NGN NCLEX 2026 · STUDY CARD SERIES

Osteoporosis *the silent thief of bone*

A progressive metabolic bone disease of low bone mass and microarchitectural deterioration — creating fragile bones that fracture under minimal force. High-yield for pharmacology, safety, fall prevention, and patient teaching.

SYSTEM · MUSCULOSKELETAL | PHARMACOLOGY · BISPHOSPHONATES | PRIORITY · FALL & FRACTURE RISK | FRAMEWORK · NCJMM

DEFINITION / OVERVIEW

01

Porous bones that fracture easily.

- **Bone resorption > bone formation** → decreased bone density & mass.
- Most common in **postmenopausal women**; estrogen loss accelerates bone loss.
- Often ***silent*** until the first fracture — commonly **hip, vertebra, or wrist (Colles')**.
- Diagnosed via **DEXA scan**: T-score ≤ -2.5 = osteoporosis.

RISK FACTORS

NON-MODIFIABLE

- Female, age > 65
- Caucasian / Asian
- Small, thin build
- Family history
- Postmenopausal

MODIFIABLE

- Low Ca^{2+} / Vit D intake
- Sedentary lifestyle
- Smoking, alcohol
- Excess caffeine
- Long-term steroids / PPIs

PATHOPHYSIOLOGY (SIMPLIFIED)

02

Bone breakdown outruns bone building.

Healthy bone constantly remodels — **osteoclasts** dissolve old bone while **osteoblasts** build new bone. In osteoporosis this balance tips, and over years bone becomes thin, brittle, and prone to fracture.

1. **Trigger:** Estrogen decline (menopause), aging, low Ca^{2+}/Vit D, or long-term corticosteroids.
2. **Osteoclast activity ↑** — bone resorption accelerates, pulling calcium out of bone matrix.
3. **Osteoblast activity ↓** — new bone formation cannot keep pace with loss.
4. **Trabecular bone thins** — cortical bone weakens → microarchitecture deteriorates.
5. **Result:** Low bone mineral density → ***fragility fractures*** from minor trauma (hip, spine, wrist).

SIGNS & SYMPTOMS

03

Silent early. Deforming late. Fractures without warning.

SILENT / EARLY

- Usually **no symptoms** until a fracture occurs
- May be detected on **routine DEXA** screening
- Mild, vague back discomfort (often dismissed)

LATE / CLASSIC

- **Loss of height** (> 1 inch) — vertebral compression
- **Kyphosis** ("Dowager's hump") — thoracic curvature
- Chronic **back pain**, especially low thoracic/lumbar
- Protruding abdomen, early satiety

RED FLAG

- **Fragility fracture** from minor fall or turn → hip, wrist (Colles'), vertebra
- **Sudden severe back pain** with movement = vertebral compression fracture
- **Hip shortened & externally rotated** after fall → suspect hip fracture
- Unable to bear weight post-fall → ***do NOT move***, call provider

LABS / DX

- **DEXA scan**: T-score ≤ -2.5 = osteoporosis; -1.0 to -2.5 = osteopenia
- Serum **Ca^{2+}, Phosphate, Vit D, Alk Phos** — often normal in primary OP
- 24-hr urine calcium, TSH (rule out secondary causes)
- X-ray shows changes only after > 30% bone loss — not for early dx

PRIORITY NURSING INTERVENTIONS

04

Protect the bone. Prevent the fall.

SAFETY FIRST (NCLEX PRIORITY)

- **Fall prevention:** non-skid footwear, remove throw rugs, night lights, grab bars, clutter-free path.
- **Assess gait & balance;** assistive devices (cane, walker) as needed.
- Reconcile meds for **orthostatic or sedating agents** that increase fall risk.
- Call light in reach; bed low and locked; call-don't-fall teaching.

ASSESS / MONITOR

- Monitor **pain, posture, and height** at every visit.
- Check **serum calcium, Vit D, renal function** before & during therapy.
- Assess nutrition: Ca^{2+} **1,200 mg/day**, Vit D **800–1,000 IU/day**.
- Screen for **depression/isolation** — chronic pain and limited mobility are common.

ACT / INTERVENE

- **Encourage weight-bearing exercise** (walking, low-impact aerobics) 30 min/day.
- Administer bisphosphonates **exactly per protocol** — see Pharm card.
- Log-roll post-vertebral fracture; maintain **spinal alignment**.
- Handle gently — *fragile bones fracture with routine positioning*.

MEMORY BOOSTERS · MNEMONICS

08

Cement it in.

ACCESS

Risk factors for osteoporosis

- **A** Alcohol use
- **C** Corticosteroids (long-term)
- **C** Calcium low
- **E** Estrogen deficiency
- **S** Smoking
- **S** Sedentary lifestyle

"Sit Up 30 · Water Full · Empty Gut"

Bisphosphonate rule: **sit upright 30 min**, **full glass of water**, **empty stomach** in the AM.

"Silent Thief"

Osteoporosis steals bone quietly — first sign is often a fracture.

PHARMACOLOGY

05

Slow resorption. Build bone. Replace what's lost.

DRUG / CLASS	MECHANISM	KEY SIDE EFFECTS	NURSING CONSIDERATIONS
Alendronate (Fosamax) — *Bisphosphonate*	Inhibits osteoclasts → ↓ bone resorption	**Esophagitis, esophageal ulcer**, dyspepsia, osteonecrosis of jaw, atypical femur fx	**AM, empty stomach, full glass of water, upright ≥ 30 min.** Nothing else PO for 30 min. Dental exam before starting.
Risedronate / Ibandronate / Zoledronic acid — *Bisphosphonates*	Same class — weekly, monthly, or yearly IV dosing	Flu-like sx after IV infusion; hypocalcemia	Check Ca^{2+} & renal function before giving. Ensure adequate Ca^{2+}/Vit D intake.
Calcium carbonate / citrate — *Supplement*	Provides substrate for bone mineralization	Constipation, kidney stones, hypercalcemia	Take with food (carbonate); citrate any time. Divide doses > 600 mg. Space from iron / thyroid meds.
Vitamin D_3 (cholecalciferol) — *Supplement*	Promotes Ca^{2+} absorption from gut	Hypercalcemia (rare); weakness, N/V if toxic	800–1,000 IU/day typical. Take with fat for absorption. Monitor 25-OH Vit D level.
Raloxifene (Evista) — *SERM*	Estrogen-like on bone; blocks estrogen on breast/uterus	**DVT / PE**, hot flashes, leg cramps	Stop 72 h before surgery / prolonged immobility. Teach DVT signs. Not for premenopausal use.
Calcitonin (Miacalcin) — *Hormone*	Inhibits osteoclasts; also analgesic for vertebral fx	Nasal irritation, flushing, rhinitis	Intranasal — alternate nostrils daily. Useful for vertebral fracture pain.
Denosumab (Prolia) — *Monoclonal Ab*	Blocks RANKL → ↓ osteoclast formation	**Hypocalcemia**, infection, ONJ	SubQ every 6 months. Verify Ca^{2+} normal before dose. Do not stop abruptly (rebound fx).
Teriparatide (Forteo) — *PTH analog*	Stimulates osteoblasts → **builds** new bone	Dizziness, leg cramps, ↑ Ca^{2+}; black-box: osteosarcoma risk	Daily SubQ injection, max 2 years. Rotate sites. Refrigerate.

NCLEX TEST TRAPS ⚠

06

Where students lose points.

Trap 1 — The bisphosphonate position
Tempting to say "lie down for comfort after taking" — wrong. Patient must **remain upright for ≥ 30 minutes** with a full glass of water to prevent esophageal ulceration.

Trap 2 — Calcium timing
Do **not** take Ca^{2+} or dairy within 30 minutes of alendronate — binds the drug and **blocks absorption**. Space them apart.

Trap 3 — Weight-bearing ≠ just walking
Swimming is NOT weight-bearing (water supports body weight). Correct answers: **walking, low-impact aerobics, resistance training, dancing, stair climbing**.

Trap 4 — "I'll just rest in bed"
Immobility **worsens** bone loss. **Early ambulation** is correct even after vertebral fractures (with spinal precautions).

Trap 5 — Fracture assessment priority
Elderly patient found on the floor: do **NOT** move them. **Assess neurovascular status, immobilize, check for shortened / externally rotated leg** (hip fx) before repositioning.

Trap 6 — Raloxifene and DVT
Patient going on long flight or planning surgery? Raloxifene **must be held 72 h before** prolonged immobility — increased **DVT/PE risk**.

Trap 7 — Prolia can't be stopped abruptly
Stopping **denosumab without transitioning** to another agent → **rebound vertebral fractures**. Always clarify follow-up dosing plan.

NCJMM CLINICAL JUDGMENT

07

Think like the test writer.

Apply the Next Gen Clinical Judgment Measurement Model to every osteoporosis scenario:

Step 1
Recognize Cues
Postmenopausal female, height loss, kyphosis, chronic steroid use, low Ca^{2+} intake, recent minor-trauma fracture.

Step 2
Analyze Cues
Cluster risk factors + DEXA T-score ≤ -2.5 + fragility fracture → confirms osteoporosis with high fracture risk.

Step 3
Prioritize Hypotheses
Highest priority: **fall/fracture prevention** > pain control > pharmacologic adherence > lifestyle modification.

Step 4
Generate Solutions
Home safety plan, bisphosphona protocol, weight-bearin exercise, Ca^{2+}/Vit D, DEXA in 1–2 yr

Step 5
Take Action
Administer meds correctly, teach upright/AM dosing, remove hazards, refer PT, coordinate endocrinology follow-up.

Step 6
Evaluate Outcomes
No new fractures, stable/improved DEXA, adherent to therapy, maintained height & mobility, no med side effects.

PATIENT EDUCATION

09

Teach it. Live it. Prevent the fracture.

Diet
Get **1,200 mg Ca^{2+}/day** (dairy, fortified plant milk, sardines, kale, broccoli) + **800–1,000 IU Vit D**.

Exercise
Weight-bearing 30 min most days: walking, low-impact aerobics, resistance bands, tai chi for balance.

Bisphosphonates
First thing AM, full glass of **plain water**, empty stomach. **Sit upright 30 min.** Nothing PO until then.

Dental Care
Tell dentist you take bisphosphonates/denosumab — **risk of osteonecrosis of the jaw**. Get dental work done ***before*** starting therapy when possible.

Avoid
Smoking, excess alcohol (> 2 drinks/day), excess caffeine, and **high-sodium** foods — all accelerate bone loss.

Home Safety
Remove throw rugs, install grab bars in bathroom, night lights, non-skid footwear, keep floors clutter-free.

Sunlight
15–20 min of **sun exposure** a few times a week helps the body make Vit D (balance with skin-cancer precautions).

Self-Monitor
Report **height loss > 1 inch**, new back pain, or any fall/fracture to provider. Keep DEXA follow-up appointments.

Red Flags to Report
Chest pain swallowing, black stool, jaw pain, thigh/groin pain, calf swelling (DVT on raloxifene).

Injections
Teriparatide: daily SubQ, rotate sites, refrigerate. Denosumab: q6 months — **never skip or stop abruptly**.

Priority Red Flags — Act Immediately

Fragility fracture (hip shortened/externally rotated, sudden back pain) · **Esophageal symptoms** after bisphosphonate (chest pain, dysphagia, melena) · **Jaw pain / loose teeth** on antiresorptive therapy · **Calf swelling or dyspnea** on raloxifene — possible DVT/PE.