hence forms a part of the spectrum of "obstetrical paralysis"
2. Erb-Duchennes or upper adducted arm type of obstetrical paralysis results due to downward traction exerted on the adducted arm, with the shoulder forcibly separated from the neck
3. C5and C6 roots are overstretched. C7 may or may not. Muscles affected by palsy are deltoid, biceps
4. Soon afterwards the affected arm is seen hanging loosely by the side of the body, with the forearm pronated & elbow slightly flexed. The child is unable to abduct the arm
5. On diagnosis, the child should have the involved extremity abducted to 90 degree flexed at the elbow to 90degree and this should be maintained. Before going home, child should be fitted with a brace to maintain the position with mother being taught to carry out a passive range of full abduction at the shoulder
6. If conservative measures fail, surgical options may be tried

147. KLUMPKE'S PARALYSIS

28 Years

- Came with C/o. incurving of fingers with difficulty in using Rt hand past 2 months

History

- Sustained an injury due to RTA, to the Rt shoulder following which he has difficulty in using Rt hand
- Associated with clawing of fingers and numbness in the inner aspect of the forearm and hand
- H/o. native treatment in the form of massages +
- No H/o. constitutional symptoms

O/E : L-Arm

Inspection

- Arm by the side of body, forearm midprone, wrist in extension, with clawing of all fingers, and thumb in adduction
- Wasting of forearm and intrinsic muscles of the hand +
- No scars / external injuries

Palpation

- Decreased tone of forearm muscles
- Movements at joints are supple.
- Decreased sensation in C_8 and T_1 dermatomes
- Froment's sign +
- Card test, Pen test and clasp test positive

Diagnosis

- Cervical plexus – lower cord injury with claw hand deformity

Important Points

1. Occurs due to birth injury or trauma causing hyper abduction of shoulder
2. The C_8 T_1 nerve roots are involved with claw hand deformity
3. Treatment is aimed at blocking the hyper extension of MP joints to give useful function to hand

148. RADIAL NERVE PALSY - WRIST DROP

40 Years - Male

- Came to the OP with C/o. inability to extend the Rt wrist dorsally since the previous night. Numbness in the dorsum of Rt hand+
- H/o. of sleeping with arm hanging down the chair end

O/E : Inspection

- Arm by side of body, elbow held in flexion finger and thumb drop (+)
- Reduced tone of forearm extensor muscles (+)
- No scars / sinuses / swellings

Palpation

- Tingling sensation + on tapping along the posterior aspect of humerus
- Wrist dorsiflexion lost. Thumb extension absent
- Contraction of brachioradialis (flexion of elbow against of resistance in mid prone position) - not felt
- Sensory blunting along the lateral border of forearm and dorsum of hand between 1st and 2nd metarcarpal +
- Elbow extension absent

Investigation

X – RAY Right Arm – AP, Lat

- Showed no obvious radiological abnormality
- Nerve conduction study: delay noted

Important Points

1. Any compression if of prolonged duration on the radial nerve leads to neuropraxia of radial nerve
2. In high radial nerve palsy sensory branches are involved as in this case
3. Radial nerve : A branch of posterior cord of brachial plexus, lies posterior to 3rd part of axillary artery
4. Before entering the spiral groove it gives branches to long, lateral and medial head of triceps and posterior cutaneous nerve of arm
5. In the groove it gives branches to anconeus, posterior cutaneous nerve of forearm and lower lateral cutaneous nerve of arm
6. After piercing lateral intermuscular septum. It supplies brachialis, extensor carpi radialislongus/brevis, before piercing the supinator gives superficial sensory branch of radial nerve
7. After piercing supinator it supplies all the extensors of wrist and metatarso phalangeal joints

149. ULNAR NERVE LESION - CLAW HAND

25 Years - Male

- Presented to the OP with H/o. cut injury to Lt forearm, following which he had numbness in Lt little & ring fingers and inability to hold objects in hand. The cut injury was treated by suturing elsewhere, details not available

Examination

Inspection

- Sutured wound over Lt forearm lateral aspect. Flexion of ring and little fingers +

Palpation

- Sensory blunting in lateral 1 1/2 fingers +
- Froment's sign + ve (Inability to adduct the thumb)
- Card test showed decreased power in palmar and dorsal interossei
- Extension of finger IP joints lost. MCP extension retained
- Distal pluses +

Discussion

1. Ulnar nerve – also called Musician's nerve
2. Supply all intrinsic muscles of hand – except thenar muscles.
3. Ulnar claw hand results due to palsy
4. Ulnar Paradox – Higher the lesion, less pronounced the deformity
5. Clinical tests include
   i. Benedict attitude
   ii. Ogawa test |
   iii. Card test |– for interossei

150. COMMON PERONEAL NERVE PALSY

32 Years - Male

- C/o. inability to dorsiflex his Rt foot and decreased sensation for past 1 week

History

- Sustained injury to Rt leg while at work
- Treated with native massage and splint with wooden sticks for the Rt leg for 3 days, following which he noticed this inability
- Associated with pain Rt leg and shock-like sensation down the leg

O/E : Rt Leg

Inspection

- Swelling of Rt leg when compared to left
- Ankle in plantar flexion
- No external injuries / scars / swelling

Palpation

- Tenderness + over the Rt knee and fibular head
- No abnormal mobility / instability of knee
- Absent sensation in outer half of leg and dorsum of foot
- Tinel's sign – ve

Movements

- Plantarflexion 10^0 - 30^0 Inversion : 0-30^0
- Dorsiflexion 0^0 Eversion : 0^0

GAIT : High stepping gait

X-ray Rt leg with knee - AP / Lat : No bony injury

Diagnosis

- Common peroneal nerve injury

Important Points

1. The CPN is often damaged at the level of fibular neck by severe traction when knee is forced in varus or by pressure from a splint / cast or direct injury
2. The patient has foot drop and can neither dorsiflex nor evert the foot
3. Direct injuries should be explored and repaired or grafted whenever possible
4. If there is no recovery, the disability may be minimised by tibialis posterior tendon transfer or foot stabilisation

151. APM-III HIP : FLEXION / ABDUCTION CONTRACTURE

15 Years - Male

- C/o. difficulty in using the (R) limb since childhood and deformity of (R) limb – 2 years

H/o. Presenting Illness

- H/o. Fever at the age of 6 months, following which he developed weakness of right lower limb
- Initially weakness was severe, gradually weakness improved, to attain the present power. Deformity of (R) limb – 2 years duration, progressive no remissions and exacerbation

Immunisation history

- Not very clear
- Milestones – normal

Birth History

- Full term normal delivery with no problems in any trimester
- O/E Patient moderately built and nourished

L/E : (Rt) hip

Inspection

- Exaggerated lumbar lordosis
- (R) ASIS at a lower level
- Wasting of thigh & calf muscles present
- Apparent shortening of (R) limb
- Attitude of (R) hip : flexion, abduction & external rotation

Palpation

- Findings of inspection confirmed

Deformity

- Fixed flexion deformity – 30^0
- Fixed abduction deformity – 20^0

Movements

	R		
Flexion	$30^0 – 140^0$	-	Both Active and Passive
Abduction	$20^0 – 45^0$	-	Passive
Rotation	full	-	passive

Ober's test for IT band contracture – positive

No abnormal movements in the form of telescopy

Measurements

- Apparent shortening – 2 cm
- Real shortening – 4 cm

Gait

- Inability to bear weight on (R) limb; unstable aided gait

Neurological Examination

	R	L
Nutrition	-	+
Tone	Hypotonia	Normal
Power		
Hip flexion	4/5	5/5
Extension	0/5	5/5
Abduction	0/5	5/5
Adduction	0/5	5/5
Sensory	N	N

Diagnosis

- APM III with flexion abduction contracture of (R) hip

Important Points

1. Flexion abduction deformity may arise as an aftermath of acute stage contracture or may arise like as a flexion – abduction deformity when the hip flexors are the only remaining active muscles at the hip. The hip tends to fall into abduction and lateral rotation when the child is supine, leading to contracture of fasia lata and persistence of deformity
2. Mild deformities corrected by open division of fascia lata or lateral intermuscular septum in the thigh
3. If FFD is severe > 60^0 – soft tissue release with intertrochantric extension osteotomy of the femur is done

152. KNEE FLEXION CONTRACTURE / GENU RECURVATUM

10 Years - Male

- C/o. difficulty in using (R) limb – since childhood
- Deformity of (R) knee – 2 years

H/o Presenting Illness

- H/o. fever at the age of 6 months, following which he developed weakness of right lower limb
- Initially weakness was severe, gradually weakness improved to attain the present strength
- Deformity of (R) limb. 2 years duration, knee going in for flexion, progressive

Immunization History

- Not very clear

Milestones

- Normal

Birth History

- Full term normal delivery with no problems in any trimester
- O/E. Patient moderately built and nourished

L/E : (Rt) Lower Limb

- Attitude : flexion at the hip, flexion at the knee, equinus of the ankle
- Wasting of thigh and leg muscles present
- Exaggerated lumbar lordosis present
- (R) Limb appears shortened
- ASIS at the same level

Palpation

- Confirms the inspection findings

Deformity

- Fixed flexion deformity hip – 20^0 by Thomas Test
- Fixed flexion deformity at the knee – 30^0
- Fixed plantar flexion at the Ankle – 30^0

Movements

- Hip flexion 20^0 – 40^0 present
- Knee flexion 30^0 – 110^0 present
- Ankle PF 30^0 – 40^0 present
- Gait – hand to knee gait with fixed equinus deformity of foot

Neurological Examination

		R	L
Hip	Flexion	4/5	5/5
	Extension	0/5	5/5
	Abduction	4/5	5/5
	Adduction	4/5	5/5
Knee flexion		4/5	5/5
Extension		0/5	5/5
Ankle DF		0/5	5/5
PF		4/5	5/5

Diagnosis

- APM III with weakness of quadriceps and hip extensors leading to fixed flexion deformity of the knee

Genu Recurvatum

- Same history with child allowed premature weight bearing without a splint in a flail limb where locking is accomplished by hyperexetension of the knee

Examination

- (R) limb – Normal lordosis
- ASIS at same level with hypertension of knee on standing
- Ankle – normal
- Deformity : no fixed deformities

Movements

- Others normal. Knee hyperextension – 0^0 – 20^0
- Gait – recurvatum gait

Neurological Examination

		R
Hip		
	Flexion	5/5
	Extension	5/5
	Abduction	5/5
	Adduciton	5/5
Knee	Extension	0/5
	Flexion	5/5
Ankle DF		5/5
PF		5/5

Diagnosis APM-III with weakness of quadriceps producing genu recurvatum

Important Points

Genu recurvatum is produced by three mechanisms

1. Paralysis of quadriceps in the presence of strong hip extension and ankle plantar flexion. Knee stability is obtained by locking the knee back. If the soft tissues at the back of the knee do not stretch, but the force is transferred to the knee, epiphysial growth of the tibial condyle is affected - recurvatum develops
2. Second type of recurvatum may develop in a knee in which all the muscles are paralysed. The knee hyperextends from the relaxation of soft tissues and lengthening of hamstring tendons

   Rare mechanism, is found when quadriceps remains active in the presence of paralysis of the hamstrings

153. FOOT : VALGUS / VARUS / CAVUS / CLAW

10 Years - Male

- C/o. weakness of (R) lower limb since childhood. Deformity of (R) foot – 6 years

H/o. Presenting Illness

- H/o. fever at the age of 6 months following which he developed weakness of right foot
- Initially weakness was severe, gradually weakness improved to attain the present strength
- Deformity of (R) foot – 6 years duration, progressive

Immunization History

- Not very clear

Milestones

- Normal

Birth History

- Full term normal delivery with no problems in any trimster
- O/E. Patient moderately built and nourished

L/E : (Rt) Leg

- Hip, knee neutral, ankle in equinus, normal valgus at the subtalar joint
- Wasting of the leg muscles especially anterior compartment
- Right limb appears shortened

Deformity

- No fixed deformities

Movements

		Active	Passive
Right Ankle	DF	0^0	$0^0 - 30^0$
	PF	$0^0 - 40^0$	$0^0 - 40^0$
Subtalar	Inversion	0^0 - 20^0	0^0 - 20^0
	Eversion	0^0 - 10^0	$0^0 - 10^0$

Neurological Examination

	(Rt)
Dorsiflexion	2/5
Plantar flexion	5/5
Inversion	0/5
Eversion	5/5

Diagnosis

- APM III – weakness of invertors of foot producing valgus deformity of foot or with associated weakness producing equino valgus deformity

VARUS DEFORMITY

10 Years - Male - presenting with same history

- L/E. (R) leg
- Hip knee – neutral
- Ankle in equinus or normal
- Varus at the subtalar joint
- Right limb appears shortened

Deformities

- No fixed deformities

Movements		Active	Passive
Right Ankle	DF	0	$0^0 - 30^0$
	PF	$0^0 - 40^0$	$0^0 - 40^0$
Subtular	Inversion	$0^0 - 20^0$	$0^0 - 20^0$
	Eversion	0	$0^0 - 10^0$

Neurological Examination (R) Leg

Dorsiflexors	-	2/5
Plantar flexors	-	5/5
Inversion	-	5/5
Eversion	-	0/5

APM-III – weakness of everters of foot producing varus deformity of foot

Cavus Deformity (Same History)

- L/E. (R) foot
- Hind foot-calcaneus deformity (fixed dorsiflexion deformity), fore foot-equinus (cavus)
- Wasting of the calf muscles

Deformity

- Dorsiflexion deformity of hind foot

Movements

- Dorsiflexion – hind foot in maximum dorsiflexion
- Plantar flexion – nil
- Inversion – $0^0 - 20^0$
- Eversion – $0^0 - 10^0$

Neurological Examination

Gastrocnemius & Soleus	-	0/5
FHL	-	3/5
FDL	-	3/5
Dorsiflexors	-	5/5

X-ray : ↑ Meanings angle. ↓ in Hibb's Angle

Diagnosis : APM-III calcaneo cavus deformity due to paralysis of triceps surae

154. CP WITH DEFORMITIES OF THE UPPER LIMB

10 Years - Male

- (Informant-Mother)
- C/o. difficulty in using (R) upper limb since childhood

H/o Presenting Illness

- Child was normal at birth, gradually developed deformity of (R) upper limb
- Progressive in nature
- No H/o. remissions and exacerbations

Birth History

- Vaginal delivery, prematurity, delay in the 2nd stage of labour

Immunization History

- Normal

Milestones

- Delayed

O/E

- Patient moderately built and nourished
- Intelligence subnormal
- Slurring of speech present
- Nystagmus present

L/E : (Rt) UL

- Shoulder adducted and internally rotated; elbow is kept in flexion, forearm in pronation with flexion and ulnar deviation of wrist, flexion at the MCP joint of fingers and extension at the IP joints with thumb in the palm type of deformity
- Muscle wasting of arm and forearm segments present

Passive Movements

Shoulder	abduction	-	$0^0 - 90^0$
	Flexion	-	$0^0 - 60^0$
	Extension	-	$0^0 - 30^0$
	External rotation	-	$0^0 - 50^0$
	Internal rotation	-	$0^0 - 90^0$
	Elbow flexion	-	$30^0 - 110^0$
	Wrist flexion	-	$0^0 - 40^0$
	Dorsiflexion with Elbow flexion	-	$0^0 - 40^0$
	Palmar flexion	-	full

Spasticity

- Spasm of shoulder adductors and internal rotators
- Elbow flexors
- Forearm pronators
- Wrist and finger flexors

Muscle Power

Shoulder	Flexion		4/5		
	Extension		4/5		
	Abduction		difficult to assess		
	Adduction		5/5		
	Internal rotation – difficult to assess				
Elbow flexion		-	5/5	Forearm –	Pronators – 5/5
Extension		-	0/5		Supinators – 0/5
Wrist	DF	-	0/5		
	PF	-	5/5		
Extensors of Fingers of Thumb		-	0/5		
Abductors of thumb		-	0/5		

Sensory System

- Normal

Reflexes

- Biceps
- Triceps — Exaggerated
- Brachioradialis

Plantar – Bilateral extension

Diagnosis

- Neurological deficit with (R) sided monoplegia of upper limb with adduction internal rotation deformity of shoulder, flexion of the elbow, ulnar deviation of the wrist, thumb in palm deformity

155. CP WITH DEFORMITIES OF THE LOWER LIMB

10 Years - Male

- (Informant-Mother)
- C/o. difficulty in using (R) lower limb since childhood
- Difficulty in walking – 6 years

H/o. Presenting Illness

- Child was normal at birth, gradually developed deformity of both lower limbs, more severe in the (R) limb
- Milestones of the child (developmental) : child was not able to sit with support upto 1½ years. Walking was delayed, started walking at 4 years with deformity

Birth History

- Born as a premature baby with delay in the 2nd stage of labour

Immunisation History

- Normal

Milestones

- Delayed

O/E :

- Patient moderately built and nourished
  Intelligence subnormal
  Slurring of speech present
  Squinting of the (R) eye present (R) lateral rectus palsy

L/E : (Rt) LL

- Exaggerated lumbar lordosis
- Right ASIS at a higher level
- Attitude (R) limb – Flexion, adduction and internal rotation at the hip
  Flexion at the knee
  Ankle in equinus with in-toeing

Wasting of the (R) thigh and leg muscles present
(R) lower limb appears shortened

Passive Movements

	Rt
Abduction with hip and knee extended	$0^0 - 20^0$
Abduction with hip flexed and knee extended	0^0 - 10^0
Fixed flexion deformity	20^0

Movements

Flexion	-	$20^0 - 110^0$
Rotation		
External rotation	-	$0^0 - 20^0$
Internal rotation	-	full
Adduction	-	full

Knee

Limitation of extension with hip extended - 20^0

Limitation of extension to 40^0 with hip flexed to - 90^0

Ankle

Plantar flexion – full

Dorsi flexion – 0^0 with knee extended

Dorsiflexion – $0^0 - 10^0$ with knee flexed

Spasticity of :

- Hip adductors, flexors, hamstring muscles and ankle plantar flexors

Muscle power

Hip		
Flexors	-	5/5
Extensors	-	3/5
Abductors	-	3/5
Adductors	-	5/5
Knee		
Flexors	-	5/5
Extensors	-	3/5

Ankle DF – not tested

PF – 5/5

Sensory	-	N
Clonus	-	++
Reflexes	-	KJ exaggerated
		AJ exaggerated
Plantar	-	B/L extensor

Additional Test

- Ely test – Prone rectus test – positive
- Indicates contracture of rectus femoris
- Silver skroid test – to determine contracture of gastrocnemius – positive

Measurements

- Linear measurements - apparent shortening – 2 cm
- Real shortening – nil
- Circumferential measurements – 2cm in thigh and 1 cm in leg segment

Diagnosis

- Non progressive neurological disorder with monoplegia of right leg; flexion, adduction and internal rotation deformity of hip; flexion deformity of knee and equinus deformity of ankle

156. TORTICOLLIS - NECK

3 Months - Male

- Was brought by the mother with tilting of head to the right side with swelling in the neck for 3 months

History

- Breech birth delivery +

Clinical Findings

- Small tender swelling noted in sternomastoid right side
- Soft to firm in consistency
- Mobile
- Located within the body of sternomastoid
- Head tilted to right side & neck deviated to left side
- Facial and skull asymmetry noted
- **X –ray of Cervical Spine** → AP/Lat : No bony abnormality

Diagnosis

- Congenital muscular torticollis

Discussion

- Due to fibrosis of muscle as a result of venous occlusion (Pressure over neck in birth canal)
- ¾th cases it is seen on the right side
- Recalcitrant cases : Release of a portion of the tendon at clavicular attachment (Should be done before school age)
- Skull and facial asymmetry corrects depending on the growth potential
- Severe deformities may require proximal and distal release called Bipolar release
- Complication of proximal release is injury to spinal accessory nerve
- Grisel's syndrome: Rotatory subluxation of childhood following local inflammation leading to synovial or capsular interposition at the atlantoaxial level (URI / following tonsillectomy/ oropharyngeal surgery)

157. SCOLIOSIS (DORSOLUMBAR)

16 Years - Female

- C/o. progressive deformity of the back for past 2 years

History

- C/o. deformity of back bending towards left – past 2 years
- No H/o. back pain / discomfort
- No H/o. trauma / constitutional symptoms
- Birth and developmental histories were normal
- H/o. wearing a brace for 1 year – in spite of which the deformity is progressive

O/E

Inspection

- Healthy, moderately built adolescent
- Scoliosis of dorsolumbar spine (+) with convexity towards left
- Marked asymmetry of the trunk became more noticeable with forward bending (Adam's test)
- Curve is well balanced in sagittal plane

Palpation

- Convexity of spine toward left with apex at D9
- Rib hump (+) in the left
- No neuro vascular deficit
- On lateral bending, the curvature was found to be mobile

X-ray DL Spine – AP / Lat

- Left side dorsolumbar scoliosis measuring 50^0
- Compensatory 2^0 curves present
- No evidence of spondylolysis or spondylolisthesis

Important Points

1. This patient has adolescent idiopathic scoliosis with a dorsolumbar curve of 50^0 which has progressed in spite of bracing and requires surgical management
2. The goal of surgery is
   i) Stopping progession of the deformity of spine
   ii) Safe and controlled correction to ensure a balanced and fused spine
3. The surgical options include anterior (or) posterior correction along with / without endoscopic release with instrumentation
4. The optimal approach is dependent on a number of factors and each patient must be treated in an individualized manner

158. LUMBAR SPONDYLOSIS WITH NERVE DEFICIT

30 Years - Female

- C/o. low back pain and pain in (R) leg – past 1 year

History

- Low back pain with radiation to (R) leg – past 1 year
- Symptoms developed insidiously, progressively increasing
- Not responding to physiotherapy and bracing
- H/o. steady decline in her overall function, difficulty in walking and activities of daily living
- No H/o. trauma / constitutional symptoms

O/E

Inspection

- Moderately built and nourished
- No deformity /curvature of back
- Gait – normal

Palpation

- Tenderness (+) Lumbosacral spine
- SLRT (+) on (R) leg $< 60^0$
- Weakness (+) (R) EHL and ankle dorsiflexion
- No sensory deficit

Movements

- ROM – lumbar spine full with pain
- SLRT (+) on (R) side $< 60^0$
- Xray LS spine - AP / Lat: Spondylosis of L5 with grade I spondylolisthesis L5/S1
- **MRI LS spine:** Severe – spinal stenosis at level of slippage (+)

Important Points

1. Spondylolisthesis – means forward shift of spine and is caused by spondylolysis as a predisposing factor
2. The six types are :
   a) Dysplastic (20%)
   b) Lytic or Isthmic (50%)
   c) Degnerative (25%)
   d) Post traumatic
   e) Pathological
   f) Post-operative

159. CARIES SPINE WITH PARAPARESIS

15 Years - Female

- C/o. back pain for past 3 months associated with difficulty in walking for past 3 months

History

- Apparently normal till 8 months back
- Developed pain in the mid-back, insidious onset, gradually progressive
- Associated with evening rise of temperature and malaise
- No H/o. trauma, other joint pain / swellings
- H/o. loss of weight and appetite +
- Has difficulty in walking past 3 months, feels insecure at the foot, could not run/walk fast, now walks with support
- Her grandfather is a known pulmonary TB patient

O/E

- Thin built and poorly nourished

Inspection: Spine

- Angular kyphosis + at D_8D_9 region
- No swellings in loin / sinus / discharge

Palpation

- Tenderness +
- Angular kyphosis +

Movement

- Coin test +
- All spinal movements restricted

N/E

			Right	Left
Tone				
	UL		Normal	Normal
	LL		Decreased	Decreased
Power UL		C5	5/5	5/5
		C6		
		C7		
		C8		
		T1		
		T2		

LL	L2	I	3/5	3/5
	L3	I	3/5	3/5
	L4	I	3/5	3/5
	L5	I	3/5	3/5
	S1	I	3/5	3/5
DTR	BJ		+	+
	TJ		+	+
	KJ		++	++
	AJ		++	++

- Sensation decreased below T_{10} level
- X-ray DL Spine - AP
  - Lat
- a) Osteopenia of D_7 and D_8 vertebra with e/o. Spondylodiscitis
- b) E/o. paravertebral and prevertebral abscess

Diagnosis : Pott's Spine with paraplegia

Important Points

1. Paraplegia is the most feared complication of spinal tuberculosis
2. 95% start in anterior elements and 5% posterior elements
3. Sedan's classification
   a. Early onset paraplegia (<2years of onset)
   b. Late onset paraplegia (>2 years of onset)
4. Absolute indications for surgery
   a. Failed conservative treatment
   b. In doubtful diagnosis
   c. Rapid onset paraplegia
   d. Cauda equina paralysis

160. ANKYLOSING SPONDYLITIS

30 Years - Male

- C/o pain in the back and increasing stiffness for past 3 years

History

- Apparently normal till 3 years back
- Has pain in lower back – started insidiously, gradually progressive, continuous, more in mornings
- Treated with IFT/IPT – not relieved
- Now associated with stiffness of back and upper back pain
- No H/o. trauma / fever with evening rise of temperature
- No H/o. pain / swelling of other joints / diarrhoea / skin disease

O/E

Inspection & Palpation

- No tenderness / deformity clinically
- B/L SLRT negative
- B/L Pump handle test positive

Movements

- Marked limitation of all movements of spine
- Schober's test positive
- Wall test positive

Measurements

- Chest expansion < 2.5cms

Investigations

- X-Ray spine
  a) Marked obliteration of sacroiliac joints (+)
  b) Sclerosis of intervertebral joints with calcification of anterior longitudinal ligament
- **ESR :** Markedly elevated
- Test for HLA B27: Positive

Important Points

1. Also known as Marie- Strumpell arthritis, chronic inflammation, progressing to bony ankylosis of the spinal column; men in IInd decade are affected
2. Cause is unknown strong hereditary link to HLA – B27
3. Disease begins in sacro iliac joints and extends upwards to lumbar, thoracic and cervical spine
4. Treatment should be directed towards preserving function
5. NSAIDS and special exercises are the mainstay of treatment

161. CERVICAL SPONDYLOSIS WITH NERVE DEFICIT

55 Years - Male

- pain in neck radiating to left arm – past 6 months
- Decreased sensation in the inner aspect of forearm and hand – past 6 months

History

- Has pain in neck associated with headache - past 7 year
- Aggravated by work and sudden movements of neck relieved by analgesics
- He is on treatment with intermittent cervical traction and cervical collar
- Now has severe pain radiation to the arm with decreased sensation in the inner aspect
- No H/o. trauma / constitutional symptoms

O/E Inspection

- No deformity / swelling of neck
- Wasting of hypothenar muscles of (L) hand (+)

Palpation

- Diffuse tenderness (+) in neck, aggravated on movements
- Altered sensation (+) in left C8, T1 dermatomes
- Wasting of hypothenar muscles with hollowing of web spaces +
- Distal pulses (+)

Movements

- Flexion, extension painfully restricted throughout the range

Investigations

- Cervical Spine X-ray AP / Lat
- Degenerative features of cervical vertebra and facet joints (+)

Important Points

1. Cervical spondylosis is essentially a degenerative disorder starting in I.V.D
2. 50% of disease occurs in people > 50 years
3. Radiographic changes of spondylosis need not be related to the actual symptoms or disability of patients
4. They can present as radiculopathy (CSR) or Myelopathy (CSM) or Neck pain (CS)
5. Conservative treatment is given in the beginning
6. Surgical treatment is based on principles of decompression, distraction and fixation

162. SPINA BIFIDA

5 Years - Male

- Brought with C/o. B/L weakness of lower limbs with urinary incontinence since birth

History

(Full Term Normal Vaginal Delivery - FTNVD)

- Ist born, FTNVD baby to non-consanguinous parents
- Noticed to have weakness of both lower limbs since birth
- Associated with enuresis and urinary incontinence
- No H/o. increased size of head at birth or other associated deformities

O/E

Inspection

- Normal development for age
- Pigmented naevus with dimple over sacral region
- Absence of movements of both lower limbs
- Bladder catheterised
- No sacral sore

Palpation

- No spinal deformity / tenderness

N/E		Right	Left
Nutrition	UL	Normal	Normal
	LL	Atropic	Atropic
Tone	UL	Normal	Normal
	LL	Hypotonia	Hypotonia
Power	UL	5/5	3/5
	LL	1/5	1/5
DTR	BJ	+	+
	TJ	+	+
	KJ	-	-
	AJ	-	-
Plantar		Equivocal	Equivocal

- Sensation decreased in L3, L4, L5, S1 dermatomes
- Xray LS spine – AP – Laminar defect with midline ridge of bone (diastomatomyelia) in L3, L4, L5 region

Diagnosis

- Spina bifida with diastomato myelia

Important Points

1. Spina bifida is a congenital disorder in which the two halves of the posterior vertebral arch fail to fuse, often associated with maldevelopment of neural tube – dysraphism
2. Usually occurs in lumbosacral region, involvement of neural element causes paralysis with loss of sensation and sphincter control
3. Treatment involves team approach of paediatrician, neurosurgeon, orthopaedician and physiotherapist.

163. SPINE FRACTURE WITH NEUROLOGICAL DEFICIT

30 Years - Male

- C/o. inability to use B/L lower limbs following a fall into dry well – 1 week back

History

- Apparently normal 1 week back
- Fell into a dry well 1 week back, while at work and sustained injury to back
- C/o. pain in back and inability to use bilateral lower limbs since then
- Associated with constipation and difficulty in micturition
- Treated initially at local hospital and referred here
- No H/o. past medical illness

O/E

- Conscious, oriented

Inspection

- On examining the back, gibbus + at D_{11}, D_{12}, L_1 region
- Grade I sacral sore +

Palpation

- Tenderness + D_{11}, D_{12}, L_1 region

Neurological Examination

Nutrition		**Right**	**Left**
UL		N	N
LL		N	N
Tone	UL	N	N
	LL	Decreased	Decreased

Power	**Right**	**Left**
UL		
C_5	5/5	5/5
C_6		
C_7		
C_8		
T_1		
L_1		
L_2	0/5	0/5
L_3		
L_4		
L_5		
S1		

DTR			
-	UL	+	+
-	LL	-	-

- Sensation decreased below L_2
- Bladder catheterised
- Other long bones, pelvis clinically normal

X-ray DL Spine AP/Lat : Burst # L_1

Diagnosis

- Burst # L_1 with paraplegia

Important Points

1. Spinal cord could be damaged due to injuries of the spine extending from cervical spine to thoracolumbar junction
2. Pathology may vary from extra dural haemorrhage to cord contusion, laceration to cord crushing
3. Treatment includes surgery / conservative management with rehabilitation programme for physical therapy, occupational therapy and social therapy

164. LUMBAR DISC PROLAPSE WITH NERVE DEFICIT

37 Years - Male

- Unskilled labourer. C/o. severe, persistent left leg pain past 18 months

History

- Pain developed after lifting a heavy object at work
- Over time his symptoms were aggravated with repeated work activity
- Started as a backache, and then progressed to severe pain all the way down to the toes
- At times this felt like electric shocks with tingling
- Over the past 2 months the patient also noted some weakness in the left foot
- Despite rest, medication, and pain modalities symptoms were progressive and interfered with all activities of daily living including sleep

O/E : Inspection

- No excessive lumbar lordosis or scoliosis
- No limb length inequality

Palpation

- Tenderness + over paraspinal muscles of the lumbar region L3, L4, L5
- No deformity or step
- Positive straight leg raising test on the left side at 60 degrees
- Weakness + in the toe extensors of the left foot as well as dorsiflexors
- Numbness + dorsum and lateral aspect of the foot and ankle.
- The Achilles tendon reflex on the left side was absent

Movements

- Both hip movements were within normal limits

Radiographic Evaluation

- Lumbar spine AP and Lat :
  a) Straightening of the lumbar lordosis
  b) No evidence of fracture or significant spinal malalignment
- MRI : large herniated disc fragment located at the L5 – S1 level and compressing the nerve roots

Discussion

- Acute disc prolapse may occur at any age, but is uncommon in the very young and the very old
- The patient is usually a fit adult of 20 – 45 years with H/o. mild recurrent backache in the past
- N/E shows, muscle weakness with diminished reflexes and sensory loss corresponding to affected level
- Disc herniations that do not lead to marked canal narrowing or neurologic dysfunction do not require surgical treatment
- Epidural steroid is an option in some cases particularly when nerve irritation and no significant compression are noted
- Surgery is required for severe pain and failed responses to other non-operative approaches

165. CERVICAL DISC DISEASE

38 Years - Female

- C/o. pain in the neck radiating to Rt arm for the past 6 months

History

- Pain in the neck, continuous, dull aching, worse on activities
- Radiating to the Rt. Arm
- Not associated with headache / vertigo
- No H/o. trauma / constitutional symptoms
- Was treated conservatively by neck traction but not relieved
- Now has tingling sensation over the inner aspect of Rt. arm and forearm

O/E. Inspection

- No deformity

Palpation

- Paraspinal spasm (+)
- Weakness of Rt triceps and wrist flexor (+) and finger flexors
- Triceps jerk diminished
- Decreased sensation (+) on ulnar border of palm, ring and middle finger (+)

Movement

- Movement of neck are painfully restricted especially at extremes

Xray C.Spine

- AP
- Lat

Loss of normal cervical lordosis (+)

MRI C SPINE

- Disc bulge of C6 and C7 level

Diagnosis

- Cervical disc disease with neurological deficit

Important Points

1. The signs and symptoms of IVDP are best separated into symptoms related to spine, symptoms related to nerve root compression and symptoms of myelopathy
2. 1^0 indications for operative treatment include
   a. Failure of non operative management
   b. Increasing neurological deficit
   c. Cervical myelopathy – progressive

166. SPONDYLOLISTHESIS

27 Years - Female

- Presented with a chief complaint of low back pain and left leg pain for the past 1 yr

History

- Complaint of low back pain and left leg pain aggravated by activity
- Symptoms first developed several years earlier and over time progressive increase in pain and disability was noted despite treatment with physical therapy, bracing, activity modification and medication
- Has a steady decline in her overall function
- Not able to walk more than five blocks and having difficulty with sitting and other activities of daily living

O/E: Inspection

- No excessive lumbar lordosis or deformity

Palpation

- Tenderness + over the lumbosacral area
- Step felt at L5 S1
- Motion of the lumbar spine provoked pain shooting into the left leg with side bending and extension
- Left SLRT precipitated pain at 75 degrees
- Weakness of left great toe extensor and ankle dorsiflexor +
- Diminished sensation was noted over the left foot and lateral ankle area

Movements

- Both hip movements within normal limits
- No limb length inequality

Radiographic Evaluation

- Radiographs of the lumbar spine AP & LAT – grade II spondylolisthesis at L5–S1
- MRI : Severe spinal stenosis at the level of slip

Discussion

- Spondylolisthesis means forward shift of spine
- Shift is nearly always between L4 and L5 or between L5 and sacrum
- Basically there are six types of spondylolisthesis, dysplastic (20%), lytic (50%), degenerative (25%), post traumatic, pathological or post-operative
- Spondylolisthesis is first treated with non-operative means unless neurologic symptoms are present
- In most cases a combination of activity restriction, bracing and physical therapy are effective. When this fails and slippage of the vertebrae continues or is unstable and persistently painful or leads to nerve dysfunction then surgery is considered. Surgical treatment options include posterior surgery alone, anterior surgery, a combination of anterior and posterior surgery
- In some cases instrumentation (rods and screws) are used in addition to bone graft to ensure immediate stability and increase the chance of a successful spinal fusion. Each case is approached in a very individual manner and the optimal treatment approach is dependent upon a number of different factors including patient age, degree of slippage, degree of nerve compression or dysfunction and the degree of spinal instability

167. SPINAL CANAL STENOSIS

55 Years - Male

- C/o. low back pain and leg pain aggravated by activity – past 3 years

History

- Apparently normal 3 years back, developed low back pain which progressively increased with difficulty in walking.
- C/o. heaviness and fatigue in legs requiring rest after walking
- No H/o. trauma / constitutional symptoms

O/E

Inspection

- No deformity / abnormal curvature of spine

Palpation

- Mild tenderness (+) lumbosacral area
- B/L SLRT negative
- Hip motion was complete and painless bilaterally
- No neurological deficit
- Sensation is intact in all dermatomes

Movements

- Lumbar spine – full with pain at extremes
- Gait – Normal

Investigations

- X-ray LS spine – AP / Lat: Bony alignment normal / spinal stenosis in lumbar area / facet joint – degeneration +

Important Points

1. Degenerative spinal stenosis, is narrowing of spinal canal due to aging with wear and tear of discs and facet joints
2. Most cases can be managed conservatively with the neurological claudication improving with physical therapy and activity modification.
3. When there is progressive loss of function with pain and inability to walk, surgery can be considered
4. Options include: spinal decompression with / without fusion using instrumentation / bone grafting

168. ADOLESCENT KYPHOSIS

15 Years - Male

- C/o. progressive hunching of the back – past 2 years

History

- C/o. progressive hunching of back
- Initially was able to correct by leaning backward
- Now associated with rigidity and inability to correct the posture
- No significant pain or radiating symptoms to arms or legs
- No family H/o. severe kyphosis

O/E

Inspection

- Well built and nourished
- Balanced kyphosis of thoracic spine +
- No abnormal skin marking, patches or discoloration

Palpation

- Round kyphosis of thoracic spine +
- Rigid and no significant correction on hyperextension
- No neuro vascular deficit of upper / lower limb

Movements

- ROM of thoracic spine (Rotational) – full

Investigations

- X-ray DL spine (AP)
  a) Thoracic kyphosis with apex at D9, D10
  b) Angle $>90^0$

Diagnosis

- Scheuermann's kyphosis

Important Points

1. Non surgical option includes observation and extension exercise for mild case, and bracing for moderate and progressive cases
2. Once growth has neared completion, bracing is usually no longer effective
3. Severe curvature may be best treated with surgery and posterior instrumentation

169. OSTEOSARCOMA

169a. OSTEOSARCOMA - PROXIMAL HUMERUS

18 Years - Male

- Complaints of swelling in the (L) upper arm for the past 4 months

History

- Noticed to have a swelling in the (L) upper arm, 4 months back
- Progressively increasing in size
- Asso. with pain – continuous, dull aching, non radiating
- Now has pain and restricted movements of (L) upper limb
- No H/o. trauma / constitutional symptoms
- No H/o. other swellings

O/E : (Inspection)

- 6 x 8 cm swelling (+) in (L) proximal arm
- Skin stretched with dilated veins
- No sinus / discharge / scars
- Restriction of movements of (L) arm (+)

Palpation

- 8 x 10 cm swelling arising from the proximal humerus
- Warmth (+), tenderness (+)
- Firm in consistency, not pulsatile
- Margins ill-defined
- No DNVD

Movements

- (L) arm – Flexion – 0^0 - 15^0
- Abduction - 0^0 - 70^0 movements are painful
- Extension - 0^0 - 10^0

Investigations

- X-ray (L) shoulder AP view : Osteolytic and Osteosclerotic mass arising from the proximal humerus with geographic appearance
- Sun burst appearance (+) - suggestive of osteosarcoma

Important Points

1. Bone Tumours with predominant osteoid formation are known as osteogenic sarcoma
2. Can be 1^0 / 2^0 - due to radiation necrosis, paget's disease, osteochondroma
3. Subtypes include, parosteal, periosteal, telangiectatic and osteolytic variety
4. Arises from metaphysis of bone in the 2^{nd} decade of life, 52% in femur, 20% in tibia and 9% in humeurs
5. Treatment in early cases is wide surgical resection, and reconstruction with adjuvant chemotherapy
6. Reconstruction included vascularised fibula graft with arthrodesis or custom prosthetic reconstruction

169b. OSTEOSARCOMA - DISTAL FEMUR

18 Years - Female

- Came with C/o. pain and swelling in the (R) knee – past 4 months

History

- Apparently normal 4 months back, sustained an injury due to a fall on (R) knee developed a swelling just above (R) knee, progressively increasing in size associated with pain-initially dull aching and continuous, now associated with limp and night pain
- No H/o. other swellings of the body

O/E : Inspection

- 12 x 10 cm swelling (+) in distal right femur
- Skin stretched and shiny with dilated veins
- No scars / sinus
- No swelling of the knee joint / popliteal fossa

Palpation

- Warmth (+) tenderness (+)
- Hard in consistency, margin ill-defined
- Not pulsatile
- No DNVD

Movements

- Knee – Extension - 0^0 - 5^0
- Flexion - 0^0 - 110^0 further flexion restricted

Investigations

- X-ray (R) thigh with knee AP / Lat : Osteolytic and osteosclerotic mass (+) in metaphysis of (R) femur. Moth eaten appearance
- Epiphysis free
- Sun burst appearances (+), Codman's triangle +
- FNAC – Biopsy - stromal cells & tumour giant cells – sugg of osteosarcoma

Important Points

1. Tumours which arise from cells principally concerned with bone formation are termed as osteosarcoma
2. It has prediliction for second decade with male predominance
3. Arises from metaphysis where normally the growth is more active
4. Majority are found in lower limb 52% femur, 20% in tibia and 9% in humerus
5. Divided into subtypes based on site and HPE staged by MSTS staging
6. Treatment depends upon staging and ranges from limb salvage surgery to amputation

169c. OSTEOSARCOMA - PROXIMAL TIBIA

15 Years - Male

- C/o. pain and swelling of (L) leg – 3 months

History

- Pain started first; swelling later on
- Constant aching pain throughout
- Aggravated on movements
- Relieved by taking analgesics
- H/o. night pain +
- H/o. trauma may be incidental
- H/o. swelling elsewhere in the body (can occur in Hereditary exostosis)

Family History

- H/o. Familial exostosis
- H/o. swelling - Localised to (L) leg
  - Progressively increasing in size

Inspection

(L) Leg

- Diffuse swelling seen over the upper end of tibia
- Skin over the swelling is stretched and shiny
- Engorged veins seen
- No visible pulsation
- Wasting of muscles present
- Warm; tenderness +

Palpation

- Swelling of size 10 x 8 cm localized to the proximal third of (L) leg
- Swelling is fusiform in shape involving the anterior, medial and lateral aspect of U/3, edge merges with bone
- Margins not well defined, irregular
- Firm to hard in consistency

Examination of Chest

- Normal (Metastasis may produce collapse of lung)
- No distal neurovascular deficit

Movements

- Flexion 0 – 90 degree

Investigations

- **X-Ray (L) Leg** – Mottled areas of rarefaction with areas of sclerosis at the metaphyseal end. Periosteal reaction +. Sunray appearance present
- Chest X-Ray – Normal
- Serum Alkaline phosphatase – raised

Important Points

1. Osteosarcoma is a tumour arising from osteocytes with the advent of multi-drug chemotherapy, it is possible for endoprosthetic replacement after resection of the proximal tibia
2. Osteosarcomas can affect all skeletal locations but most primary osteosarcomas occur at the sites of the most rapid bone growth, including the distal femur, the proximal tibia and the proximal humerus
3. On a radiograph, the most common appearance is that of an aggressive lesion in the metaphysis. Although the lesion can be either predominantly blastic or lytic, more commonly both areas of bone production and bone destruction are present. Lesion is usually quite perspective and borders ill – defined. Periosteal reaction may take the form of a "Codman's triangle" or it may have a "sunburst" or " hair on end" appearance

170. GIANT CELL TUMOUR

170a. GIANT CELL TUMOUR - DISTAL FEMUR

18 Years - Male

- C/o. pain and swelling is (R) knee past 8 months

History

- Apparently normal 8 months back
- Developed pain in (R) knee, gradually increasing, dull aching, continuous with night time aggravation
- Noticed a swelling in (R) distal thigh – gradually increasing in size
- Treated natively with splinting
- No H/o. significant trauma / constitutional symptoms

O/E

Inspection (R) Thigh

- Diffuse swelling in the lower (R) thigh
- No dilated veins / scars / sinuses
- Margin is ill defined

Palpation

- 8 x 12cm swelling arising from (R) lower femur antero medial aspect
- Tenderness (+), warmth present
- Surfaces smooth, margin illdefined
- No abnormal mobility
- No DNVD

Movements

- Knee flexion restricted to 70^0 due to pain

Measurements

- No limb length discrepancy

Investigations

- X-ray (R) femur with knee AP / Lat
  a) Osteolytic, expansile lesion in epiphyseal region of (R) distal femur
  b) No periosteal reaction

170b. PROXIMAL TIBIA : GIANT CELL TUMOUR

19 Years - Female

- C/o. pain and swelling in (L) proximal leg past 1 year

History

- Pain started following a trauma in (L) knee 1 year back
- Noticed a swelling below the knee at that time
- H/o. native treatment by splintages
- Pain and swelling progressively increasing
- No H/o. significant trauma / constitutional symptoms

O/E

Inspection – (L) Knee

- Diffuse swelling in the anteromedial aspect of (L) proximal tibia
- Margin / edges ill defined
- No dilated veins / scars / sinus

Palpation

- Tenderness (+), warmth (+)
- 8 x 10 cm swelling in proximal metaphyseal regions of tibia (+)
- Surface smooth, margin ill defined
- No DNVD

Movements

- Knee Flexion - $0^0 - 100^0$
  Extension - $0^0 - 10^0$

Investigations

- X-ray (L) Tibia with knee AP – Lat :
  a) Osteolytic expansile lesion in proximal metaphyseal region of the (L) tibia
  b) No periosteal reaction
  c) No cortical breach or articular breach

170c. DISTAL RADIUS

18 Years - Female

- C/o pain and swelling in (L) wrist – past 8 months

History

- Pain and swelling (L) wrist – anterolateral aspect past 8 months
- Gradually progressive
- Pain – dull aching, continuous, non-radiating
- No H/o. trauma / constitutional symptoms

O/E

Inspection: (L) Wrist

- 3 x 5 cm swelling in anterolateral aspect of wrist (+)
- No dilated veins / scars / sinuses

Palpation

- Not tender, warmth (+)
- Surface smooth, bony hard, edges ill-defined
- No distal neurovascular deficit

Movements

- Dorsiflexion - 0^0 - 60^0
  Palmarflexion - 0^0 – 60^0

Investigations

- X-ray (R) wrist – AP / Oblique :
  a) Expansile osteolytic lesion in distal metaphysis of radius
  b) No periosteal reaction

Important Points

GCT

1. Lesion of uncertain origin, appears in mature bone most common around knee, proximal humerus and distal radius
2. It occurs in the metaphysio epiphyseal region of the long bones after its fusion in the age group 20 – 40 years
3. Radio logically, there is eccentric expansion with no evidence of periosteal reaction
4. Graded by Campanacci as latent, active and aggressive types
5. Treatment – wide resection with reconstruction using bone graft (or) prosthesis for high grade and intralesional curettage with phenol / bone cement in low grade tumours

171. ANEURYSMAL BONE CYST

17 Years - Male

- C/o. pain and swelling in the proximal (L) leg – past 2 months

History

- Apparently normal till 2 months back
- Noticed a swelling associated with pain in the upper part of (L) leg
- Swelling rapidly increasing in size
- Pain – continuous, dull aching, aggravated on bearing weight causing a limp
- No H/o. trauma / constituitional symptoms
- No H/o. similar swelling in the body

O/E

Inspection

- Diffuse swelling in proximal metaphyseal region of (L) tibia +
- No dilated veins / scar / sinues
- ROM of (L) knee – full

Palpation

- Warmth + / tenderness +
- Firm to hard in consistency
- Margins ill defined
- No DNVD

Movement

-	(L) Knee	Flexion	$-0^0 - 140^0$
		Extension	$-0^0 - 5^0$

Investigations

- X-ray (L) Knee with Leg – AP / Lat - Eccentric, extensive lytic lesion with hollowed out shell in metaphysis
- No sclerosis / periosteal reacion

Important Points

1. ABC is a benign lesion, characterized by cyst like walls of predominantly fibrous tissues with blood
2. Common in second decade of life : male > female
3. Metaphysis of long bones are frequently affected followed by vertebrae and pelvis
4. Eccentric expansion or "blow-out" in radiograph is very characteristic
5. Classified radiographically into 5 types by Campanacci
6. Histologically combination of benign spindle cells, giant cells and haemosiderin
7. "En block" excision whenever possible is ideal
8. Curettage and bone grafting is associated with 20 to 30% recurrence

172. SIMPLE BONE CYST

14 Years - Male

- C/o. pain and inability to move (L) upper limb following a trivial trauma – 1 day back

History

- Apparently normal 1 day back, sustained a trivial trauma to (L) arm in the form of a twisting force
- Could not lift his arm – associated with severe pain on attempted movement
- No H/o. previous pain / swelling
- No H/o. constitutional symptoms

O/E

Inspection : (L) arm

- No swelling
- No scars / sinuses
- No deformity / obvious clinical abnormality
- Movements restricted due to pain

Palpation

- Tenderness +
- Crepitus + / abnormal mobility + in (L) upper arm
- Irregularity / discontinuity felt in proximal humerus
- No regional lymphadenopathy
- No DNVD

Movements

- Severely restricted due to pain

Investigations

- **X-ray (L) shoulder with arm (AP)** :
  a) Radiolucent defect in the proximal metaphysis of the humerus +
  b) Fallen fragment +
  c) No cortical / epiphyseal erosion

Important Points

1. Simple bone eyst – solitary unilocular cavity which arises near the growth plate in the metaphyseal region
2. Hitology – unknown. "Synovial arrest" thesis is implicated
3. 90% occur in Ist decade : Male to female ratio : 2:1
4. Proximal ends of humerus and femur are most common sites. Rarely they occur in vertebrae and flat bones
5. "Fallen leaf" sign in radiography is confirmation of diagnosis
6. Intracavitory steroid injection and curettage & bone grafting are the available treatment options

173. CHONDROSARCOMA

44 Years - Male

- C/o. swelling in the (R) shoulder past 1 year

History

- Noticed swelling in the (R) shoulder 1 year back.
- Gradually increasing in size, rapid for past 3 months
- Associated with pain and restriction of arm movements for past 4 months
- No H/o. trauma / constitutional symptoms
- No H/o. swelling elsewhere

O/E

Inspection

- 20 x 18 cm swelling arising from the posterior aspect of (R) shoulder
- Skin stretched and shiny, no scars / sinus
- Movements of (R) arm restricted

Palpation

- No warmth / tenderness
- Firm to hard in consistency
- Arising from the part of scapula, edges well defined
- No DNVD

Movements

(R) Shoulder -	Flexion	40^0	IR	10^0
	Extension	10^0	ER	10^0
	Abduction	70^0		

Investigations

X-ray (R) Shoulder AP

- Predominant lytic lesion involving the scapula with calcification and extensive cortical erosion

FNAC

- Well – Differentiated chondrosarcoma

Important Points

1. Chondrosarcoma of bone is a malignant tumour of proliferating cartilage tissue
2. Occur in adults 3rd to 5th decade, males > females
3. 75% occur in trunk, pelvis, scapula, proximal part of femur, humerus
4. Classified into conventional, periosteal, mesenchymal and clear cell variety
5. The primary treatment is wide or radical resection or amputation
6. Prognosis depend on size, grade and location of lesion

174. SOLITARY EXOSTOSIS

17 Years - Male

- Came with C/o. swelling in outer aspect below the (L) knee joint for past 8 months

History

- Noticed to have a small swelling in the outer aspect of (L) knee
- Progressively increasing in size
- Associated with pain, which increases on movement
- No H/o. trauma / constitutional symptoms
- No H/o. other swelling / family H/o. bone swelling

O/E

- 3 x 4 cm swelling (+) in lateral aspect of leg, 3 cm below the knee joint line
- No H/o. sinus / discharge / dilated veins
- Movements of knee full and free

Palpation

- 3 x 4 cm swelling arising from lateral proximal tibia (+)
- Bony hard in consistency, tenderness (+)
- Not pulsatile / compressible / warmth (-) / not mobile
- No DNVD

Movements

- Knee – Extension - 0^0 - 5^0
- Flexion - 0^0 - 130^0 Pain on extreme flexion

Investigation

- X-ray (L) knee AP – Lat : 3 x 4 cm osseous mass arsing from lateral condyle of tibia, with pedicle

Important Points

1. Osteochondroma (or) solitary exostosis is the most frequent bony tumour
2. Male : female 2:1, with occurrence around the knee being commonest site
3. Can be solitary or multiple
4. Etiology – Virchow's hypothesis of displaced growth of cartilage and Shere's hypothesis of abnormal embryogenic activity of periosteum
5. Treatment is extraperiosteal total excisional biopsy

175. MULTIPLE EXOSTOSIS

12 Years - Female

- C/o. left knee pain on inner aspect

History

- Left knee pain on the medial aspect of leg
- Dull aching type, non-radiating
- Disturbs sleep
- Worsening with sports activities
- No H/o.trauma / constitutional symptoms
- No family H/o. bony swelling

O/E Inspection

- Diffuse swelling anterolateral aspect of (L) knee
- No scars / sinuses

Palpation

- 2 x 1 cm mass + medial distal tibia
- 2 x 2 cm mass in medial proximal tibia
- Bony hard in consistency
- Not warm
- No joint effusion / tenderness
- No neurovascular deficit

Movements: Knee

- ROM – full and free

Investigations

- X-ray (L) Knee – AP / Lat – Multiple pedunculated bony swelling in distal femur and proximal tibia, no periosteal reaction

Important Points

1. Most common benign bone tumor
2. 90% solitary lesion, sessile / pedunculated
3. 10% occur in inheritable form of multiple exostosis
4. Male : female (1:1), 80% in Ist decade of life
5. Associated with ulnar deformation, radial head dislocation, coxa valga, genu valgum, genu recurvatum, LLD in lower extremities
6. Malignant degeneration is the most significant potential problem

176. CHONDROBLASTOMA

18 Years - Female

- C/o. pain and swelling in (R) upper leg past 6 months

History

- Apparently normal 6 months back
- Developed pain, continuous, more in night, aggravated by exertion in (R) leg, gradually increasing in size
- Associated with pain on movement and limp
- No H/o. trauma / constitutional symptoms
- No H/o. similar swellings elsewhere in the body

O/E

Inspection

- Diffuse swelling + in anteromedial aspect of right proximal tibia
- No stretching of skin / dilated veins / scars / sinuses
- Gross wasting of muscles +
- Painful restriction of movements +

Palpation

- Warmth + / tenderness +
- Firm in consistency – margins are ill defined
- Knee joint effusion +
- No regional lymphadenopathy
- No DNVD

Movements

- (R) Knee – flexion – 0^0 – 120^0 – flexion painful

Measurements

- (R) Leg 4 cm less in girth than (L) leg

Investigations

- X-ray (R) Knee AP / Lat - Round lytic area in the epiphysis of proximal tibia with rim of sclerosis +
- Punctate calcification +

Important Points

1. Chondroblastoma is a rare benign bone tumour from immature cartilage cell of epiphysis
2. Also known as Codman's tumour : <1% of 1^0 bone tumor
3. Common in Ist & IInd decade of life in males
4. Common bones involved are proximal humerus, proximal tibia and distal femur
5. Pain and swelling are the common symptoms
6. The highly capricious nature of this tumour leads to an aggressive clinical behaviour, increased local recurrence rate and even rare metastasis
7. Surgical excision remains the treatment of choice

177. SYNOVIAL SARCOMA

30 Years - Male

- C/o. swelling behind his (L) knee past 4 months

History

- Noticed a small swelling behind (L) knee, 4 months back, progressively increasing in size
- Not painful, not associated with joint swellings
- Associated with difficulty in squatting
- No H/o. trauma / constitutional symptoms
- No H/o. any other swellings in the body

O/E

Inspection

- No knee joint swelling
- 3 x 2 cm swelling (+) in post aspect of (L) knee (Popliteal fossa)
- No sinus / discharge

Palpation

- Firm to hard – variable consistency
- Warm – not tender
- Not pulsatile, not attached to skin, not compressible
- No DNVD

Movements

- Flexion - 0^0 - 100^0 further flexion restricted & painful
- Extension - 0^0 - 5^0

Investigations

- X-ray (L) knee AP / Lat : no mass visible
- FNAC : Biphasic spindle & granular cells (+) sugg. of synovial sarcoma
- Doppler study : popliteal vessels free; no vascular invasion

Important Points

1. Rare and aggressive soft tissue malignant tumour which begins near joints
2. Arise from tendon, bursae and synovium
3. Occur mainly near large joints, common location being knee joint
4. 3^{rd} & 4^{th} decade, men > women
5. Etiology is unknown; characterized by chromosomal translocation in chr 18
6. Treatment includes surgery, radiation and chemotherapy
7. Survival rate is 50% at 5 years which increases to 73% with chemotherapy

178. FIBROUS DYSPLASIA

16 Years - Female

- Presenting to the orthopaedic OP with pain and deformity in her right hip joint for the past one year

Inspection

General examination:

- Café-au-lait-spots are present all over the body
- Sexual precocity noted
- Thyroid swelling +

Local Examination

- Right lower limb more externally rotated than the left
- ASIS same level

Palpation

- Tenderness + in proximal femoral shaft below the trochanteric flare

Movements

- Abduction and internal rotation restricted at extremes

Investigations

- X-ray of Rt hip with thigh: AP/ Lat :
- Lucent area appearing as fine and granular like a ground glass. There is expansion of bone in the proximal femoral shaft with thinning of the cortex and numerous trabeculated cysts

Laboratory Findings

- Blood calcium, phosphorus, alkaline phosphatase were within normal limits
- **Biopsy:** Bony trabeculae formation in a stroma of fibrous tissue

Diagnosis

- Fibrous dysplasia

Discussion

- Also called osteitis fibrosa Juvenalis, Osteodystrophica fibrosa, Albright's disease (Polyostotic form)
- Other types: mono ostotic, monomelic fibrous dysplasia
- Developmental disorder of bone forming mesenchyme
- Most commonly involves femur, tibia, humerus or radius. Rarely skin or jaw may be affected
- Weight bearing bones may go in for bending and deformity (Shepherd's crook deformity) as in this case or pathological fracture
- Management is by curettage and packing the defect by autogenous cancellous bonegraft, internal fixation of pathological fracture, osteotomy correction of deformity and internal fixation
- It is a self limiting condition
- Complication of malignant change following radiotherapy is reported (Sarcoma)
- D/D includes Hyperparathyroidism

179. MULTIPLE MYELOMA

60 Years - Male

- C/o. low back ache – past 5 months

History

- LBA – past 5 months – aggravated for past 5 days; insidious onset, continuous, non-radiating
- Aggravated by work
- H/o. loss of weight (significant) and loss of appetite
- No H/o. trauma / constitutional symptoms
- No past H/o. significant illness

O/E

Inspection

- Moderately built and poorly nourished
- No deformity / swelling / scars

Palpation

- Diffuse tenderness (+) in lower back
- No palpable deformity / swellings

Movements

- B/L SLRT negative
- ROM of spine – painful and restricted
- No neurological deficit

Investigation

- X-ray LS spine – AP / Lat : Diffuse osteopenia (+), E/o. Wedge # of L2 (+), osteolytic lesion + in L4 L5 and iliac crest
- Urine – Bence Jones Protein (+)
- S.electrophoresis – positive for M.band

Important Points

1. Multiple Myeloma is a malignant B-cell lymphoproliferative disorder of the bone marrow
2. The effects on bone are due to marrow cell proliferation and increased osteoclastic activity
3. The patient is typically in 3rd / 4th decade with weakness, backache, bone pain or pathological fracture
4. The classic lesions include multiple punched out defects with soft margin in the skull, pelvis and proximal femur
5. The treatment includes pain relief, management of pathological fracture and specific therapy with alkylating cytotoxic agents (Melphalan)

180. SOLITARY PLASMACYTOMA

60 Years - Male

- Presenting to orthopaedic OP following trivial fall with pain. swelling, deformity (Rt) thigh and inability to walk

O/E

- Patient moderately built and nourished.
- Rt lower limb shortening +
- Swelling, deformity + M/3 Rt thigh
- No DNVD

Palpation

- Swelling, tenderness, abnormal mobility + M/3, Rt thigh
- Crepitus +
- No regional lymphadenopathy

Investigation

- X-ray of the Rt thigh→ AP / Lat: Punched out osteolytic lesion of M/3 of (R) femur with loss of cortical continuity in the lesion due to pathological fracture noted
- Skeletal survey: Normal except for the lesion mentioned above

Lab Findings →

- Serum alkaline phophatase elevated
- Serum immunoelectrophoresis shows monoclonal spike
- Urine +ve for Bence Jones Protein

Biopsy

- Plasma cells in a cellular background positive for CD56 and are monoclonal in origin

Discussion

- Solitary plasmacytoma is a rare variant of multiple myeloma
- In the long run it becomes full blown multiple myeloma
- Often presents as pathological fracture
- Management is by primary chemotherapy
- For individual lesion wide resection and internal fixation is advised

181. TENDON SHEATH TUMOUR

32 Years - Male

- C/o. pain and swelling in the left index finger – past 3 months
- Swelling started first, insidious, rapidly progressive, associated with pain for past 1 month, continuous, dullaching
- No H/o. trauma / constitutional symptoms
- No H/o. any other swellings / joint pain

O/E. Inspection

- Globular eccentric swelling near the middle phalanx of left index finger
- No dilated veins / scars

Palpation

- No warmth, mild tenderness
- Restriction of movement of Left index finger

Investigations

- **X-ray Lt Hand – AP / Oblique**
  a) Eeosion of middle phalanx of (L) index finger
  b) No periosteal reaction
- FNAC: Histiocytes with giant cells and haemosiderin

Diagnosis

- Tendon sheath giant cell tumour

Important Points

1. GCT of tendon sheath is a relatively common tumour usually involving the tendon sheaths of adult finger
2. It first appears as enlarging but painless mass
3. X-ray shows bony erosion from without
4. Histology is characteristic and treatment is by marginal excision

182. ENCHONDROMA

30 Years - Male

- Came with C/o. pain and swelling on his left hand fingers for the past 6 months. H/o. trivial injury (hitting at the door+) following which he had swelling and pain in middle phalanx

Clinical Findings

- Moderately built and nourished

Inspection

- Swelling, deformity Lt middle finger, middle phalanx
- Palpation: Crepitus + Lt middle finger middle phalanx

Investigations

X-ray of Lt Hand AP and Oblique

- Central well circumscribed area of rarefaction most frequently diaphyseal, expansion of surrounding cortex noted in the phalanges and metacarpals

Diagnosis

- Enchondroma

Discussion

- Also called as Cartilagenous hamartoma
- Most common age group IInd – IVth decades
- Rarely femur and tibia are involved
- D/D bone infarct, bone islands
- Curettage and filling the defect with bone grafts
- Can become malignant (Chondrosarcoma)

183. SECONDARIES SPINE

60 Years - Male

C/o. low back pain – past 5 months

History

- LBA past 5 months – insidious, onset, continuous non-radiating
- Gradually progressive, now unable to stand / walk
- H/o. night pain (+)
- H/o. significant loss of weight & loss of appetite
- No H/o. trauma / constitutional symptoms
- Had surgery for BPH 1 year back

O/E Spine – Inspection

- Moderately built
- No deformity / swelling / scars

Palpation

- Diffuse tenderness (+) in lower back
- No palpable deformity / swelling

N/E

- No distal neurological deficit
- Distal pulses (+)

Investigation

- X-ray pelvis (AP) : diffuse osteopenia with multiple osteolytic lesion in lumbar spine of pelvis
- S.alkaline phosphatase and serum prostate specific antigen (PSA) : elevated

Important Points

1. The skeleton is the one of the commonest sites of secondary metastasis in patients > 50 years
2. The commonest source includes breast carcinoma, cancer of prostate, kidney and thyroid
3. The commonest sites includes vertebrae, pelvis, proximal half of femur and humerus
4. Metastases are usually osteolytic and pathological fractures are common
5. Pain is the commonest and often the only clinical feature
6. The treatment is usually supportive and palliative radiotherapy, hormonal therapy or chemotherapy

184. FIBROSARCOMA

44 Years - Female

- C/o. pain just above (L) knee – past 6 months
- Swelling above (L) knee : past 2 months

History

- Pain initially mild, gradually progressive, limiting weight bearing and walking, now continuous
- Night cries +
- Swelling – diffuse, increasing in size of (L) thigh
- Associated with limitations of movements of knee
- No H/o. trauma / constitutional symptoms
- No H/o. family members with similar complaints

O/E

Inspection

- Diffuse swelling in the distal aspect of (L) thigh
- Effusion of (L) knee +
- No sinus / scars / dilated veins

Palpation

- Warmth + / tenderness +
- Diffuse swelling – margins ill-defined
- Firm to hard in consistency – irregularity of distal femur +, synovial effusion +
- No DNVD

Movements

- ROM of (L) knee limited due to pain flexion $10^0 - 90^0$

Measurements

- 6 cm increase in the circumference of (L) thigh when compared to right

Investigations

- X-ray (L) Thigh AP / Lat = Eccentric osteolytic lesion in the metaphysis of (L) femur with absence of calcification and periosteal new bone formation suggestive of fibrosarcoma

Important Points

1. Fibrosarcoma is a rare malignancy, characterized by proliferation of spindle cells without any discoverable matrix production
2. Occurs in IInd to VIth decade : male = female
3. Commonly occur in distal femur or proximal tibial metaphysis
4. Present with pain and pathological fracture
5. No pathognomic radiographic features for fibrosarcoma
6. Treatment of choice is wide surgical resection.
7. Radiotherapy may be palliative

185. CHORDOMA SACRUM

22 Years - Male

- C/o. pain and swelling in mid gluteal region – 6 months
- Weakness of B/L lower limbs for past 4 months

History

- Noticed a swelling in the lower back mid gluteal region 6 months back
- Swelling gradually increasing in size, associated with pain
- H/o. low backache for past one year, treated conservatively with analgesics
- Now has weakness of bilateral lower limb → incapacitating him from standing / walking
- No H/o. trauma / constitutional symptoms

O/E. Inspection

- 8x12 cm mass present in the sacral region
- Skin smooth, dilated veins +, no scars / sinuses
- Edges well defined
- Patient could not stand or walk

Palpation

- Bony hard mass arising from sacrum
- Non-tender, edges well-defined, surface smooth, hard in consistency
- Mass palpable by doing a P. R. examination

N/E

			Rt	**Lt**
Tone	Upper limb		N	N
	Lower limb		↓	↓
Power	Upper limb		5/5	5/5
	Lower limb			
		Hip		
		Knee	4/5	4/5
		Ankle		
		EHL/FHL		
DTR		KJ	++	++
		AJ		
No sensory deficit			++	++

X-ray pelvis with both hips

- Radiolucent lesion in the sacrum with puntate calcification.

MRI Pelvis

- 8 x 10 cm swelling with altered signal intensity arising from sacrum compressing nerve roots

Diagnosis

- Chordoma sacrum

Important Points

1. Chordoma is a rare malignant tumour which arises from primitive notochordal remnants
2. It affects young adults and usually presents as a slow growing mass in the sacrum. In late cases there may also be neurological signs
3. Treatment options include wide local excision with local radiotherapy

186. EWING'S SARCOMA

8 Years - Male

- C/o. pain and swelling of (L) thigh past 2 months

History

- Apparently normal 2 months back
- Developed swelling of (L) thigh, gradually increasing, associated with pain, malaise & fever
- Not able to walk / bear weight past 7 months
- No H/o. trauma
- No H/o. exposure to TB / other swellings in the body

O/E - Inspection

- Diffuse swelling of the left thigh +
- Skin stretched, no sinus / scars
- Movements of left hip and knee limited due to pain

Palpation

- Warmth +, tenderness +, diffuse swelling of thigh +
- Effusion of knee joint +
- No sinus / discharge
- No DNVD

Movements

- (R) Hip – 0^0 - 70^0 flexion, 0^0 – 10^0 extension; (R) Knee 0^0 – 90^0 flexion, 0^0 – 5^0 extension

Measurement

- 4 cm ↑ in girth of (L) thigh when compared to right

Investigation

- ESR : Elevated - CRP : Elevated

Radiograph

- Cortical destruction with moth eaten appearance of (L) femur +
- Cortical destruction with periosteal elevation
- 'Onion skin' appearance +
- FNAC : small round cell without matrix – suggestive of Ewing's sarcoma

Important Points

1. Ewings sarcoma of bone is a highly anaplastic small round cell tumour
2. Occur in I/II decades of life : males > females
3. 60% occurs in pelvic girdle and lower extremity, diaphysis of long bones
4. Pain and swelling with constitutional symptoms, mimics infection
5. Mainstay of treatment – multiagent chemotherapy
6. Limb salvage surgery with radiotherapy is used for local control

187. CERVICAL RIB

34 Years - Female

- C/o. numbness of (R) forearm and hand – past 5 months

History

- Numbness of (R) forearm & hand – more on inner aspect associated with pain and tingling sensation radiating down the (R) arm to hand. Relieved on rest
- No H/o. trauma / constitutional symptoms
- No significant past medical history
- Symptoms are more in the night

O/E : (R) Forearm and Hand

Inspection

- Wasting of hypothenar muscles of (R) hand +
- No scars / swellings / dilated veins

Palpation

- No warmth / tenderness
- Altered sensation in C8,T1, dermatome of (R) hand
- Adsons test +
- Bruit felt in (R) subclavian artery
- Distal pulses felt

Movements

- ROM full (R wrist and hand)

Investigation

- X-ray C spine AP – Lat : Rudimentary cervical rib (R) – type II

Important Points

1. Neurovascular symptoms and signs in the upper limb may be produced by compression of the lower roots of brachial plexus (8,7). [Thoracic outlet syndrome]
2. The causes range from anomalous scalene muscle to extra rib which cause compression
3. Most patients can be managed by conservative treatment
4. Operative treatment includes decompression by removal of the cervical rib either by a supraclavicular approach or pre-axillary approach

188. NEUROPATHIC JOINT ELBOW

35 Years - Male

- C/o. inability to extend the elbow (L) – 6 months.

History

- Swelling - sudden onset
- Associated with painless abnormal mobility in all directions
- No H/o. trauma / fever

Inspection

- (L) Elbow – Grossly swollen
- Diffuse erythema around the joint present in stage of hydrarthrosis
- Skin over the swelling is shiny but not stretched

Palpation

- No warmth, No tenderness
- Swelling 10 x 8 cm – diffusely present all around the (L) elbow
- Coarse crepitations +; Egg shell like crackling

Movements

- Abnormal mobility in all directions present which is painless

Sensory Function

- Pain, touch, temperature, position sense absent on (L) side
- No vascular deficit

Investigation

- X-Ray (L) elbow – AP View – Disorganized Joint

Important Points

1. Neuropathic joint which arises frequently in cases of tabes dorsalis and syringomyelia was long considered syphilitic in origin, but is now known to occur following non-specific conditions such as prolonged steroid therapy, rheumatoid arthritis, chronic liver disease and administration of drugs such as indomethacin
2. The outstanding feature is the pronounced and rapid destruction of the articular surfaces. The compact bone underlying the cartilage is also destroyed until the cancellous tissue is laid bare. The capsule is thickened and intra articular ligaments are destroyed. The joint cavity is enlarged
3. There are three stages in neuropathy :
   a. Stage of hydrarthrosis, with distension of the joint by serous effusion – ligamentous laxity
   b. Stage of atrophy when there is destruction
   c. Stage of hypertrophy – new bone formation around the diaphysis

189. OSTEOGENESIS IMPERFECTA

5 Years - Male

- Was brought with C/o. short stature and failure to thrive since infancy

History

- 1st born male child to consanguinous parents by normal delivery
- Noticed to have large head and failure to thrive with decreased growth
- No H/o. fever / diarrhoea / recurrent respiratory tract illness
- No H/o. significant illness in past requiring hospitalization
- No family H/o. similar complaints

O/E Inspection

- Globular skull with blue sclera of eyes + Ht.:80cm, Wt.:16 kgs
- Kyphoscoliosis of spine with apex at D8+
- B/l genu varum (+)
- Irregular dentition (+)

Palpation

- Diaphysis of the long bones are narrow, with thickening of epiphysis
- Bending of bilateral femur and tibia (+) with malunited fractures

Movement

- All joints are hypermobile

Investigations

- X-ray skull : Wormian bones (+)
- X-ray chest (PA) : Thick, sharply bent ribs
- X-ray Dorsal Spine : Scoliosis to (R) at D8 apex

Important Points

1. Also known as ostetitis fragilitans, osteopsathyosis idiopathica
2. Due to mutation in the gene for type I collagen
3. Histopathologically there is a defect of the primitive mesenchymal cells to mature and calcify
4. Classified clinically into 4 types
5. Treatment involves prophylactic bracing of long bones, splinting / CMR of fractures and spinal braces
6. Prognosis depends on sub type and bone morphology, poor for fetal & infantile forms and fair in adolescent form

190. ACHONDROPLASIC DWARF

14 Years - Male

Brought with C/o. abnormal bend in back and short stature

History

- II born, male child born to consanguinous parents, apparently normal childhood and developmental milestones
- Was shorter than his peers and was recently noticed as having abnormal bend of his back
- No H/o. trauma / constitutional symptoms
- No significant family history

O/E

Inspection

- Disproportionate dwarfism with abnormally short limbs
- Finger tips do not reach below upper 1/3 of thigh
- Prominent fore head (+)
- Short stubby fingers (+)
- Hyperlordosis with prominent buttock

Palpation

- No abnormal swelling / deformity
- No neurological deficit

Radiographs

- X-ray pelvis with both hips: quadilateral shape of ilium with B/L coxa valga hips
- X-Ray B/L Hand : Short (fingers) (phalanges – Trident hand)
- X-Ray – B/L Thigh : Short diaphysis with flaring of metaphysis

Achondroplasia – Important Points

1. It is a hereditary autosomal dominant and congenital condition
2. There is abnormal enchondral ossification due to abnormal maturation of chondroblasts. Membranous ossification is normal
3. Most common type of dwarfism, and the child is dwarf from birth – short limbed dwarf. The length of trunk is not much affected
4. Neurological deficit may develop due to 2^0 spinal canal stenosis
5. Orthopaedic and neurological complications require treatment as they arise

191. OSTEOPOROSIS WITH KYPHOSIS

56 Years - Female

C/o. gradual bending of back with back pain - past 6 years

History

- C/o. gradually increasing curvature of back past 6 years
- Associated with pain; diffuse, continuous, with episodes of exacerbations
- No H/o. trauma / constitutional symptoms
- No H/o. chronic drug intake / medical illness
- Attained menopause 12 years back
- No bladder / bowel disturbances

O/E

Inspection

- Diffuse curvature of dorsolumbar spine (round)
- No gibbus / scars / sinuses

Palpation

- Diffuse tenderness of back +

Movement

- ROM – full, terminal restriction with pain
- No neurological deficit clinically

Investigations

- X-ray dorsolumbar spine AP / Lat
- Diffuse osteopenia of all vertebra with picture frame appearance :
  e/o. Old wedge # L_I and D_{II}; kyphosis +

Important Points

1. Osteoporosis is a generic term denoting a state of decreased mass per unit volume of a normally mineralised bone
2. Most common skeletal disorder in the world
3. Has a long latent period, before clinical symptoms develop
4. MC symptom is back pain secondary to vertebral compression
5. HRT, Bisphosphonates, calcitonin and fluorides are drugs used in osteoporosis
6. Complications include pathological fractures of hip, wrist and spine

192. RICKETS

3 Years - Female

- Brought with C/o. B/L deformities of legs – past 6 months
- Informant: Mother

History

- Deformity of legs bilateral – past 6 months – progressive
- Makes her to walk with difficulty
- 3rd child, born prematurely to non-consanguinous parents
- No significant past medical history
- Milestones were achieved normally

O/E Inspection

- Short and thinly built for age
- Delayed psycho motor development +
- Severe bowing of Rt leg and incurving of Lt leg +
- Bilateral thickened and widened wrists +

Palpation

- No effusion or warmth
- Tenderness in B/L knee joint line
- No valgus / varus instability
- ROM – full and painful
- Trendelenburg gait +

Measurement

- No limb length discrepancy

Important Points

1. Despite the possible causes the clinical presentation, histology and radiographic changes of rickets are virtually identical
2. All involve a relative decrease in calcium / phosphorus which interfere with epiphyseal growth and normal mineralisation of the skeleton in the growing child
3. Rachitic children are apathetic, irritable with profound affection of extremities
4. If the mal-alignment fails to improve after the underlying metabolic abnormality is corrected, bracing and / or surgery may be indicated

193. OSTEOPETROSIS

18 Years - Female

- Brought with C/o. progressively severe anaemia, increasing deafness and fracture of the (L) thigh following a trivial fall

History

- Apparently normal till 3 years back, started developing pallor and increasing deafness
- Had a fall due to slip, sustained injury to (L) thigh and was diagnosed to have a fracture
- No H/o. constitutional symptoms / significant illness in the past

O/E

Inspection

- Short stature for age
- Pallor (+)
- Swelling (+), over M/3 of (L) thigh
- No other deformity / swelling

Palpation

- Tenderness (+)
- Abnormal mobility of (L) thigh (+), PA : - Hepatosplenomegaly (+)
- No DNVD

Movements

- Movements of joints are within normal limits

Investigation

- X-Ray (L) Thigh AP and Lat : Dense and thickened femur with lots of trabeculations in medullary cavity with transverse # M/3 (L) femur
- X-ray Skull AP-Lat. : Dense skull bone with small pituitary fossa, with absent sinuses
- X-ray Dorsal Spine AP & Lat - Sclerotic vertebra with bands

Important Points

1. Osteopetrosis is a hereditary, congenital, autosomal recessive disease
2. Also known as Alber schonberg's disease (or) Marble bone disease, there appears to be failure of remodelling of bones
3. Both membranous and cartilaginous bones are involved. Any (or) all the bones may be affected and is usually symmetrical
4. Loss of marrow space leads to aplastic anemia and hepato splenomegaly and restriction of formina of skull lead to deafness, blindness and neurological deficits
5. Treatment is symptomatic. Bone marrow transplantation may be tried

194. PYKNODYSOSTOSIS

18 Years - Male

- Came with C/o. pain, abnormal mobility of (L) leg following a fall

History

- Apparently normal young male, had a fall due to a slip and sustained injury to (L) leg 3 days back
- C/o pain, abnormal mobility and inability to bear weight
- No H/o. significant trauma / constitutional symptoms

O/e : Inspection

- Short statured with globular head and prominent mandible
- Swelling (+) in (L) leg mid1/3
- No other swellings / deformity

Palpation

- Tenderness (+)
- Abnormal mobility (+), crepitus (+) M/3 (L) leg
- No DNVD

Radiograph

- X-ray (L) leg AP / Lat : Increased density of the (L) leg bones with loss of trabeculations and transverse # M / 3
- X-ray B/L Thigh AP / Lat : Increased density with intact medullary canal and unicortical fractures
- X-ray Skull AP / Lat : Brachycephaly (+)
- X-ray Pelvis AP : abnormally increased density of Iliac bones with E/o. healed fractures

Important Points

1. Pyknodyostosis is a abnormal idiopathic bone disease characterized by increased density of the bones (abnormal osteopetrosis)
2. Characterized by short stature, tendency to fracture, brachycephaly, short stubby fingers and increased angulation of mandible with abnormal dendition
3. There is no affection of medullary canal and hence hemopoietic system is undisturbed
4. Treatment is symptomatic

195. MARFAN'S SYNDROME

18 Years - Male

- C/o. transient pain and hyper mobility in joints of upper and lower limb – past 4 years

History

- Apparently normal 4 years back, started to have pain in the upper and lower limb joints on and off
- Dull aching type, aggravated by work and playing, relieved by rest and analgesics
- Associated with hyper mobility of joints since childhood
- No H/o. significant medical illness in the past

O/E

Inspection

- Tall, thin built, dis-proportionately long leg +
- Pectus excavatum (+), spider fingers (+)
- Dorsal kyphoscoliosis (+)

Palpation

- No swelling / tenderness of joints
- Hyperextension of elbows and knees +
- Passive hyperextension of MCP > 90^0

Movements

- All joints are lax

DD

- Homocystinuria

Important Points

1. Marfan's syndrome is a generalized disorder affecting skeleton, joints, ligaments, eyes and cardiovascular system
2. Due to cross linkage defect in collagen
3. Autosomal dominant disorder with defect in fibrillin gene in chromosome 15
4. Transient joint pains are common with associated increased risk of joint sprains
5. Patients occasionally need treatment for scoliosis or flat feet

196. NEUROFIBROMATOSIS

23 Years - Male

- C/o. abnormal thickening of skin over (R) shoulder with sideways bending of back (dorsal spine) – past 6 years

History

- Apparently normal 6 years back
- Developed skin abnormality with over growth over (R) shoulder which is gradually increasing in size
- Has abnormal / bend in the back – also progressive
- No H/o. trauma
- No H/o. constitutional symptoms

O/E

Inspection

- Multiple café-au-lait spots in the body
- Plexiform neurofibromatous thickening of (R) shoulder
- Dorsal scoliosis to left with rib hump +
- Forward bending makes the curve more obvious

Palpation

- Deviation of midline of spinous process to left
- Dorsal scoliosis with rib hump (+)
- Secondary compensatory curves +
- Plumb – line test : balance +

Movements

- Fixed scoliosis – bend prominent on flexion
- No distal neurovascular deficits

Investigations

- Xray – Dorsal Spine (PA) – Cobb's angle of 40^0 with apex at D6

Important Points

1. Neurofibromatosis is a single gene disorder – two types are
   i) NF – 1 : (Von Recklinghausen's Disease) in chromosome 17
   ii) NF – 2 : chromosome 21
2. Clinical presentation include multiple skin patches – café au lait spots, neurofibromata and neuroma
3. Orthopaedic manifestations include dystrophies, spinal deformities, scoliosis and congenital tibial dysplasia and pseudoarthrosis

197. MORQUIO'S DISEASE

5 Years - Male

- Child brought with C/o. deformity of spine and abnormal gait since 2 years
- Informant : Mother

History

- Deformity of back with forward bending since childhood; progressively increasing
- Associated with short stature and abnormal gait
- Birth and immunization histories are normal
- Delayed developmental milestones +

O/E

Inspection

- Kyphotic deformity of dorsolumbar spine +
- Coarse facies with macrocephaly
- Chin on chest deformity (+)
- B/L genu valgum (+)

Palpation

- Flexible scoliosis deformity (+) with abnormally lax mobility of all major joints
- Gait – waddling gait with B/L Trendelenburg sign +

Investigations

- X-ray DL spine – AP / Lat – platyspondly with hypoplastic vertebra
- Manubrio sternal angle > 70^0
- Urine for MPS : Keratan sulfate +

Important Points

1. Mucopolysaccharidoses are a group of single gene disorders characterized by deficiency of enzymes leading to abnormal accumulation of GAG
2. Depending upon the deficiency of enzyme 10 different disorders are recognized
3. Morqiuo Brailsford syndrome is MPS type IV due to deficiency of N-acetyl galactosamine 4 sulphate
4. It presents with multiple orthopaedic manifestations like genu valgum, scoliosis, coxa valga and atlanto axial instability
5. There is no specific treatment. Treatment is addressed to symptoms

198. LIMB GIRDLE MUSCLE DYSTROPHY

16 Years - Male

- C/o. progressive weakening of both upper and lower limbs for past 2 years

History

- C/o. progressive weakness of all 4 limbs
- Difficulty in rising from chair
- Difficulty in using arms above the head
- C/o. unstable gait and difficulty in running and climbing stairs
- No past H/o. significant medical illness
- No family H/o. similar medical illness
- Birth and immunization history are normal

O/E

Inspection

- Thinly built and malnourished
- No other obvious deformity

Palpation

- Decreased tone of all muscles
- *N/E upper limb*

		R	L
	Shoulder	3/5	3/5
	Elbow	4/5	4/5
	Wrist	5/5	5/5
	Fingers	5/5	5/5
Lower limb			
	Hip	3/5	3/5
	Knee	5/5	5/5
	Ankle	5/5	5/5
	EHL / FHL	5/5	5/5
Reflexes :	DTR UL	++	++
	LL	++	++

- **Sensation :** no sensory deficits

Gait

- Waddling gait

Investigations

- X-ray shoulder and hip (AP) : No bony abnormality
- Muscle biopsy : features of muscle dystrophy
- Serum CPK : Increased

Important Points

1. Limb girdle muscle dystrophy is an autosomal recessive disorder, much less debilitating than Duchenne type
2. Characterized by pelvic girdle and pectoral girdle weakness
3. The disease is slowly progressive and by fifth decade the disability is usually marked
4. Treatment consists of physiotherapy and splintages to prevent contractures and operative correction if necessary

199. CLEIDOCRANIAL DYSPLASIA

12 Years - Male

- Brought with C/o. drooping of bilateral shoulders since childhood

History

- 1st born, male child to non-consanguinous parents, FTNVD
- Normal developmental milestones
- No H/o. injury / other medical illness

O/E

Inspections

- Short for age (dwarf) with narrow chest wall
- Flat facial features, frontal prominence with bilateral shoulder drooping
- Movements of shoulders full
- No clinical spinal abnormality

Palpation

- B/L absence of clavicles (+) with hypo plastic medial ends
- No tenderness of chest wall / spine
- No abnormal mobility / laxity of joints

Movements

- Movements of spine – normal
- Abnormal movement – both shoulders could be brought anteriorly to touch each other
- Other movements of shoulder, elbow and hands are normal

Investigations

X-Ray Skull (Ap/Lat)

- Brachycephaly, wormian bones (+)

X-Ray Chest (Ap)

- B/L hypoplastic clavicles with remnant at medial ends

Diagnosis

- Cleidocranial Dysplasia

Important Points

1. It is a disorder of autosomal dominant inheritance, characterised by hypoplasia of clavicles and flat bones
2. There is underdevelopment of clavicle, scapulae and pelvis
3. Scoliosis, coxa vara and dental anomalies are common
4. Treatment is unnecessary unless the patient has significant coxa vara or scoliosis