

Module -9 Musculoskeletal disorders in the elderly

Learning objectives:

By the end of the chapter, non-specialist medical officers should be able to:

- effectively diagnose musculoskeletal disorders commonly encountered in the elderly
- appropriately manage these disorders

Introduction:

Musculoskeletal disorders account for increased morbidity in the elderly population. Timely recognition and correct diagnosis may prevent complications, including deformities and falls. This leads to improvement in the quality of life. They are the most common cause for a medical consultation in the elderly.

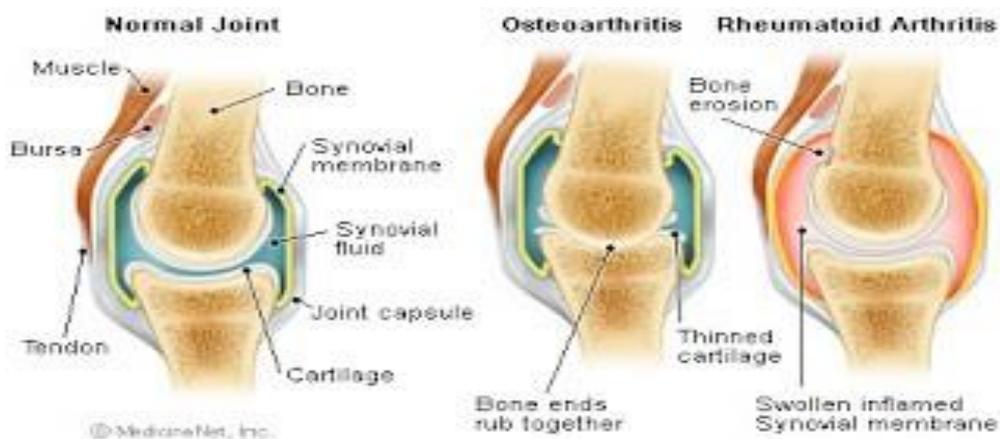
Common musculoskeletal disorders encountered in the elderly

- Osteoarthritis
- Rheumatoid arthritis
- Gout
- Pseudogout
- Osteoporosis

OSTEOARTHRITIS

Definition

Osteoarthritis is a predominantly non-inflammatory joint disorder, strongly associated with aging. An initial insult –synovial damage- leads to a process of repair, remodeling and progressive joint failure



Normal and Arthritic Joints

ACR Diagnostic Criteria for Osteoarthritis of the Hip, Hand and Knee

Hip ¹	Hand ²	Knee ³
<p>Hip pain + ≥ 2 of :</p> <ul style="list-style-type: none">• ESR <20 mm/hour• Radiographic femoral or acetabular osteophytes (bony outgrowths in the hip socket or on the thigh bone)• Radiographic joint space narrowing	<p>Hand pain, aching, or stiffness + ≥ 3 of :</p> <ul style="list-style-type: none">• Hard tissue enlargement of ≥ 2 of 10 selected joints• Hard tissue enlargement of ≥ 2 DIP joints• <3 swollen MCP joints• Deformity of ≥ 1 of 10 selected joints	<p>Knee pain + ≥ 1 of:</p> <ul style="list-style-type: none">• Age >50 years• Stiffness <30 minutes• Crepitus (crackling of joints) + osteophytes (small, abnormal bony outgrowth, or spur)

ACR = American College of Rheumatology; DIP = distal interphalangeal; ESR = erythrocyte sedimentation rate; MCP = metacarpophalangeal
1. Altman R et al. *Arthritis Rheum* 1991; 34(5):505-14; 2. Altman R et al. *Arthritis Rheum* 1990; 33(11):1601-10; 3. Altman R et al. *Arthritis Rheum*. 1986; 29(8):1039-49.

Terminology

Primary and Secondary OA:

Primary OA does not have any definite cause while in secondary OA there is pre-existing joint damage

The clinical patterns in OA are: Localized OA and Generalized OA. Some of the localized forms may have associated polyarticular involvement

Importance and magnitude:

The prevalence of OA increases with aging. By 65 years of age, 80% people have radiographic evidence of OA but only 25 % of these will be symptomatic. 10-25 % of persons over 65 years have knee and hip involvement.

Clinical features:

Symptoms:

The most common symptom of OA is **use-related pain** in the joint. This pain is usually chronic, insidious, and variable in intensity and occurs on movement or weight bearing. It may persist for hours after activity has ceased. **It is relieved by rest.**

The most important functional effects are on mobility, inability to squat, get out of a chair, go up and down stairs, reach for objects, work with the hands. There may be an unsteady gait, weakness of muscles, falls and subsequent injuries.

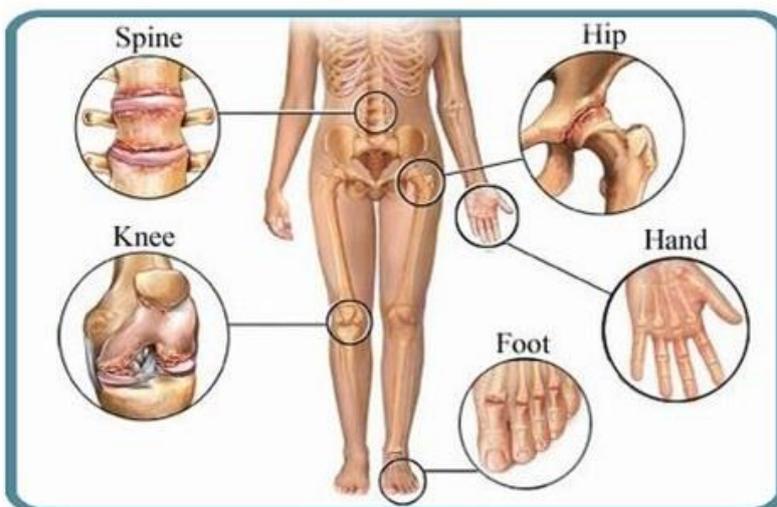
Night pain is a prominent feature and indicates that the joint has been used excessively for a long time.

Signs:

There may be **swelling** over the anatomic area of the joint which may be soft (effusion) or hard (bony **osteophytes**). Usually there is no rise in temperature over the joint.

Initially, there may be difficult and **limited range of motion** of the joint.

On moving the joint, there is tenderness evident by the wincing of the patient, a grating or crunching type of feeling called **bony crepitus** which can sometimes be heard/felt.



Knee joint osteoarthritis is the most common form of OA in the elderly

The muscles across the knee joint may be wasted and this is most evident by the **quadriceps wasting**. The joint deformity in the knee is usually a varus (bow knee) one due to medial tibio-femoral

Skill – video of musculoskeletal system examination of Knee joint

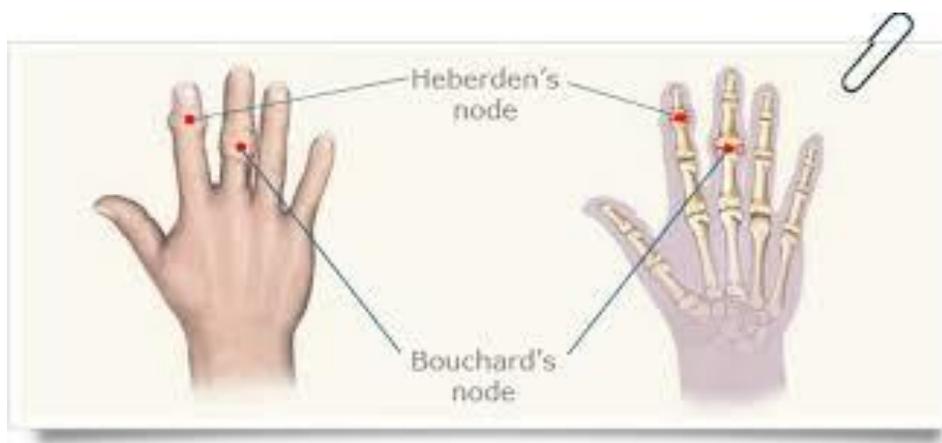
Hip joint

- **Shortening** of the leg may be seen.
- **Joint deformity**, mal-alignment, instability and shortening indicate severe joint destruction

The **gait** is a jerky asymmetric and antalgic in unilateral knee or hip OA.

Hand–Heberden’s nodes (DIP) and Bouchard’s nodes (PIP) are characteristic of Hand OA.

Some degree of joint **instability** may be elicited by specific maneuvers



Kellgren-Lawrence (KL) grading scale					
	Grade 1	Grade 2	Grade 3	Grade 4	
CLASSIFICATION	Normal	Doubtful	Mild	Moderate	Severe
DESCRIPTION	No features of OA	Minute osteophyte: doubtful significance	Definite osteophyte: normal joint space	Moderate joint space reduction	Joint space greatly reduced: subchondral sclerosis

Key Investigations

Investigations are rarely needed in typical cases of OA which is established by history and a directed clinical examination.

The most common investigation ordered in OA is the X-ray. Before embarking on this, an idea of the number of joints and the views required need to be understood.

The hip joint has the best correlation of symptoms with radiographic changes. The non-weight bearing PA view of the pelvis is adequate for assessing hip OA.

In Knee OA, a weight bearing / standing (stressed) AP view assesses the tibio-femoral component while a skyline view assesses the patello-femoral component.

The radiologic evidence of OA is: Joint space narrowing, subchondral sclerosis, osteophytes, subchondral cysts.

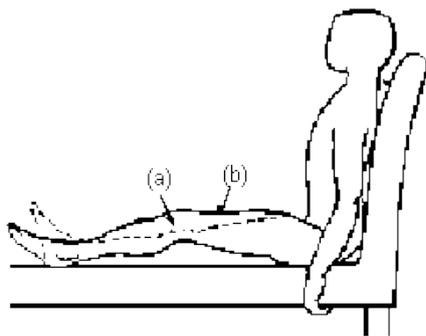
Aspiration of the joint fluid and imaging modalities like CT and MRI, if needed, are done at a higher centre.

Management:

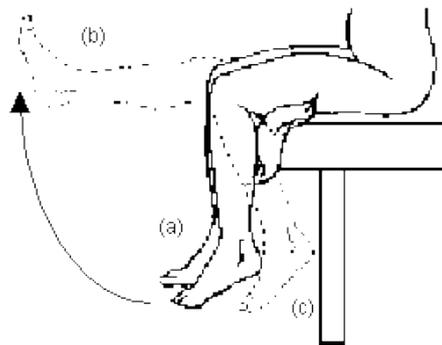
There is a need for combining non-pharmacological measures and pain-relief medication simultaneously.

1. Non-Pharmacological interventions:

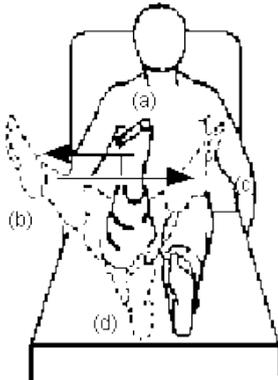
- Patient education: The patient should be informed of the chronicity of the disease and the need for regular physiotherapy.
- Joint protection: The simple rules are to avoid **excessive impact-loading** and repetitive use of compromised joints.
- Use of a cane: Proper use of a cane can reduce the hip contact forces by 40%. The ideal height of the cane is from floor to greater trochanter. For other appliances like splints, orthotics and braces, refer to a higher centre. - **when**
- Obesity-Weight loss prevents progression of OA. Therefore, weight reduction should be encouraged.
- Exercise: Includes muscle strengthening exercises – **pamphlet can be given.**



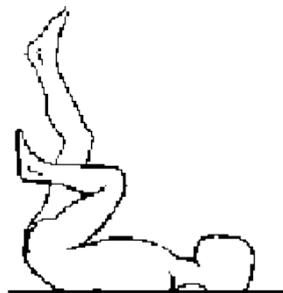
Exercise 1: Quadriceps tightener



Exercise 3: Altering leg pushes



Exercise 2: Leg Lifts



Exercise 4: Cycling exercise

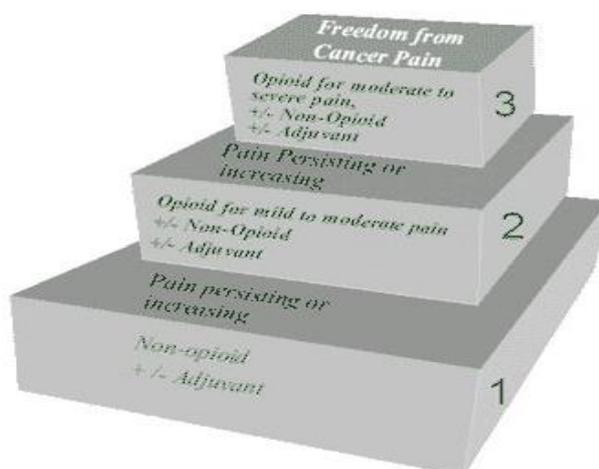
Pain relief modalities – kindly refer to physiotherapist for this.

Modifications in living arrangements:- Raised toilet seats, grab rails for getting up, hand rails may improve ADLs.

2. Pharmacological interventions –

a) WHO Pain Relief Ladder

Figure : WHO Pain Relief Ladder



Source: <http://www.who.int/cancer/palliative/painladder/en/>

b) Topical gels may also be used

- The use of oral steroids in osteoarthritis is NOT RECOMMENDED.
- NSAIDs should not be used indiscriminately.

c) If there is no relief with the above measures, referral to an orthopedician/rheumatologist for intra articular medications/surgery.

<u>Non -Modifiable</u>	<u>Modifiable</u>
Female gender Age >50 years ?Genetic susceptibility	Obesity Trauma High intensity repetitive sports Occupations – miners, farmers, cotton workers and footballers

Key messages:

OA is the most common joint problem in the elderly

Case Scenario

Case 1:

- Knee OA in an obese 68 year old lady with mild disability and co-morbid Hypertension, CHF and Diabetes mellitus:
- Critical thinking: Weight reduction, pain relief and reduction of joint damage, anti-hypertensive and anti-diabetic therapy, address polypharmacy

Case 2:

- Bilateral Severe Knee OA in a 75 year old veteran:
- Critical thinking: Highly active independent life desired, need for bilateral knee replacement, post-TKR management.

Case 3:

- An 80 year old widow with severe OA of the hands:
- Critical thinking: Identify pain relief, modifications for effective use of hands, social support, cooking and ADL.

Resources and Additional Reading

1. Davidson's Principles and Practice of Medicine, 21st Edition
2. Kumar and Clark Clinical Medicine, 6th Edition
3. Harrison's Principles of Internal Medicine, 19th Edition
4. Kelley's Textbook of Rheumatology, 7th Edition

5. Rheumatology Subspecialty Consult
6. Brocklehurst Textbook of Gerontology and Geriatric Medicine

Late Onset Rheumatoid Arthritis

Introduction:

This illness has a less female predilection as compared to the rheumatoid arthritis found in the younger population.

Definition:

An inflammatory symmetric polyarthritis with extra-articular manifestations

Onset

- Acute
- Constitutional symptoms – fever and weight

Disease severity – more, with a higher number of swollen and tender joints and a longer duration of morning stiffness as compared with YORA- young onset rheumatoid arthritis

Joints involved - mainly of the upper extremity – shoulder, wrist, metacarpophalangeal joint and proximal interphalangeal joints

Patterns of joint involvement

1. 70% resemble classical RA – rheumatoid factor positivity and joint erosions. Prognosis is usually worse
2. 25% of cases – involvement of joints of upper limb especially shoulder. This group is usually rheumatoid factor negative. There are no joint erosions seen
3. 11% of cases – have edema of the joints.

Laboratory investigations

- Increased ESR and blood counts
- Low hemoglobin – anemia of chronic disease
- Rheumatoid factor positive in 43-48% of the cases
- Imaging - ? erosions may be seen

Comparison of Clinical and Lab Features of Young Onset Rheumatoid Arthritis (YORA) and Late Onset Rheumatoid Arthritis (LORA)

	YORA	LORA
Onset	Insidious	Acute
No. of Joints	Polyarticular	Oligoarticular
Pattern of Joint Involvement	Small joints of upper and lower limb	Large Joints Shoulder, Hip , Knee
Rheumatoid Factor	60-70%	48-69%
Weight Loss	Rare	Common
Hand Oedema	Rare	Not Uncommon
Acute Phase Reactants	Variable	Usually very high
Response to Steroids	Rapid and Sustained	Slow and unsustained
Polymyalgia features	Rare	Common

Treatment

1. Pain relief – physiotherapy and according to WHO pain ladder

Refer to a higher centre in case the inflammation persists.

GOUT:

Gout is a metabolic disease that results from an increased body pool of urate

It typically is characterized by episodic acute arthritis or chronic arthritis caused by deposition of Monosodium urate crystals in joints and connective tissue tophi and the risk for deposition in kidney interstitium or uric acid nephrolithiasis

Picture of tophi:



ACUTE AND CHRONIC ARTHRITIS

Acute arthritis is the most common early clinical manifestation of gout. Usually, only one joint is affected initially, but polyarticular acute gout can occur in subsequent episodes. The metatarsophalangeal joint of the first toe often is involved, but tarsal joints, ankles, and knees also are affected commonly.

Picture of Gout in first MTP joint:



Especially in elderly patients or in advanced disease, joints of the fingers may be involved.

The first episode of acute gouty arthritis frequently begins at night with dramatic joint pain and swelling. Joints rapidly become warm, red, and tender, with a clinical appearance that often mimics that of cellulitis.

Early attacks tend to subside spontaneously within 3–10 days, and most patients have intervals of varying length with no residual symptoms until the next episode.



Precipitating factors:

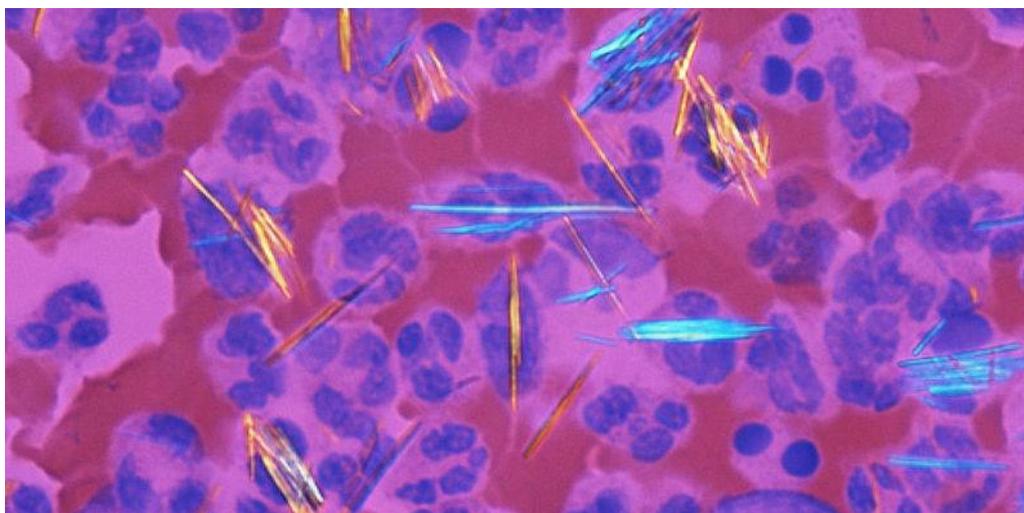
- dietary excess
- trauma, surgery
- excessive ethanol ingestion
- hypouricemic therapy
- serious medical illnesses such as myocardial infarction and stroke

Less commonly, the disease will manifest only as peri-articular tophaceous deposits in the absence of synovitis.

Women represent only 5–20% of all patients with gout. Most women with gouty arthritis are postmenopausal and elderly, have osteoarthritis and arterial hypertension that causes mild renal insufficiency, and usually are receiving diuretics.

Laboratory Diagnosis:

Even if the clinical appearance strongly suggests gout, the presumptive diagnosis ideally should be confirmed by needle aspiration of acutely or chronically involved joints or tophaceous deposits by a specialist



Differential diagnosis:

- Acute septic arthritis
- Other crystal associated arthropathies
- Psoriatic arthritis

Serum uric acid levels can be normal or low at the time of an acute attack, as inflammatory cytokines can be uricosuric and effective initiation of hypouricemic therapy can precipitate attacks.

A 24-h urine collection for uric acid can, in some cases, be useful in assessing the risk of stones, elucidating overproduction or under excretion of uric acid, and deciding whether it may be appropriate to use a uricosuric therapy. Excretion of >800 mg of uric acid per 24 h on a regular diet suggests that causes of overproduction of purine should be considered.

Radiographic Features:

Cystic changes, well-defined erosions with sclerotic margins (often with overhanging bony edges), and soft tissue masses are characteristic radiographic features of advanced chronic tophaceous gout.

ACUTE GOUTY ARTHRITIS

Non Pharmacological: Ice pack applications and rest of the involved joints can be helpful.

Pharmacological:

The mainstay of treatment during an acute attack is the administration of anti-inflammatory drugs such

- nonsteroidal anti-inflammatory drugs (NSAIDs),
- colchicine
- glucocorticoids- under supervision of specialist

Colchicine given orally is a traditional and effective treatment if used early in an attack. Useful regimens are one 0.6-mg tablet given every 8 h with subsequent tapering or 1.2 mg followed by 0.6 mg in 1h with subsequent day dosing depending on response. The drug must be at least temporarily discontinued promptly at the first sign of loose stools, and symptomatic treatment must be given for the diarrhea.

HYPOURICEMIC THERAPY: given after the acute episode has subsided

- Allopurinol 100mg thrice daily
- Febuxostat 40 mg once daily

PSEUDOGOUT

Introduction

It is a joint disorder, mainly seen in the elderly. It occurs due to CPPD (Calcium pyrophosphate dihydrate) crystal deposition in joints and its hyaline and fibrocartilaginous structures. It is often recognized by radiological examination and aspiration of the affected joint shows positively birefringent rhomboid crystals on polarized light microscopy. Sometimes it presents as an acute and self limiting arthritis

Definition: Pseudogout is a disease of the elderly. In many patients it is asymptomatic and only recognized on radiologic examination

Clinical presentation:

Asymptomatic presentation: Chondrocalcinosis is the presence of calcium pyrophosphate crystals as fine linear densities parallel to subchondral bone on radiographs and seen in menisci of the knee or other joints. It may be incidentally picked up on routine X rays.



Acute CPPD/ Pseudogout: This is more common in men. It is often precipitated by acute hospitalization due to severe illness, trauma, or surgery. It must be considered when acute arthritis is seen 24-48 hours after major surgery in elderly. Sudden mono- or oligoarthritis (2-3 joints) occurs with pain, redness and swelling. It usually affects the knee and wrist. Elderly patients may have fever, and sometimes confusion. The attack resolves in 1-3 weeks.

Chronic CPPD: It is slowly progressive, punctuated by acute attacks and involves wrist, ankles, shoulder and knee joints. In some patients presentation is symmetric with systemic features involving MCP joints

Differential Diagnosis: In the acute form it needs to be differentiated from

- Traumatic arthritis
- Septic arthritis
- Gout

More chronic forms may need differentiation from

- osteoarthritis
- rheumatoid arthritis.

Key Investigations

In acute disease:

Leucocytosis and elevated ESR

Radiographs:

On X- ray typical chondrocalcinosis, subchondral sclerosis, cyst formation and joint space narrowing, it does not produce erosions.

Special Diagnostic tests which require referral include: Ultrasound and CT of joints.

Arthrocentesis is the diagnostic test and should be performed at a higher center, which shows

- leucocyte count of 15-30,000/mm³
- positively birefringent rhomboid crystals on polarised light microscopy
- gram stain and culture of the fluid may be required to rule out septic arthritis.

Management

Treatment is targeted to control of symptoms.

In the acute primary health care setting:

- Rest to the joint
- NSAIDS are used for control of inflammation and pain.
- Refer to a higher centre early in the course of the disease if there is no improvement

Skill

Xray – for pattern recognition

Case Scenario

An 80 year old man admitted for haemorrhoidectomy develops pain in the knee joint 2 days after surgery. X-ray shows typical findings of chondrocalcinosis. He has history of Peptic ulcer disease, Hypertension and Coronary artery disease for which he is on Tab. Ecosprin 150 mg daily, Tab. Metoprolol XL 25 mg daily, Tab. Atorvastatin 20 mg at bedtime daily, Tab. Telmisartan 40 mg once a day and Tab. Hydrochlorothiazide 25 mg daily.

Critical thinking:

- Safety of NSAIDS when prescribed in an 80 year old man?
- A Possibility of gout in view of taking Hydrochlorothiazide?
- Effect of combination of Ecosprin and NSAIDS?
- Effect of NSAID on Blood pressure control?
- Safety of NSAIDS in Coronary Artery Disease

Resources and Additional Reading

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OSTEOPOROSIS

Introduction

Osteoporosis is a reduction of bone density or mass, (a micro-architectural deterioration of bone tissue) leading to an increased risk of fractures

Definition - Osteoporosis is a skeletal disorder, with loss of bone osteoid, reduction of bone strength and an increased risk of fractures

Learning objectives

At the end of this module, the doctor in the role of a family physician will :

1. Have knowledge of the clinical relevance and impact of osteoporosis in elderly
2. Identify its key symptoms and signs, and confirm the diagnosis with DEXA, or FRAX
3. Prescribe basic medication in an evidence-based manner for patients with osteoporosis.
4. Refer appropriately

Clinical features

1. Asymptomatic
2. Incidental finding on Xray
3. Progressive loss of height - kyphosis
4. Pain – acute/chronic
5. **Fragility fractures** – it is a type of pathologic fracture that occurs as result of an injury that would be insufficient to cause fracture in a normal bone)

Table 1. Common Risk Factors for Osteoporosis

Nonmodifiable	Modifiable
Older age	Low levels of calcium and vitamin D
Female gender	Reduced intake of vegetables and fruits
Menopause	Increased intake of caffeine, sodium, or protein
Family history	Sedentary lifestyle
Small frame or low body weight	Smoking
History of broken bones or height loss	Increased use of alcohol

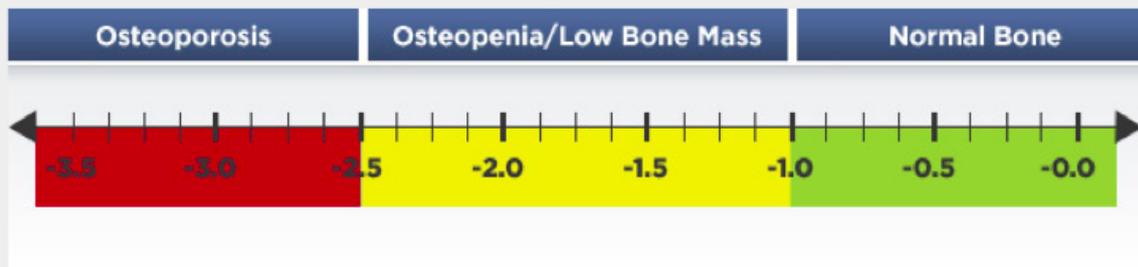
Source: Reference 4.

Investigations

- Xray of spine – decrease in height of vertebra
- Refer to a higher center, when you suspect a person to have osteoporosis based on history and investigations.
- At the higher centre, one needs to rule out Vitamin D deficiency
- The gold standard for diagnosing Osteoporosis is DEXA scan

BMD – Skill Video

WHO Definition of Low Bone Density and Osteoporosis Based on BMD



Normal

BMD value within 1 S.D. of young-adult mean (T-score at or above -1)

Osteopenia

BMD value between -1 S.D. and -2.5 S.D. below young-adult mean (T-score between -1 and -2.5)

Osteoporosis

BMD value at least -2.5 S.D. below young adult mean (T-score at or below -2.5)

Severe Osteoporosis

BMD value at least -2.5 S.D. below young adult mean and presence of fracture

CHART

. *FRAX score is used to predict 10 year fracture probability.

Management

A. General measures -

- i. Advice on diet, exercise and cessation of smoking and alcohol
- ii. Supplementation of Calcium and Vitamin D:
- iii. Advise the patients on safety at home and falls prevention
- iv. Pain relief – according to WHO pain ladder.

B. Specific therapy -This treatment is usually started by specialists

Bisphosphonates are the drugs of choice by inhibiting bone resorption more than bone formation. Use drug with caution with history of upper GI problem or cancer eg. Alendronate, Risendronate, Ibandronate and Inj Zoledronic Acid. IV preparations of Bisphosphonates may produce a flu-like illness, fever, malaise, anorexia, generalized aches occurring 24-48 hours after administration. It is self limiting and responds to paracetamol or NSAIDs.

Precautions: Oral bisphosphonates must be taken on empty stomach, with a glass full of plain water. The patient should not lie down for one hour after taking the medicine.

Bisphosphonates may be given for 5 years followed by a drug holiday, as per the discretion of the specialist

Indications for surgery

- All persons with fractures need consultation with an orthopaedic surgeon.
- Kyphoplasty and vertebroplasty provide pain relief for vertebral fractures

Complications

The major complications include:

- Loss of standing height
- Difficulty in mobilization
- Increased forward bending of the spine (Dowager's Hump)
- Falls
- Fractures with or without minor trauma.
- Immobilization

Training Methodology

- Didactic lecture
- DEXA scan interpretation
- Dietary advice
- Falls prevention advice

Case Scenario

1. A 70year old female with 10 years history of Rheumatoid arthritis and off and on steroid intake. The relatives have noticed that she complains of chronic back pain and has becomes shorter.
2. A 65 year old lady with fracture of hip sustained by tripping in the garden.

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4. Kelley's Textbook of Rheumatology 7th Edition
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6. Brocklehurst's Textbook of Gerontology and Geriatric Medicine

7. Shatrugna V, Kulkarni B, Kumar PA et al. Bone status of Indian Women from a low income group and its relationship to the nutritional status. *Osteoporosis Int.* 2005; 16: 1827-35.
8. Ganguly S, Das BK. Osteoporosis in India : Prevention and Management. Chapter 120. In *Progress in Medicine and Medicine Update 2016-1 Volume 2*. Wander GS and Pareek KK Eds. Jaypee Brothers Medical Publishers (P) Ltd., New Delhi. 2016; p 605-609.

Facilitator guide

1. Power point presentation