Osteoporosis

A fragility fracture IS the diagnosis · screen by age and risk, treat by risk tier, and never stop denosumab without a plan

Treat the disease
not just the fracture

DIAGNOSE & SCREEN *three doors into the diagnosis, and the 2025 screening rules*

THREE WAYS TO MAKE THE DIAGNOSIS

T-score ≤ -2.5 at femoral neck, total hip or lumbar spine (lowest site governs). **OR a hip or vertebral fragility fracture at ANY T-score**: bone that breaks from standing height has proven it fails under physiologic load, and a normal DEXA does not un-diagnose it. **OR osteopenia plus FRAX above threshold** (10-yr hip ≥ 3% or major osteoporotic ≥ 20%).

WHO GETS A DEXA (USPSTF JAN 2025)

All women 65 and older (Grade B). Postmenopausal women under 65 with a risk factor: run a risk tool and screen if elevated (Grade B). **Men: no USPSTF mandate**, but fracture, glucocorticoids, ADT and hypogonadism justify scanning, and male post-hip-fracture mortality exceeds female. **Repeat on the SAME machine**: inter-machine error can fake a change.

T VS Z, AND THE SECONDARY HUNT

Z-score ≤ -2.0 in premenopausal women or men under 50 means bone below expected for age: hunt causes. Check **25-OH vitamin D, calcium, creatinine, TSH** in everyone; targeted PTH, celiac serologies, SPEP/light chains, testosterone, 24-h urine calcium. **Review the drug list first**: steroids, PPIs, aromatase inhibitors, ADT, anticonvulsants.

TREAT BY RISK TIER *foundation for everyone, then match the drug to the risk*

Tier	What and why
Everyone	**Calcium 1,000-1,200 mg/day, food first** (supplement only the shortfall); **vitamin D 800-1,000 IU** to 25-OH ≥ 30, repleted BEFORE antiresorptives or you provoke hypocalcemia; **resistance plus balance exercise** (the balance half prevents the fall that breaks the hip); deprescribe sedatives and orthostatic agents; stop smoking, alcohol under 2/day
Who gets drugs	T ≤ -2.5, OR hip/vertebral fragility fracture at any T-score, OR osteopenia with FRAX ≥ 3% hip / ≥ 20% major. **FRAX under-reads recent fractures, multiple vertebral fractures, steroids and falls**, so do not let it overrule a fracturing skeleton
High risk (most)	**Oral bisphosphonate first-line**: alendronate 70 mg or risedronate 35 mg weekly. Decades of fracture data, generic, rare harms. **Zoledronic acid 5 mg IV yearly** if GI intolerance or adherence fails
⚠ Very high risk *T ≤ -3.0 with fracture, multiple or recent vertebral fractures, fracture on therapy*	**Anabolic FIRST, antiresorptive second.** Teriparatide or abaloparatide 18-24 months, or romosozumab 12 months (boxed warning: not within 1 year of MI/stroke), then lock gains with bisphosphonate or denosumab. **Why the order matters**: antiresorptive-first blunts the anabolic, and unconsolidated anabolic gains drain away. Build first, then lock
Steroid users	**≥ 2.5 mg prednisone ≥ 3 months: assess everyone**; most on ≥ 7.5 mg at moderate+ risk get an oral bisphosphonate (ACR). Steroid bone loss is fastest in the first 3-6 months, so waiting for a bad DEXA wastes the window
Doses at a glance	Alendronate **70 mg PO weekly** · risedronate **35 mg PO weekly** · zoledronic acid **5 mg IV yearly** · denosumab **60 mg SC q6 months** · teriparatide **20 mcg SC daily** · abaloparatide **80 mcg SC daily** · romosozumab **210 mg SC monthly** · raloxifene **60 mg PO daily**
Niche agents	**Raloxifene**: vertebral protection only, raises VTE, lowers ER+ breast cancer, occasionally the right trade in a younger postmenopausal woman. **Calcitonin**: short-term analgesic bridge for acute vertebral fracture only, not a long-term drug. **HRT**: prevention in younger postmenopausal women who need it for vasomotor symptoms anyway
Monitoring	**Repeat DEXA in 1-2 years on the same machine.** Fracture or falling BMD on therapy: first ask **adherence and administration technique** (half stop orals by 1 year), then re-hunt secondary causes, then escalate to anabolic-first. A suppressed CTX confirms the bisphosphonate is actually on board when adherence is in doubt

THE RULES THAT PREVENT THE COMMON FAILURES *administration, holidays, and the one drug you must not stop*

Rule	Detail
Oral bisphosphonate technique	**Empty stomach, full glass of water, upright 30 min.** Absorption is under 1% and food abolishes it, so "taking it with breakfast" mimics treatment failure; upright prevents pill esophagitis. Avoid below CrCl 30-35
Drug holiday (bisphosphonates ONLY)	After **5 years oral / 3 years IV**, reassess: low-moderate risk can pause because the drug stays bound in bone and keeps protecting, while duration-linked risks recede. High risk continues to 10 / 6 years
⚠ NEVER just stop denosumab	RANKL inhibition vanishes in ~7 months and the osteoclast rebound causes **multiple spontaneous vertebral fractures**. A lapsed refill is a patient-safety event. Stopping requires a **bisphosphonate transition**; there is no denosumab holiday. Flag it on the med list like an anticoagulant
Keep rare harms in proportion	ONJ ~1 per 10,000-100,000 patient-years and atypical femoral fracture similarly rare, versus fractures prevented in 1 of every 10-20 treated. **New thigh or groin ache on long-term therapy gets an X-ray** (AFF prodrome), but stopping therapy over headlines trades a rare risk for a common one
CKD routing	CrCl < 30-35 bars bisphosphonates; **denosumab is not renally cleared** and becomes the antiresorptive of choice, with hypocalcemia surveillance (replete vitamin D, check calcium after dosing)

THE HIP-FRACTURE ADMISSION *where the treatment gap closes, or becomes permanent*

ZOLEDRONIC ACID BEFORE DISCHARGE

5 mg IV within 90 days of repair: new clinical fractures down ~35% and all-cause mortality down 28% (HORIZON-RFT). Few ward drugs carry a mortality benefit this clean. Replete vitamin D first, confirm CrCl ≥ 35, and warn about the first-infusion flu-like reaction (1-3 days, acetaminophen blunts it). **"Too acute to treat" becomes "never treated"**: fewer than 25% of hip-fracture patients ever start therapy.

CLOSE THE LOOP

Name the diagnosis in the chart: "mechanical fall with fracture" buries the disease that caused it. Lateral spine imaging if height loss > 1.5 in (silent vertebral fractures reclassify to very-high-risk). Ortho-geriatric comanagement, PT with balance work, fall-maker deprescribing, calcium and vitamin D, and a discharge line naming who repeats the DEXA and when. **Acute vertebral fracture: mobilize early**, bed rest accelerates bone loss.

PEARLS & PITFALLS

- **The fracture is the diagnosis.** A hip or vertebral fragility fracture with a T-score of -1.8 is osteoporosis, and waiting for -2.5 is how the treatment gap happens. Prior fracture is also the strongest predictor of the next one.
- **Same hormone, opposite outcome:** continuous PTH (hyperparathyroidism) destroys bone; intermittent daily pulses (teriparatide) build it. The exposure pattern, not the molecule, decides.
- **Half of oral bisphosphonate patients stop by one year.** Before calling any regimen a failure, ask about adherence and administration technique, then re-hunt secondary causes, then escalate.
- **The drug protects the bone, not from the floor.** Balance exercise and deprescribing sedatives and orthostatic agents prevent the fall itself, and exercise is the strongest single non-drug intervention.

References: USPSTF 2025 osteoporosis screening recommendation · Bone Health & Osteoporosis Foundation clinician guide · Endocrine Society pharmacological management of osteoporosis guideline · ACR glucocorticoid-induced osteoporosis guideline · HORIZON Recurrent Fracture Trial (NEJM 2007).

Educational aid; verify against current guidance, local formulary and patient factors.