2.8 MUSCULO-SKELETAL DISEASES

2.8.1 Osteoporosis (*Asthi sauṣirya)*

Introduction

With increasing numbers of the elderly people in India, Osteoporosis is fast emerging as a public health problem of massive proportions. It is often under-diagnosed and responsible for substantial morbidity and mortality. It is a systemic skeletal disease characterized by low bone mass and micro architectural deterioration of bone tissue, with a consequent increase in bone fragility and susceptibility to fracture[40]. It is also called 'Brittle bone disease'. The spine hips and wrists are common areas of bone fractures from osteoporosis.

Osteoporosis is most common in women after menopause. Fragility fractures have doubled in the last decade. 40% of all women over 50 yrs. will suffer on osteoporotic fracture. The number of the hip fractures will rise from about 1.7 million in 1990 to 6.3 million by 2050[41].

Osteoporosis comes under *'Dhātu kṣaya'* in *Ayurveda*. Osteoporosis can be correlated with *asthi majjā dhātu kṣaya.* The symptoms described in *asthi majjā kṣaya* closely resemble osteoporosis i.e. *asthi sauṣirya* (weak and porous bones) *bhrama* (vertigo), *timira darśana* (darkness in front of eyes) *asthi tōda* (cutting pain in bones) and *athi śūnyatā* (numbness in bone) etc.

Aetiology: The cause of osteoporosis is not known. However the factors those contribute include

1. Low calcium intake
2. Early menopause
3. Sedentary life style
4. Inadequate exercise

5. Familial history of the disease
6. Endocrine disorders (Hyperthyroidism, Hypogonadism, Hyper-parathyroidism and Diabetes mellitus)
7. Prolonged use of steroids
8. Immobility for a prolonged duration

Pathogenesis

Bone remodeling occurs at discrete sites within the skeleton and proceeds in an orderly fashion, with bone resorption always being followed by bone formation. In older individuals the rate of resorption exceeds the rate of formation resulting in 'too little bone mass' or osteoporosis. The bone mass progressively decreases but the bone is morphologically normal. In the first 5 years after menopause, bone density declines by about 2% annually and then declines to 1% loss every year.

Risk factors

Non modifiable

1. Gender - Women are at greater risk than men
2. Age - Advance age; female above 45 and males above 55 years
3. Body size - Small and thin people
4. Family history
5. Low oestrogen and testosterone levels

Modifiable:

1. Excess alcohol consumption
2. Vit. D deficiency
3. Low Body Mass Index (BMI)
4. Malnutrition
5. Higher Cadmium exposure
6. Use of soft drinks

Clinical features

Osteoporosis itself has no specific symptoms, in fact the first manifestation of the illness may be

1. Hip, spine or wrist fractures
2. External rotation and shortening of the involved leg
3. Delayed fracture healing process
4. Vertebral collapses
5. Kyphosis and painless vertebral fractures

Complications

Fractures of bone in hip, spine, wrist joints and ribs are the most common complications of osteoporosis.

Investigations

1. X-ray - Hip and wrist
2. Bone densitometry by
   - Photon absorptiometry
   - Dual energy X-ray absorptiometry (DXA)
3. Ultrasound scan
4. Quantitative CT scan
5. Serum Calcium, Alkaline phosphatase, Phosphate
6. Assesment of vitamin D and the bone markers (markers for the bone formations and of bone resorption)

Diagnosis[42]

WHO has established the following diagnostic guidelines (Bone densitometry) using these T-scores -

a. T- score > - 1.0 - Normal

b. T-score < - 1.0 to > - 2.5 - Osteopenia

c.	T-score	<	- 2.5	-	Osteoporosis
d.	T-score	<	- 2.5 and Presence of at least one fragility fracture	-	Severe osteoporosis

Management approaches

a. Prevention

1. Proper nutrition
2. Uses of *māṣa* (black gram), *tila* (sesame seeds), milk, milk products, *kadalī* (banana), pear, apple and other dietary articles rich in calcium
3. Practice physical exercise like walking, swimming, *yogāsana* and meditation
4. Life style modifications like reduction in weight, regular, slow and gentle exercises
5. Adequate rest
6. Regular Abhyaṅga (Gentle massage) of joints with medicated oils (twice a week)
7. Exposure to sunlight
8. Prevent injuries to joints
9. Avoid pungent and astringent or salty food
10. Avoid suppression of natural urges, excess tea, coffee, smoking and alcohol
11. Avoid excessive exertion

b. Medical management

Line of treatment

1. ***Nidāna parivarjana*** **(avoidance of aetiological factors) -** Avoid the causative factors to prevent complications of the disease. Avoid self medication with steroids, sedentary life style and consume wholesome diet
2. ***Samśodhana cikitsā*** **-** (Bio-cleansing therapies) followed by *Śamana cikitsā* (Palliative therapy) should be advocated. But it should be decided by physician according to the condition of the patient whether *Śodhana* therapy (Bio-cleansing therapies) is beneficial or not

i. *Snehana* - externally**:** Gentle massage with medicated oils such as

- *Mahānārāyaṇa taila*
- *Kṣīra balā taila*
- *Mahāmāṣa taila*
- *Balā taila* etc.

ii. *Snehapāna* (internal oleation) with *Guggulutikta ghṛta/ Pañcatiktaka ghṛta* 50 ml with 2-3 gm *saindhava lavaṇa* daily for 3-7 days before *pañcakarma* (bio-cleansing procedure).

iii. *Svedana*

- *Ṣaṣṭiaka śāli piṇḍa svēda (made from Ṣaṣṭiaka śāli, Balāmūla, Aśvagandhā mūla* and milk) for 15 days
- *Upanāha sveda*
- *Sneha dhārā (kāyaseka - pizhichil)* with *Dhānvantara taila* for 14 days

iv. *Vasti - Pañcatikta kṣīra vasti* for 7 days

Pañcatikta kṣīra kvātha	-	240 ml
Honey	-	120 ml
Madhuyaṣṭhyādi taila	-	120 ml
Guggulutikta ghūta	-	120 ml
Saindhava lavana	-	15 gm

The Dosage (per dose) should be decided by physician according to severity of the disease and condition of the patient.

3. Drug Therapy

The goals of treatment in Osteoporosis are to increase the strength of bones and improve and maintain the joint functions.

SINGLE DRUGS

Drug	Dosage (per dose)	MOA[$]/ Vehicle	Duration*
Aśvagandhā (*Withania somnifera* Dunal) *cūrṇa*	3-6 gm	Water/milk	30 days

Śatāvarī (*Asparagus racemosus* Willd.) *cūrṇa*	2-4 gm	Milk	30 days
Āmalakī (*Phyllanthus emblica* Gartn) *cūrṇa*	2-4 gm	Water	30 days
Asthi śṛṅkhalā (*Cissus quadrangularis* Linn.) *cūrṇa*	1-2 gm	Warm milk	30 days

COMPOUND FORMULATIONS

Drug	Dosage (per dose)	MOA[$]/ Vehicle	Duration*
Pañcatikta kṣīra kvātha	10-20 ml	Water/milk	30 days
Guggulu tikta ghṛta	10 gm	Warm water	30 days
Pañcatikta ghṛta guggulu	3-6 gm	Warm water	30 days
Lākṣādi guggulu	1-1.5 gm	Warm water	30 days
Yogarāja guggulu	1-1.5 gm	Warm water	30 days
Trayodaśāṅga guggulu	1-1.5 gm	Warm water	30 days
Pravāla piṣṭī	125-250 mg	Water/milk	30 days
Muktā piṣṭī	250-500 mg	Water/milk	30 days
Godantī bhasma	250-500 mg	Water/milk	30 days
Mahāmāṣa taila	for external use	-	30 days
Mahānārāyaṇa taila	for external use	-	30 days
Balāśvagandhādi taila	for external use	-	30 days
Dhānvantara taila	for external use	-	30 days
Kṣīrabalā taila	for external use	-	30 days

[$]MOA - Mode of administration

* Initially 2 times in a day after meal followed by condition of patient and physician's direction

NOTE: Out of the drugs mentioned above any one of the drug or in the combination may be prescribed by the physician.The duration of the treatment may vary from patient to patient. Physician should decide the dosage (per dose) and duration of the therapy based on the clinical findings and response to therapy.

c. *Yogic* practices - The following *yogic* practices are beneficial in Osteoporosis; however, these should be performed only under the guidance of qualified Yoga therapist. Duration should be decided by the Yoga therapist.

1. *Śavāsana*
2. Deep relaxation technique, breathing exercises (Hand in and out, hand stretch, *śaśāṅkāsana* breathing, *trikoṇāsana* breathing, tiger breathing)
3. *Nādī anusandhāna , Nāḍī śodhana*
4. *Prāṇāyāma*

Counselling - Advice the patient to

1. Take nutritious diet rich in calcium and vitamin D
2. Practice weight bearing exercises (walking, climbing stairs, dancing etc.)
3. Spend a brief time under early morning sun light every day
4. Increase dairy products (milk, curd, butter cheese etc.) in diet
5. Take calcium supplements
6. Avoid over exertion
7. Avoid falls and trauma
8. Reduce/ stop smoking and alcohol intake

Indications for referral:

1. Any bone fractures

COSTING DETAILS

Approx. costing of Osteoporosis management

S.No.	Medicine	Requirement	Unit	Rate in Rs.	Cost in Rs.
1.	*Aśvagandhā cūrṇa*	180-360	gm	0.48	87-174
2.	*Śatāvarī cūrṇa*	120-240	gm	0.5	60-120
3.	*Āmalakī cūrṇa*	120-240	gm	0.25	30-60

4.	*Asthi śṛṅkhalā cūrṇa*	60-120	gm	0.2	12-24
5.	*Lākṣādi guggulu*	180	gm	1.33	240
6.	*Guggulutikta ghṛta*	1500	gm	0.61	920
7.	*Indukānta ghṛta*	250-350	gm	0.45	120
8.	*Pañcatikta ghṛta guggulu*	180-360	gm	0.95	171-342
9.	*Yogarāja guggulu*	60-90	gm	1.30	78-117
10.	*Trayodaśāṅga guggulu*	60-90	gm	1.35	80-120
11.	*Pravāla piṣṭī*	7.5-15	gm	4	30-60
12.	*Muktā piṣṭī*	15-30	gm	1.4	21-42
13.	*Godantī bhasma*	15-30	gm	1.9	28.5-57
14.	*Mahāmāṣa taila*	200	ml	1.28	256
15.	*Mahānārāyaṇa taila*	200	ml	1.75	350
16.	*Balāśvagandhādi taila*	200	ml	0.285	57
17.	*Dhānvantara taila*	200	ml	0.41	82
18.	*Kṣīrabalā taila*	200	ml	0.68	136

Approx. costing of *Pañcakarma* procedure in Osteoporosis **

S.No.	***Pañcakarma* procedure**	**Days**	**Rate in Rs./ day**	**Cost in Rs.**
1.	*Snehana* (externally)	15	200	3000
2.	*Ṣaṣṭika śāli piṇḍa sveda*	15	350	5250
3.	*Nirūha Vasti (Kṣīra vasti)*	7	250	1750
4.	*Sneha dhārā (Pizhichil)*	14	350	4900

2.8.2 Osteoarthritis (*Sandhi vāta*)

Introduction

Musculoskeletal disorders predominate in the older adults and are a major reason for chronic disability and health care utilization in the geriatric age group. Osteoarthritis (OA) is a