Bone Health:
Osteoporosis Diagnosis & Management

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Disclaimer

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DIAGNOSIS

Who should get a DEXA scan?

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National Osteoporosis Foundation (NOF) guidelines:

Anyone with a fragility fracture

Postmenopausal women, men >50 with other risk factors

Women >65, men >70

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Who should get a DEXA?

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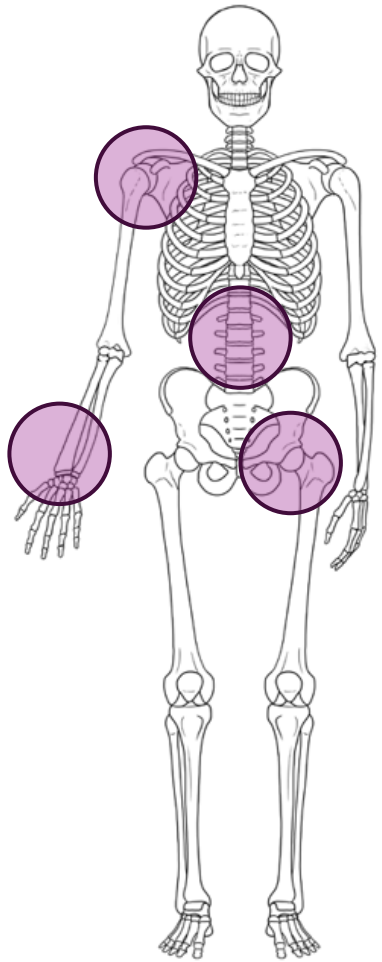


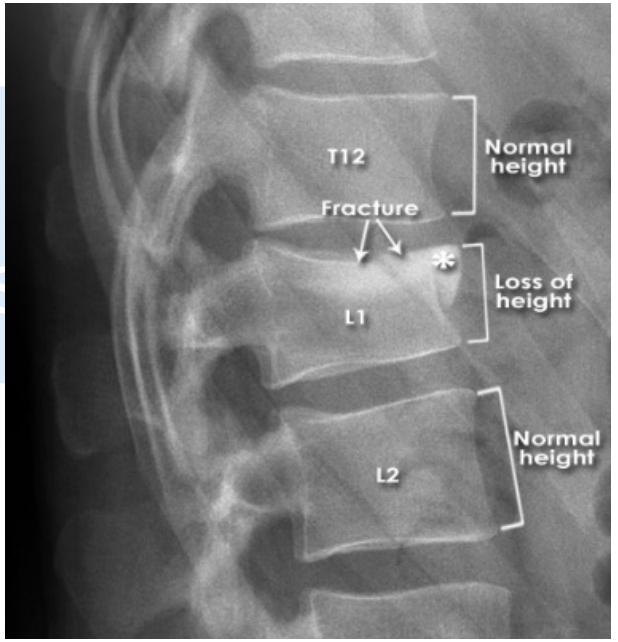
Anyone with a fragility fracture

a fracture sustained from a fall from standing height or lower that would not cause a fracture in a healthy person, AKA a "low-energy" or "low-trauma" fracture.

Postmenopausal women, men >50 with other risk factors

The most common sites include the hip, spine (vertebral compression fractures), wrist, and shoulder. Approx 2/3 of vertebral compression fractures are asymptomatic.

Women >65, men >70



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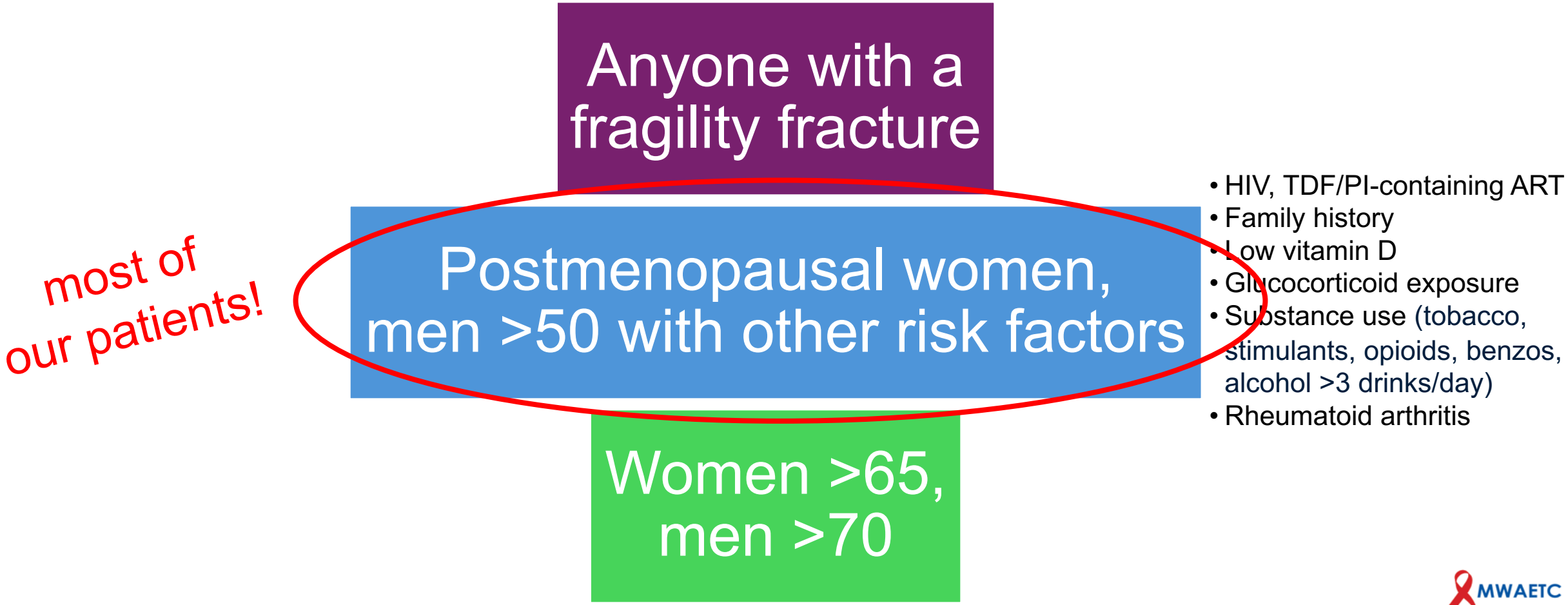

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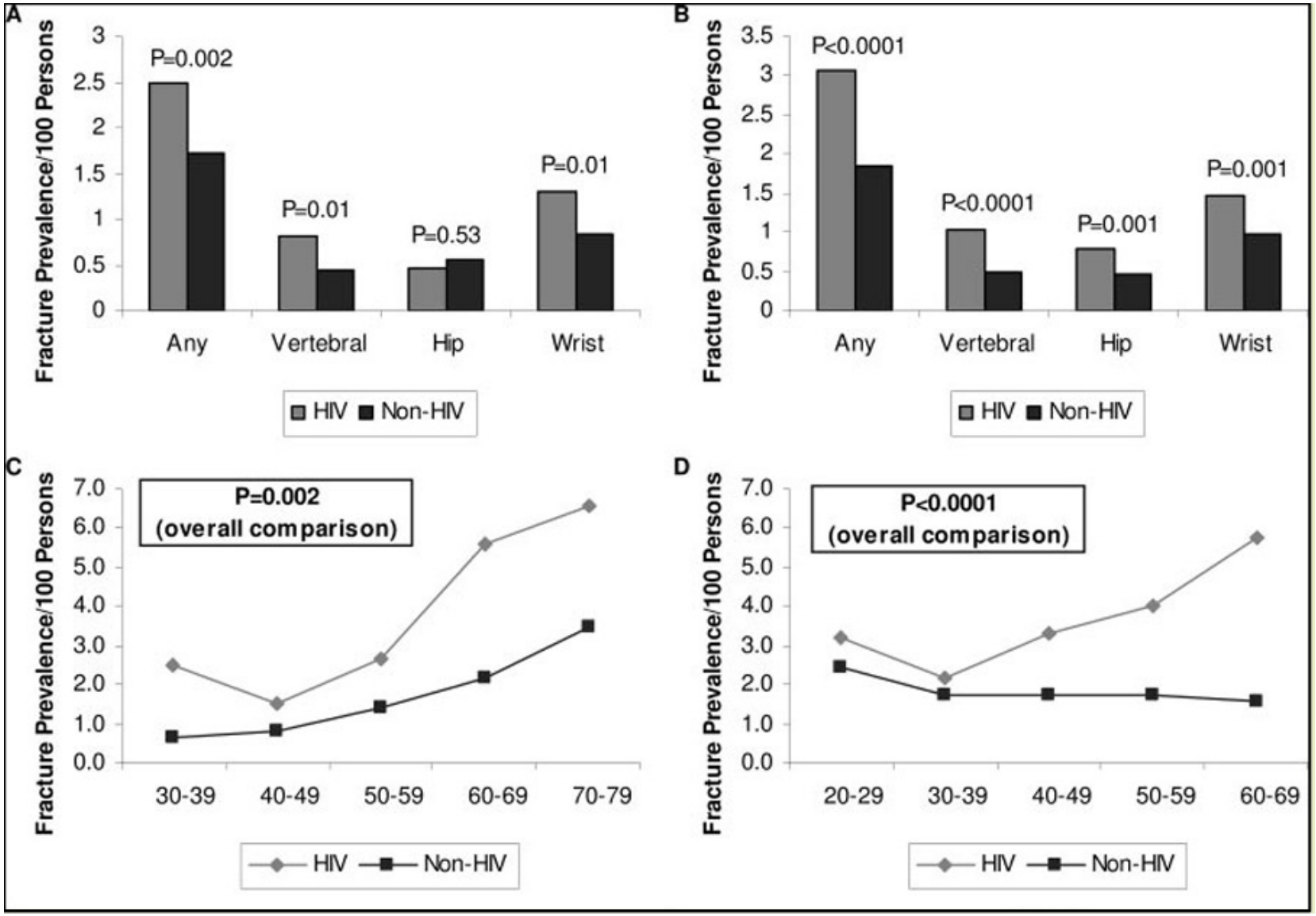
Fracture risk:

Women:

Men:



Triant et al; J Clin Endocrinol Metab 2008

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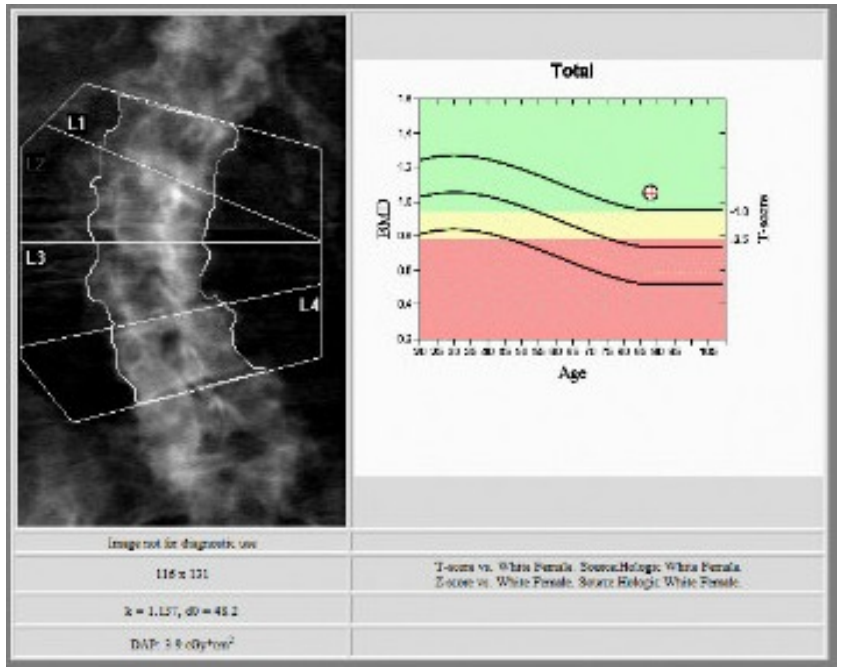
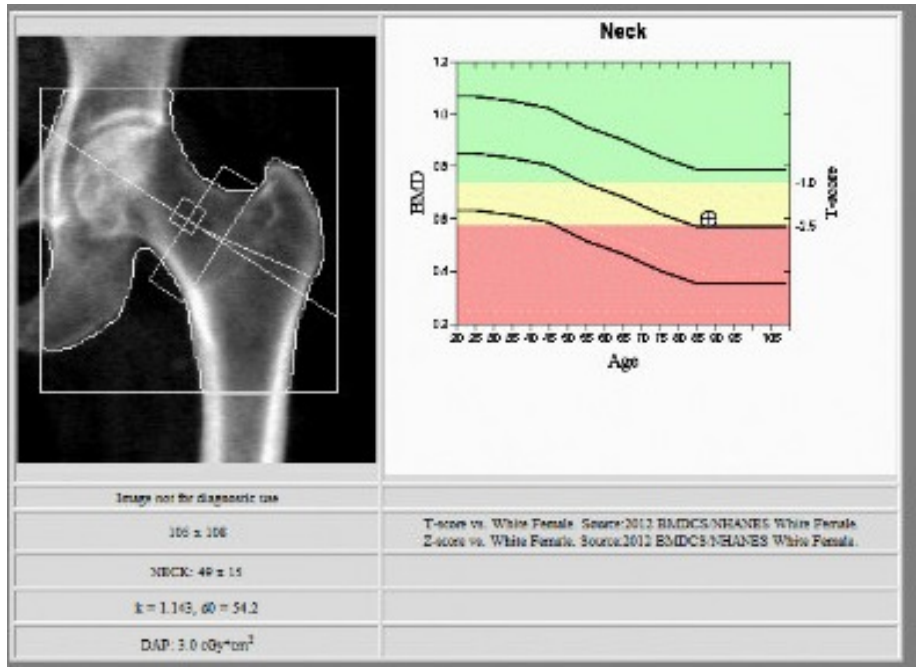
Interpreting DEXA results:

Normal BMD
T-score ≥-1.0

Osteopenia
T-score <-1.0 and ≥-2.4

Osteoporosis
T-score ≤-2.5





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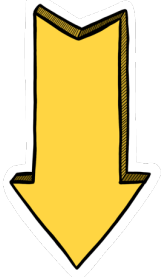

MANUALLY calculate FRAX;
do not trust EMR report.

https://www.fraxplus.org/calculation-tool

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FRAX Calculator

Questionnaire

1. Age (between 40 and 90 years): 73
2. Sex: ○ Female ● Male
3. Weight: kg 76 — kg / cm
4. Height: cm 173
5. Previous Fracture: X
6. Parent Fractured Hip: X
7. Current smoking: X
8. Glucocorticoids: X
9. Rheumatoid arthritis: X
10. Secondary osteoporosis: ✓
11. Alcohol 3 or more units/day

12. Femoral neck BMD: Hologic × — 0.596

Calculate

- No BMD available
- GE-Lunar
- Hologic
- Norland
- T-score
- DMS/Medilink
- Mindways QCT

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When should do we repeat DEXA scans?

No established guidelines…

In people who have not been treated, consider repeating DEXA

1. if new fragility fracture and >1-2 years since last DEXA
2. after 5 years if ongoing risk factors present.

For those receiving osteoporosis treatment, recommendations vary.
Note that in-person variation in BMD may hide/obscure treatment effects.
Reduction in fracture risk has been seen regardless of BMD changes.

WHO WARRANTS TREATMENT?

Pharmacologic Fracture Prevention

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Who gets treatment for osteoporosis?

- **History of fragility fracture**
- **Osteoporosis (T-score ≤-2.5)**
- Osteopenia (T-score <-1.0 and ≥-2.4) with elevated fracture risk
  - By *manual FRAX calculation*, 10-year risk of

    major osteoporotic fracture ≥ 20% OR hip fracture ≥3%

Management for ALL PATIENTS:

1. Ensure 25-OH Vitamin D ≥30 ng/dL ← **MANDATORY BEFORE TREATMENT**
2. Check renal function
3. Check calcium; aim for >1200mg of calcium per day via diet/supplement
4. Fall prevention strategies: improve balance/strength, minimize risk factors

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Nutrient-dense Food and Beverage Sources of Calcium

FOOD	STANDARD PORTION	CALCIUM (mg)
Dairy and Fortified Soy Alternatives		
Yogurt, plain, nonfat	8 ounces	488
Yogurt, plain, low fat	8 ounces	448
Kefir, plain, low fat	1 cup	317
Milk, low fat (1%)	1 cup	305
Soy beverage (soy milk), unsweetened	1 cup	301
Yogurt, soy, plain	8 ounces	300
Milk, fat-free (skim)	1 cup	298
Buttermilk, low fat	1 cup	284
Yogurt, Greek, plain, low fat	8 ounces	261
Yogurt, Greek, plain, nonfat	8 ounces	250
Cheese, reduced-, low-, or fat-free (various)	11/2 ounces	~115-485
Vegetables		
Lambsquarters, cooked	1 cup	464
Nettles, cooked	1 cup	428
Mustard spinach, cooked	1 cup	284
Amaranth leaves, cooked	1 cup	276
Collard greens, cooked	1 cup	268
Spinach, cooked	1 cup	245
Nopales, cooked	1 cup	244
Taro root (dasheen or yautia), cooked	1 cup	204
Turnip greens, cooked	1 cup	197
Bok choy, cooked	1 cup	185
Jute, cooked	1 cup	184
Kale, cooked	1 cup	177
Mustard greens, cooked	1 cup	165
Beet greens, cooked	1 cup	164
Pak choi, cooked	1 cup	158
Dandelion greens, cooked	1 cup	147
Protein Foods		
Tofu, raw, regular, prepared with calcium sulfate	1/2 cup	434
Sardines, canned	3 ounces	325

Calcium goal:
>1200mg per day

Doable by PCP!

Table 2. Pharmacologic Therapies for Postmenopausal Osteoporosis.*

Drug Class and Medication	Mechanism of Action	Treatment Dose	Fracture Risk Reduction[17,18]†			Adverse Effects	Contraindications and Warnings
			Vertebral	Hip	Non-vertebral		
			percent				
Bisphosphonates: bind to osteoclasts							
Alendronate		10 mg once daily or 70 mg once weekly orally x5 years then holiday	44	40	17	GI irritation, MSK pain; rarely ONJ, AFF[19]§	Esophageal varices or dysmotility, creatinine clearance <30–35 ml per min, hypocalcemia, bisphosphonate allergy
Zoledronic acid		5 mg per yr IV annual x3-5 years then holiday	56	42	18	Acute-phase reaction, renal impairment, hypocalcemia, atrial fibrillation, rarely ONJ and AFF[19]§	Creatinine clearance <35 ml per min, AKI, hypocalcemia, bisphosphonate allergy; important to ensure vitamin D sufficiency
RANK-ligand inhibitor: **Denosumab**		60 mg every 6 mo subcutaneously FOREVER?	68	40	20	MSK pain, skin infections, rashes, hypocalcemia, rarely ONJ and AFF[19]; rebound bone loss and fractures after stopping	Hypocalcemia, hypersensitivity; important to ensure vitamin D sufficiency
PTH receptor agonists: increases bone formation							
Teriparatide		20 μg daily subcutaneously All anabolics are followed by a bisphosphonate.	74	ND	39	Hypercalcemia, muscle cramps, nausea, headache, dizziness, hypotension	Bone metastases, skeletal cancers, history of skeletal radiation, increased risk of osteosarcoma, Paget's disease, hypercalcemic disorders, unexplained elevated alkaline phosphatase, hypersensitivity
Sclerostin inhibitor: monoclonal antibody against sclerostin, increases bone formation, decreases bone resorption							
Romosozumab		210 mg per mo subcutaneously	73	38††	19††	Arthralgia, headache, MSK pain, hypocalcemia, CV events; rarely ONJ, AFF	Recent stroke or MI; other CV risks, hypocalcemia, or hypersensitivity; important to ensure vitamin D sufficiency

Avoid if hx of GERD. Poor absorption; need to take on empty stomach and remain upright.

Only option if CrCl <30
→ Refer to specialist

Consider "anabolics" if T-score ≤-3.0
→ Refer to specialist

N ENGL J MED 389;21 nejm.org, 2023

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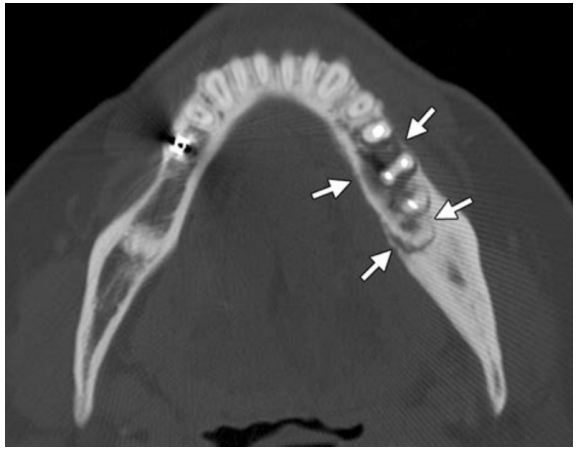
Pitfalls

- If a patient experiences vague mid-thigh pain while on treatment, stop treatment and get stat MRI of both legs - this is suspicious for **atypical fracture.**
  - Very rare, but risk increases with duration of bisphosphonate treatment (median time 7.1 years)

Pitfalls

- If a patient experiences vague mid-thigh pain while on treatment, stop treatment and get stat MRI of both legs - this is suspicious for atypical fracture.
- Ensure anticipated major dental procedures (anything involving a drill) are done prior to initiating treatment to minimize risk of **osteonecrosis of the jaw**.
  - routine dental cleanings are okay!
  - Incidence highest in oncology population (1-15%); in the osteoporosis population, incidence is 0.001-0.01%.
  - risk factors: glucocorticoid use, poor oral hygiene, DM, ill-fitting dentures, maxillary or mandibular bone surgery.



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Pitfalls

- if a patient experiences vague mid-thigh pain while on treatment, stop treatment and get stat MRI of both legs - this is suspicious for atypical fracture.
- Ensure anticipated major dental procedures (anything involving a drill) are done prior to initiating treatment to minimize risk of osteonecrosis of the jaw.
- **Osteoporosis treatment failure** is generally defined as
  - significant bone mineral density (BMD) loss
    (>5% at lumbar spine, >4% at total hip, or >5% at femoral neck over 2 years),
    OR
  - two or more fragility fractures while on therapy, particularly vertebral fractures.

Thank you!

Happy to answer questions!

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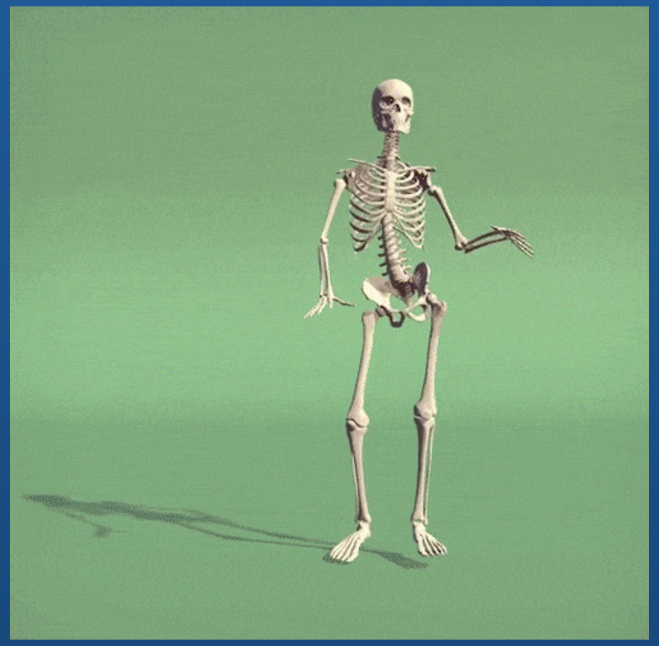

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