
UNIT 3 FRACTURES AND OTHER MUSCULOTENDINOUS DISORDERS

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3.0 OBJECTIVES

After reading this unit, you should be able to:

- identify the common sites of fractures which occur due to fall;
- discuss bone tumours and other musculotendinous disorders; and
- plan treatment and refer the case to specialist in case of difficulty.

3.1 INTRODUCTION

You have already read about the diseases of joints in the previous unit. In this unit you shall learn about fractures and other musculotendinous disorders. Fractures are common in elderly. The main reason being increased probability of falls and osteoporosis which is very common in this age. The most common fractures encountered are fracture of neck of femur, trochanteric region of femur and lower end of radius.

Bone tumours especially the malignant ones are more common in this age group. The two mostly found are multiple myeloma and metastatic bone secondaries. The secondary tumours are more common than primary. The common sites from which metastasis occur are breast and prostate.

You will also learn about commonly presenting musculotendinous disorders. Among these are frozen shoulder, complete tear of supraspinatus tendon, painful arc syndrome and polymyalgia rheumatica.

3.2 FRACTURES

Did you ever realise the importance of fall in elderly persons? Fall is one of the important presenting symptom in elderly.

Falls have been discussed in details in the Unit-5 of Block-4, Course-3.

Fractures due to fall are common in elderly patients. Since osteoporosis is commoner in females than males, so fractures occur more often in female. Common sites of fractures in old people are:

- 1) Neck of femur
- 2) Trochanteric region of femur
- 3) Lower end of the radius (Colles's fracture)

3.2.1 Fracture of the Neck of Femur

Some of you might have seen in your clinical practice that fractures of the neck of femur is common in elderly over the age of 60 years, in whom there is a tendency of the bone to become increasingly fragile due to osteoporosis.

The cause of injury is usually a fall or stumble which produces rotational strain on the neck of femur resulting into fracture. This fracture is also called intracapsular fracture.

On the basis of displacement of fragments, it is classified into two types:

- 1) **Displaced Fracture:** In majority of cases the distal fragment (attached to shaft of femur) is markedly displaced upwards and rotate laterally.
- 2) **Impacted Undisplaced Fracture:** The two fragments are firmly impacted together with slight abduction of the distal fragment upon the proximal. It is less common as compared to the displaced one.

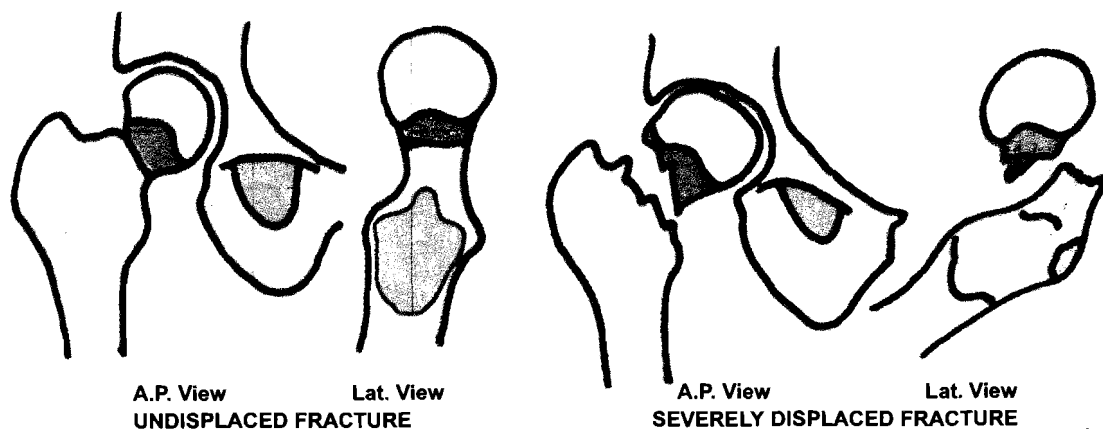


Fig. 3.1: Fractures of neck of femur

Clinical Features

In a case of displaced fracture, you may find a typical history of tripping and falling and the elderly person was unable to stand unaided. He/she was subsequently unable to take weight on the injured limb. On examination you can see that there is marked lateral rotation of limb with 2-3 cm. shortening. Any movement at hip causes severe pain.

Impacted undisplaced fracture is less common. The history will reveal that the patient was able to get up herself/himself after falling and was able to walk a few steps with assistance. These patient usually report late when pain is not relieved. On examination you will not detect any rotation and shortening in the injured limb. Movements at hip are possible with less pain.

Radiograph

X-ray films of hip joint in antero-posterior and lateral views are must to confirm the diagnosis. Undisplaced impacted fractures is better visualized in lateral view.

Management

The management of fracture starts right from the accident site i.e. proper transportation of fracture patient to the place of treatment. It is so because improper transportation can make the fracture worse. Transportation of hip fracture patient is discussed here just to refresh your past learning.

Transportation

After treating the shock if it is there, immobilize the thigh by bandaging to the sound limb with padding up to below knee, if splint is not available. If it is available, then apply a padded splint between legs from crotch to the foot and tie the feet and ankles with figure of eight. Apply another well padded splint from axilla to the foot on the side of affected limb and tie with broad bandages at different levels viz. below arm pit over the chest, hip joint level over pelvis, both ankles and feet, both thighs, both legs and both knees. The patient should be lifted in one piece and carried on the stretcher or a hard wooden board to the place to treatment.

Management of these fractures, whether displaced or impacted, is almost always operation. The basic objective of doing surgery in elderly patient is to avoid prolonged bed rest or external immobilization because they develop serious complications due to prolonged bed rest which increases the mortality to a great extent.

Complications of Prolonged Immobilization

Two types of complications can occur following fracture in elderly:

- 1) **General:** They are venous thrombosis, pulmonary embolism, hypostatic pneumonia, urinary tract infection, decubitus ulcers and constipation.
- 2) **Local:**
 - a) **Avascular Necrosis** — Due to severed blood supply to the femoral head from nutrient vessels of bone and capsular vessels in displaced fractures.
 - b) **Non-union** — In late stages, it is due to collapse of head femur due to avascular necrosis.
 - c) **Secondary OA** — This occurs due to mechanical damage of the articular cartilage at the time of injury or due to avascular neurosis.

These complications can be prevented by appropriate and prompt surgery, so that the patient is out of bed at the earliest possible time. Therefore these patients should be referred to an orthopaedic surgeon in a hospital/centre if these facilities are not existing in your set up.

Surgical procedure is selected on the basis of time period from the injury.

If the fracture is recent, open reduction and internal fixation is done. If the fracture is untreated for more than 4 weeks, then the choice of operation is Replacement Arthroplasty. In this head and neck of femur is excised and replaced by a metallic prosthesis (Austin Moore or Thompson Prosthesis). After a few days of operation, the patient can start walking with partial weight on the affected limb. Now-a-days, in severely osteoporotic/osteoarthritic hip, total hip replacement is also done.

3.2.2 Fracture of Trochanteric Region of Femur

Any fracture in the proximal femur that occurs in area between greater and lesser trochanter is called trochanteric fracture. Since the fracture lies distal to the femoral attachment of hip joint capsule, it is also called extra capsular fracture of neck femur. This fracture is common in elderly patients especially women of 70-80 years of age where bones have become weak due to osteoporosis. The cause is always a fall or stumble.

Clinical Features

The history is almost same as in case of fracture neck femur. On examinations you may find the limb in external rotation and short (due to proximal displacement of femoral shaft fragment at the fracture site). There is tenderness over trochanteric region and hip movements are painful and limited. After a day or two ecchymosis may appear in upper thigh due to extravasated blood, (a feature not seen in femoral neck fracture, where the haematoma is retained within the joint capsule).

Radiograph

X-ray of hip joints in AP and lateral views confirms the fracture and show the degree of displacement and comminution at the fracture site.

Management

Trochanteric fractures unite readily as the bone at fracture site is cancellous in nature. Management is aimed at preventing malunion and complications of prolonged immobilization in bed. These fractures can be managed by conservative and operative methods.

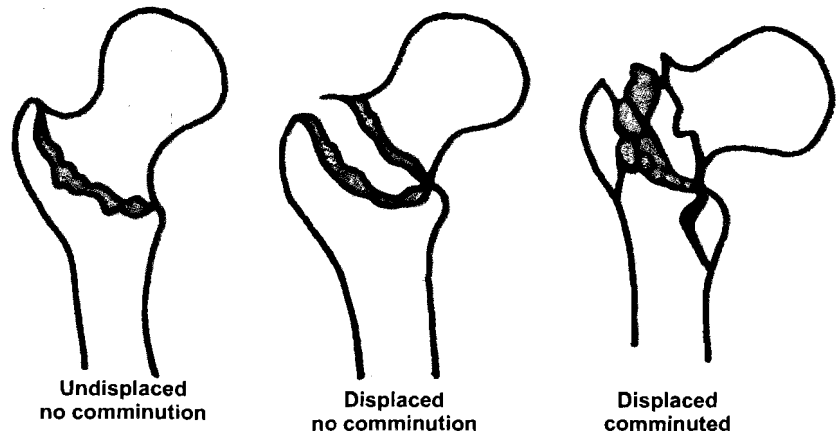


Fig. 3.2: Trochanteric Fracture

Conservative Management: It is done only in patients who are not fit for operation or having severe osteoporosis. Skeletal traction is applied to the leg and hip is kept in slight abduction and neutral rotation by pulleys and pillows for 6 weeks. After that active hip and knee mobilising exercises are started. Weight bearing is deferred for about 4-6 months from injury until there is radiological evidence of union of the fracture.

Operative Management: Cases who can withstand the stress of surgery are operated under general or spinal anaesthesia. Under X-ray control, open reduction and internal fixation with Nail Plate is performed. Now-a-days, external fixators are being used to immobilize and fix the fracture which does not require major surgery and also give excellent results. If the fixation is good, the patient can start sitting up and non-weight bearing crutch walking can be started later on, well before the radiological evidence of union of fracture.

Complications

Apart from General complication as we have discussed earlier, local complication are malunion (common) and failure of fixator device (due to osteoporosis).

3.2.3 Fracture of the Lower End of Radius

Colles's Fracture

This is the commonest fracture around wrist, usually occurs in women after the age of 50. The cause is always a fall on the out-stretched hand. The radius is fractured approximately one inch proximal to the distal articular surface. Fracture may sometimes remain undisplaced, but it is mostly a displaced fracture with distal fragment moving in proximal, lateral and posterior direction.

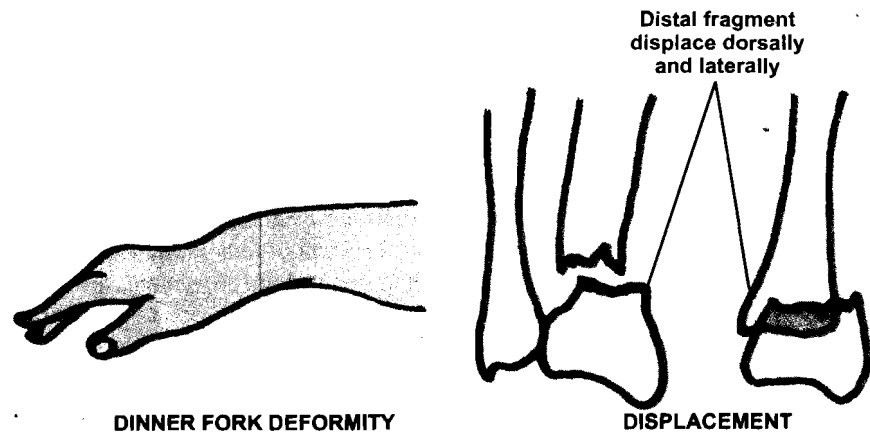


Fig. 3.3: Colles' fracture

Clinical features

On examination, you will see a typical deformity called Dinner Fork deformity in grossly displaced Colles's fracture. Tenderness and swelling is present over the distal radius, wrist movements especially supination and pronation are limited and very painful.

Radiograph

X-ray of wrist in AP and lateral views show the direction and degree of displacement. You may sometimes find comminution at fracture site along with fracture of ulnar styloid process.

Management

First aid is very important in all fracture cases. For proper orthopaedic management, the patient must be referred to an orthopaedic Surgeons in a hospital or clinic having X-ray or plaster application facilities.

Whenever you suspect a wrist fracture in an elderly, place elbow in 90° flexion across the chest with palm facing chest. If no splint is available, improvise it by rolling a folder, newspaper or magazine round the forearm and wrist. Apply bandage first covering the fracture site, then turn it into figure-of-eight around wrist and hand. Finally support the limb by a broad arm sling.

Plaster Immobilization

Displaced Colle's fracture can be easily reduced by closed manipulation performed under general anesthesia. All displacements are corrected. Following reduction wrist is immobilised in below elbow plaster in full pronation, slight flexion at wrist and ulnar deviation, for 6 weeks. Meanwhile regular active finger movement, elbow and shoulder mobilizing exercises are advised to avoid stiffness in the joints. After removal of plaster, more intensive exercises of wrist and hand are taught. Hot and moist fomentation and paraffin wax bath is also helpful in mobilising joints of hand and wrist.

Check Your Progress 1

1) What are the common sites of fracture due to fall in elderly?

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2) What are general complications of prolonged immobilisation?

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3.3 BONE TUMOURS

Malignant bone tumours usually occur in older age group while benign ones are in adolescent and young adults. In this section you will read two conditions, multiple myeloma (a primary bone Tumour) and secondary metastatic bone tumour which are occasionally seen in elderly patients. The patients usually present with progressive back pain, not associated with exertion or inactivity often worsening at night. These tumours grow faster, penetrate local tissues and spread to distant sites.

3.3.1 Multiple Myeloma

It arises from plasma cells of bone marrow and presents as multiple tumour masses or a solitary lesion involving bones that contain abundant red marrow e.g. spine. This tumour has invariably fatal outcome within 2-5 years.

Clinical Features

In most cases the tumour affects adults of past middle age (40-60 years), men are affected twice as often as women. The patients commonly complain of local bone pain, weakness, backache and general ill health. Root pains or paraplegia may be present if the nerve roots and spinal cord are compressed by tumour. Pathological fractures in vertebrae are common. As more and more of bone marrow is replaced by tumour tissue, anaemia progresses. Generalized bone resorption results hypercalcemia, hypercalciuria and ectopic calcification in kidney, lungs and other tissues. Renal tubules get blocked with plugs of proteins which lead to renal stone and nephrocalcinosis. Amyloidosis can also occur in long-standing cases.

Radiograph

Radiographs of ribs, vertebral bodies, pelvic bones, proximal end of femur and humerus show multiple small osteolytic areas, osteoporosis and pathological fractures.

Radio-isotopic bone scanning is more helpful in diagnosis and show increased uptake of the isotope in the individual lesions.

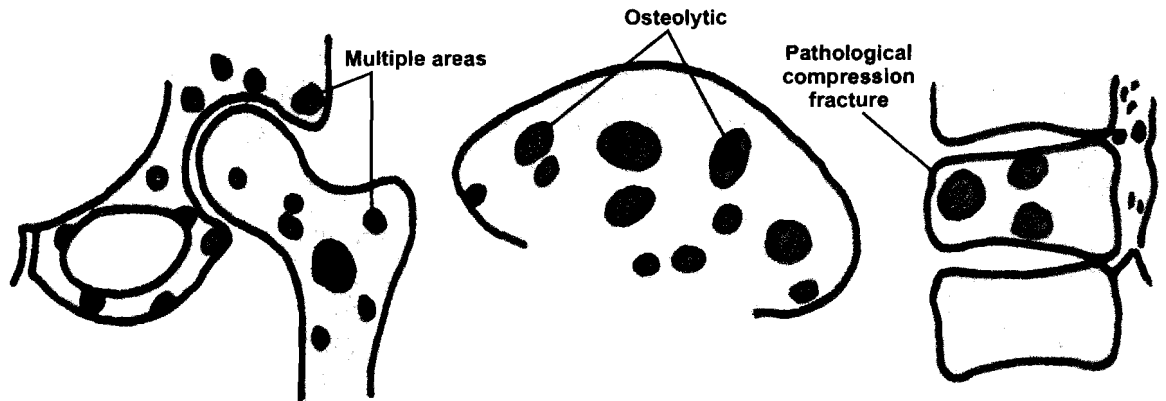


Fig. 3.4: Multiple osteolytic defects in bones in multiple myeloma

Investigations

There is microcytic anaemia and erythrocyte sedimentation rate is increased. Bence - Jones proteins are present in urine in more than half the cases. These proteins precipitate on heating urine and disappears on further heating to above 500C. Serum globulin is increased so much so that the albumin - globulin ratio (normally 2:1) is reversed. Bone Marrow biopsy usually shows a proliferation of typical myeloma cells. Electrophoresis of plasma shows M-bands of plasma proteins.

Management

The mainstay of the treatment is radiotherapy and chemotherapy:

- 1) Since the tumour is radiosensitive, so radiotherapy relieves pain and other pressure effects from individual lesions. It also promotes healing of pathological fractures. It is palliative in its effect.

- 2) Melphalan with prednisolone or in combination with cyclophosphamide if used in cycles, may give initial response within 6 months.
- 3) Pathological fractures in limbs are treated with internal fixation followed by local radiotherapy. Multiple vertebral compression fractures require spinal support (brace) for relief of pain.
- 4) Sometimes laminectomy is required to decompress the cord if patient develops paraplegia.

3.3.2 Metastatic Bone Tumours

Bone is the third most common site for distant spread of metastatic disease next to liver and lung. Secondary malignant tumours in bone are much more common than primary tumours; but whereas most primary malignant bone tumours occur in children or young adults, secondary tumours generally occur in later life. Commonest primary tumours in elderly producing metastasis in bone are carcinomas of breast and prostate. Next less common tumours are carcinomas of thyroid, Kidney, bronchus (lung) urinary bladder and gastrointestinal tract. In few cases no primary tumours is ever detected and the patient is treated only for secondaries with unknown primary site.

The tumour usually disseminates by the haematogenous route through direct connection between pelvic and vertebral venous system and by direct invasion as in ribs from breast carcinoma. Metastases occur most commonly in parts of skeleton where red marrow is abundant, especially the vertebral bodies, ribs, pelvis and upper end of femur and humerus. The bone structure is simply destroyed and replaced by tumour tissue.

Clinical Features

The patients are usually elderly. They present with back pain or local bony pain but some times as pathological fracture also. The pain may be referred or radiating to limbs, simulating to a herniated disc because spine is frequently involved. There may be history of night pains. With progression of the disease, neurological dysfunction may progress to complete paralysis. In advanced stage the patient may develop symptoms of hypercalcaemia, nausea, vomiting, dehydration and even coma. The primary tumour can usually be demonstrated in few cases.

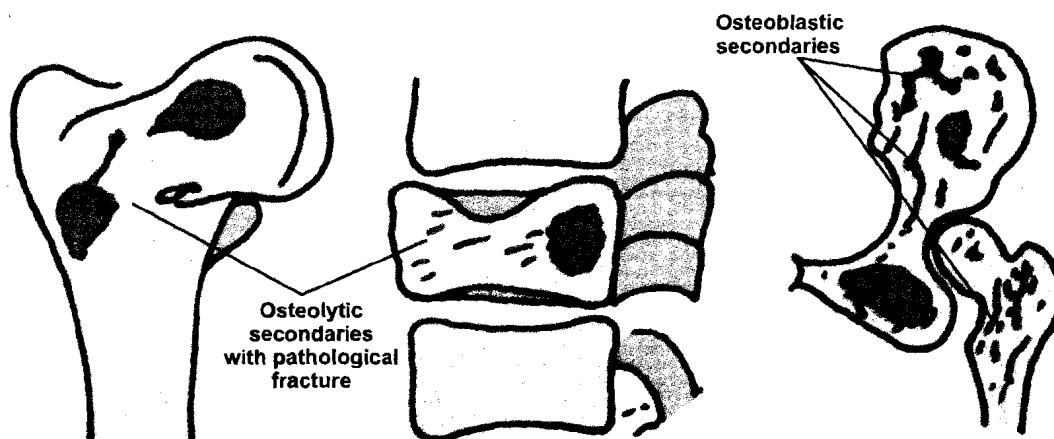


Fig. 3.5: Metastatic deposits in bone

Radiograph

Plain X-ray of bone show secondary deposits as small, osteolytic areas with no surrounding sclerosis or periosteal reaction in most cases. The deposits are first seen in medulla but later it expands into cortex also. Secondary deposits from prostate appear as dense osteoblastic areas. Chest radiographs are also advised to see the possibility of metastasis in the lungs.

Radioisotope bone scan is best for detecting even occult metastatic deposits in the skeleton. For detection of spinal metastases, magnetic resonance imaging (MRI) is more sensitive technique.

Investigation

There is increased level of alkaline phosphatase (in osteolytic metastasis) and acid phosphatase level (in prostatic carcinoma). Hyper calcaemia may sometimes occur due to excessive bone resorption in widespread metastases.

Management

In most cases metastatic bone disease represents, the advanced stage of primary malignancy with almost no hope for cure and treatment is aimed only to reduce the progression of disease, relieve pain and preventing and treating pathological features. Measures used in management are:

- 1) Analgesics and sedatives to relieve disabling pain
- 2) Radiotherapy to secondary (metastatic) deposits relieves pain and reduces tumour mass and so improves compression also.
- 3) Radio-active Isotopes—Radioactive iodine is valuable for metastases from thyroid carcinoma.
- 4) Chemotherapy is beneficial in controlling and also against identified primary tumours.
- 5) Hormone therapy is used in carcinoma of prostate and breast.
- 6) Pathological fractures, if possible are treated with internal fixation followed by radiotherapy. This allows the patient to sit up and move about.
- 7) Surgery is rarely indicated except to remove fungating tumour.

Check Your Progress 2

1) What is myeloma?

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2) Enumerate the radiological findings of multiple myeloma.

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3) Name commonest primary tumours producing metastasis in bone.

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4) Which is most sensitive technique to detect spinal metastases?

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3.4 MUSCULOTENDINOUS DISORDERS

Degenerative process involves not only joints but muscles and tendons also in the advancing age. In this section you will read certain musculo-tendinose conditions which you may come across in elderly. Whenever, an elderly person comes to you with shoulder pain, gradually limiting shoulder movements without any apparent cause, you should look for the conditions discussed in this section.

3.4.1 Frozen Shoulder (Periarthritis of Shoulder)

It commonly affects patients in old age.

Clinical Features

The patient experiences gradually increasing stiffness of the shoulder mostly after trivial trauma. There is pain, worse at night often disturbing the sleep. Stiffness of the shoulder gradually increases to almost complete loss of movements, resulting in classical frozen shoulder.

On examination you may find marked restriction of all movements at shoulder especially abduction and external rotation. In severe cases, there may be practically no movement and all passive movement are very painful.

Radiograph

Usually do not reveal any abnormality. This differentiates the condition from other causes of joint stiffness.

Management

Pain and stiffness can be relieved by anti-inflammatory and analgesic drugs, local heat (hot packs and short-wave diathermy), regular active and sometimes passive exercise to regain shoulder movement in early cases. Exercises are advised three times a day. When pain is excruciating, local injection of hydrocortisone with xylocaine is given in subacromial area to control pain and inflammation. If recovery of movement is very slow, after pain has subsided, gentle manipulation of shoulder under anaesthesia may prove to be useful. For this, the patient must be referred to a hospital. Always explain the patient that the problem will recover spontaneously and completely within 12-18 months.

3.4.2 Complete Tear of Supraspinatus Tendon

A sudden strain or fall on the side causes rupture of tendon of supraspinatus muscle close to its insertion (The tendon has already undergone degenerative changes on account of aging).

Clinical Features

This occurs in patients over 60 years, who complain of pain at the tip of the shoulder radiating down the arm. On examination, you will find local tenderness below the acromion. When the patient is asked to abduct the arm, he is able to perform 45-60° of initial movement (scapular movement) only because there is no active movement at glenohumeral joint. Passive shoulder joint movement are usually found full.

Radiograph

Radiograph of shoulder joint are normal. Arthrography may show communication between joint and subacromial bursa. Even ultrasonography is also helpful in diagnosis.

Management

Repair of the torn tendon is usually avoided because degenerated tendon is practically difficult to repair. Active abduction by deltoid muscle alone may sometimes be regained with proper exercises.

3.4.3 Painful Arc Syndrome (Supraspinatus Syndrome)

This is characterized by pain in the shoulder and upper arm during active abduction between 45°-150° and no pain at the extremes of range. This is due to the fact that the space between the upper end of humerus and the acromion process is small in the mid-range of abduction and any swelling or tender structure if present beneath the acromion is likely to get nipped, causing pain. There are four causes of this syndrome in elderly.

- 1) Incomplete (Partial) tear of supraspinatus tendon
- 2) Chronic supraspinatus tendinitis
- 3) Subacromial bursitis
- 4) Calcification in degenerated (in old age) supraspinatus tendon

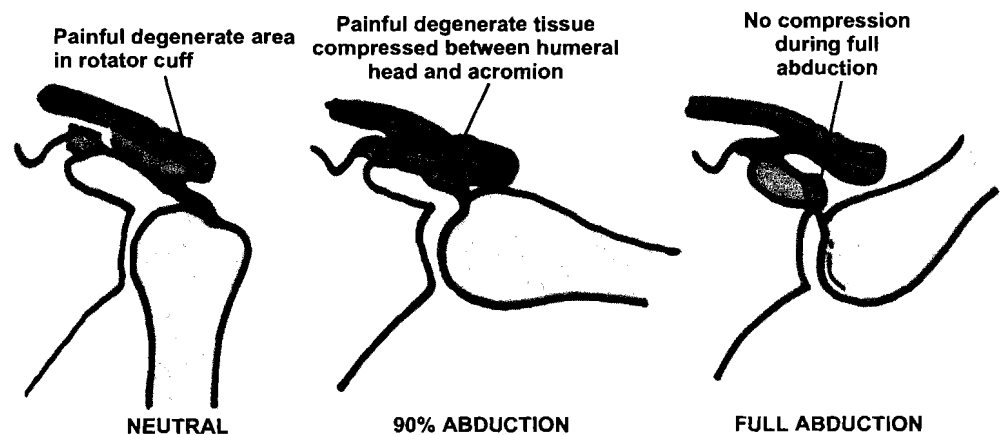


Fig. 3.6: Painful arc syndrome

Clinical Features

The patient is usually middle aged or elderly and complains of pain during mid range of shoulder abduction (45°-160°). When the arm is by the side of the body or in full abduction, pain is either absent or minimal. The severity of pain varies depending upon the cause. In most cases, there is tenderness in subacromion region.

Radiograph

Radiograph of shoulder joint may show calcification of supraspinatus tendon in some cases, otherwise it is normal.

Management

The same as for Sub-section 3.4.2.

3.4.4 Polymyalgia Rheumatica

This is a connective tissue disorder of unknown etiology, recognized more in elderly female over the age of 60 years.

Clinical Features

The patients have pain and stiffness in the muscles of neck and shoulder girdle or sometimes in low back and buttocks. These features when associated with systemic symptoms like fever, malaise, anorexia, weakness and loss of weight characteristically differentiate it from OA of spine. In 1/3rd of cases, when it is associated with retinal arteritis (related to polyarteritis), sudden blindness may occur which require urgent treatment.

Investigation

There can be increased erythrocyte sedimentation rate and negative Rheumatoid factor.

Management

Symptomatic treatment for several months usually brings recovery in these cases. In some cases, when sudden blindness is suspected, the patient should be referred to an Eye Specialist immediately.

Check Your Progress 3

What is painful arc syndrome? Give its causes in elderly person.

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3.5 LET US SUM UP

You have also come to know about the common fractures and their common sites in elderly population. It is important that these patients should be transported in proper way to the definitive place of proper treatment.

Whenever an old person complaint of local bony pain in spine with varying motor weakness and general ill health for no obvious reason, you should always look and investigate for two important neoplastic conditions i.e. multiple myeloma and metastatic bone tumour because the prognosis of this condition is not good. Towards the end, you have learnt about the identification of some disorders like peri-arthritis, polymyalgia etc, which present as non-specific pain. These problems can be managed by drugs and heat and exercises.

3.6 KEY WORDS

Arthrodesis	: Surgical fusion of a joint
Arthrography	: A technique in which radiographs are taken to visualize the cavity of the joint by injecting a water-soluble, absorbable radio-opaque fluid into joint cavity.
Arthroplasty	: To restore motion and function of a joint by surgery.
Comminuted	: Fracture of a bone in more than two pieces.
Displaced	: Fracture fragments whose ends are separated.
Impacted	: Fracture fragments whose ends are driven into each other.
Pathological Fracture	: Fracture that occurs because of the bone is weakened by some abnormal condition/disease.

3.7 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

- 1)
 - Neck of the femur
 - Trochanter of the femur
 - Lower end of radius
- 2)
 - Venous Thrombosis
 - Pulmonary embolism
 - Hypostatic pneumonia
 - Urinary tract infection
 - Decubitus ulcers
 - Constipation

Check Your Progress 2

- 1) It is characterised by proliferation of plasma cells of bone marrow and presents as multiple tumour masses involving the bones that contain abundant red marrow.
- 2) Radiological findings include multiple small osteolytic areas, osteoporosis and pathological fractures.
- 3) Carcinoma of breast and prostate.
- 4) Magnetic Resonance Imaging (MRI)

Check Your Progress 3

It is characterised by pain in the shoulder and upper arm during active abduction between 45-160° and no pain at the extremes of range of movement. There are four causes of painful arc syndrome in elderly which are

- i) Incomplete tear of supraspinatus tendon
- ii) Subacromial bursitis.

iii) Calcification in degenerated supraspinatus tendon.

iv) Chronic supra spinatous tendonitis.

3.8 FURTHER READINGS

John Crawford Adams, David L. Hamblen, *Outline of Fractures*, Tenth edition, 1991.

John Crawford Adams, David L. Hamblen, *Outline of Orthopaedics*, Twelfth edition, 1995.

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