Pharmacy Pearls

Osteoporosis Management

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Osteoporosis is the most common metabolic bone disease in the US and can result in significant physical, psychological, and economic consequences. It is often overlooked and undertreated, in large part because it is clinically silent; with no symptoms, before a fracture occurs.

Diagnosis by DEXA Scan*

Normal	Osteopenia	Osteoporosis
T-score ≥-1	T-score -1 to -2.5	T-score ≤-2.5**

*Additional circumstances in which osteoporosis can be diagnosed:

- Presence of fragility fractures in the absence of other metabolic bone disorders, even with normal bone mineral density (BMD)
- Osteopenia with increased fracture risk using FRAX assessment tool, linked **here**

**Diagnosis persists even if subsequent DEXA measurement shows a T-score higher than -2.5

Initiating Pharmacological Treatment

Treatment strongly recommended for patients with:

- T-score between -1.0 and -2.5 and a history of fragility fracture of the hip or spine
- T-score between -1.0 and -2.5 and a FRAX 10-year major osteoporotic fracture risk ≥20% or 10-year hip fracture risk ≥3%
- T-score of -2.5 or lower

Low risk (<10% 10-year risk of major osteoporotic fracture, applies to all patients)

- Exercise, strength and balance training
- Calcium 1,000-1,200 mg/day (varies based on age)
- Vitamin D 1,000-2,000 units/day (higher doses may be required in elderly patients and those with obesity or malabsorption)
- Smoking cessation
- Limit alcohol

High risk (indications above)

Antiresorptive Agents

- Bisphosphonates (1st line)
  - Alendronate 10 mg PO daily or 70 mg PO weekly
  - Risedronate 5 mg PO daily or 35 mg PO weekly or 150 mg PO monthly
  - Ibandronate 150 mg PO monthly
  - Zoledronic acid 5 mg IV yearly
- Raloxifene (women only) 60 mg PO daily
- Denosumab 60 mg SQ every 6 months
- Hormone replacement therapy

Bone Forming Anabolic Agents

- Teriparatide 20 mcg SQ daily x2 years*
- Abaloparatide 80 mcg SQ daily x2 years*
- Romosozumab 60 mg SQ every 6 months x1 year*

Very high risk (indications above AND fracture in past 12 months, fracture while on osteoporosis therapy, T-score less than -3.0, etc.)

Bone Forming Anabolic Agents

- Teriparatide 20 mcg SQ daily x2 years*
- Abaloparatide 80 mcg SQ daily x2 years*
- Romosozumab 60 mg SQ every 6 months*

Follow-up

- Monitor adherence, tolerability, new cautions/contraindications, calcium/vitamin D intake, change in risk, new falls

*Should be followed by antiresorptive therapy upon discontinuation

Pharmacotherapy

Medication	Route	Mechanism of Action	Contraindications	Side Effects	Notes
Bisphosphonates					
Alendronate*[£α] (Fosamax®, Binosto®)	Oral	Inhibit osteoclast activity and bone resorption	High risk of aspiration, esophageal stricture, inability to stand or sit upright for ≥30 minutes after dose Reclast® only: CrCl <35 mL/min and evidence of acute renal impairment	Hypocalcemia, musculoskeletal pain, abdominal pain, heartburn, HTN	Not recommended: • CrCl <35 mL/min (alendronate, zoledronic acid) • CrCl <30 mL/min (ibandronate, risedronate) Separate calcium, antacids, iron, magnesium by ≥2 hours
Risedronate*[£α] (Actonel®, Atelvia®)	Oral				
Ibandronate* (Boniva®)	Oral				
Ibandronate*	IV				
Zoledronic acid*[£α] (Reclast®)	IV				
PTH Analogs					
Teriparatide*[£] (Forteo®)	SQ	Stimulates osteoblast activity	Boxed Warning for osteosarcoma	Hypercalcemia, orthostasis, dizziness	Refrigerated pen lasts 28 days Inject into thigh or abdomen
Abaloparatide*[£] (Tymlos®)	SQ				
Monoclonal Antibodies					
Denosumab*[£] (Prolia®)	SQ	Binds to nuclear factor-kappa ligand (RANKL) and blocks interaction between RANKL and RANK (receptor on osteoclasts), preventing osteoclast formation	Hypocalcemia (must be corrected prior to using) Pregnancy	Back pain, limb pain, increased cholesterol	Bone loss can be rapid upon discontinuation, consider antiresorptive therapy to mitigate decline in BMD
Romosozumab*[£α] (Evenity®)	SQ	Inhibits sclerosin (regulatory factor in bone metabolism), increasing bone formation (also decreases bone resorption to a lesser extent)			Romosozumab is indicated for patients who have failed or are intolerant to other available osteoporosis therapy
Misc Agents					
Raloxifene* (Evista®)	Oral	Selective estrogen receptor modulator (SERM)- acts like estrogen agonist in bone to prevent bone loss	Boxed Warning for increased risk of thromboembolic events (especially in the first 4 months of use)	Hot flashes, peripheral edema, arthralgia	Discontinue ≥72 hours prior to and during prolonged immobilization

*Demonstrates reduction in vertebral fracture risk; [£]Demonstrates reduction in nonvertebral fracture risk; [α]Demonstrates reduction in hip fracture risk

Duration of Therapy

- Reassessment of bisphosphonate therapy should typically occur after 3-5 years
- Patients initially at very high risk (and who remain very high risk) should receive oral bisphosphonate therapy for 10 years (6 years for IV zoledronic acid)
- Risk-benefit of treatment past 10 years has not been studied and is unknown
- Max duration of teriparatide use is 18-24 months*
- Max duration for romosozumab use is 12 months*

*Should be followed by antiresorptive therapy

Medications that can lower BMD (not all-inclusive)

- Glucocorticoids
- Depot medroxyprogesterone acetate
- Anticonvulsants (carbamazepine, phenobarbital, others)
- Heparin
- Lithium
- Loop diuretics
- PPIs
- SSRIs
- TZDs (pioglitazone)