Patient vignettes in osteoporosis: Fracture prevention with bone formation (anabolic) therapy

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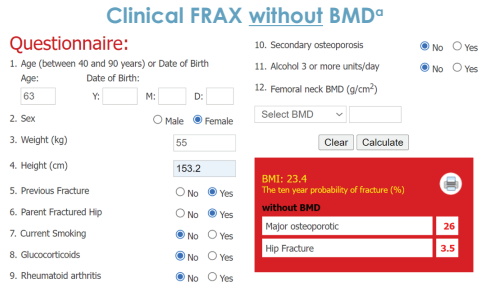
Alice

A 63-year-old woman with a recent fracture (naive to anti-osteoporosis therapy)

Age	63 y	**Sex**	Female	**Weight**	55.0 kg	**Height**	153.2 cm
Fracture history	• Clinical spine fracture (confirmed by x-ray), age 63 y			**Medications**	**Current** Steroid asthma inhaler ~2 qw Vitamin D 1000 IU qd and multivitamin qd **Prior** No prior anti-osteoporosis therapy		
BMD T-score	**Lumbar spine** N/A	**Femoral neck** N/A	**Total hip** N/A	**Comorbidities**	IBD (controlled with TCM), age 30 y Mild adult-onset asthma, age 55 y No DM, HTN, or dyslipidemia		
	BMD assessment date Not yet performed; age, <65 y			**Additional notes**	• Spine fracture was observed on a recent (≤1 mo) lateral spine radiograph ordered by a GP after the patient presented with sharp spontaneous onset of back pain without preceding trauma or falls; patient was also worried because her mom had a painful spine fracture • Referral for a specialist assessment was provided to discuss bone formation therapy as an option • Patient saw 'strong bone improvements' when her mom was on bone formation therapy and was wondering if it would also be a suitable option for her • Normal initial blood tests ordered by GP: calcium (corrected for albumin), phosphate, creatinine (eGFR), alkaline phosphatase, thyroid-stimulating hormone, serum protein electrophoresis, 25-hydroxyvitamin D, PTH, magnesium, and TSH		
Fracture risk details	• Clinical spine fracture • IBD • Steroids/current/inhaled • Mother had a spine and hip fracture • Highly physically active: walking, ~6 h/week; gym/Zumba classes, 2/week; yoga/Pilates classes, 1/week • No falls within last year • Nonsmoker, rarely drinks alcohol						

FRAX: 10-y fracture risk calculator based on Canadian data[1]



Osteoporosis Canada, AACE, BHOF, NAMS, and SOGC guidelines indicate that FRAX can be used without entering BMD when not available[2-6]; FRAX without BMD predicts a hip fracture with ~80% chance[7]

≥20% for MOF[2-6,8] (i.e., hip, spine, humerus, or distal forearm fracture) or **≥3.0%** for hip fracture[2-5,8] indicates **high** future fracture risk

Alice: Clinical management based on recent North American guidelines[2-6,8,9]

Osteoporosis and fracture risk

- Needs treatment—at minimum high risk: spine fracture[2-6,8] (also, MOF ≥20%[2-6,8] and hip ≥3.0%[2-4,5,8] FRAX score)
- **Recommended for BF therapy—very high risk: recent fracture ≤1 y[2,3,5,9]**
- Osteoporosis diagnosis recorded based on a spine fracture[2-6]

⚠ After completing BF treatment, guidelines[2-6,8,9] and product monograph[10] recommend switching to antiresorptive therapy to preserve the achieved BMD gains.

♂ **What if this patient was a man with a similar risk factor profile?** Per product monograph, romosozumab is not indicated in men and teriparatide may be considered after failure/intolerance to prior therapy.[10,11]

Management

- Indicated for **romosozumab**: osteoporosis + fracture or ≥2 risk factors (fracture and family hx); no hx of MI or stroke and no major CVD risk factors[10]
- Indicated for **teriparatide**: fracture hx; no known risk factors for osteosarcoma[11]
- DXA scan: ordered to confirm baseline/pretreatment BMD
- Vitamin D: continue supplementing 1000 IU/d; calcium: 1 small yogurt/d + ~2 slices of cheese/d + multivitamin
- Blood tests: reordered (prior tests ~4 mo ago) to exclude contraindications/hypocalcemia and secondary osteoporosis causes[2-6]
- Patient preferences: discussed treatment initiation with BF therapy (qd vs qm dosing) and follow-on antiresorptive treatment after completing BF treatment (bisphosphonates vs denosumab)

AACE, American Association of Clinical Endocrinology; BF, bone formation; BHOF, Bone Health and Osteoporosis Foundation; BMD, bone mineral density; BMI, body mass index; CVD, cardiovascular disease; DM, diabetes mellitus; DXA, dual-energy x-ray absorptiometry; eGFR, estimated glomerular filtration rate; FRAX, fracture risk assessment tool; GP, general practitioner; HTN, hypertension; hx, history; IBD, inflammatory bowel disease; MI, myocardial infarction; MOF, major osteoporotic fracture; NAMS, The North American Menopause Society; qd, daily; qw, weekly; qm; monthly; SOGC, Society of Obstetricians and Gynaecologists of Canada; TCM, traditional Chinese medicine.

[a]Additional details for the following FRAX entries: 5. adult fracture occurring with low trauma (excluding hands, feet, and cranium); 6. biological mother/father hip fracture; 7. currently smokes tobacco; 8. current/past oral glucocorticoid use, ≥5 mg qd or equivalent; 9. confirmed diagnosis of rheumatoid arthritis; 10. disorders strongly associated with osteoporosis (including type 1 diabetes, osteogenesis imperfecta in adults, untreated long-standing hyperthyroidism, hypogonadism, premature menopause/<45 y, chronic malnutrition, malabsorption, and chronic liver disease); 11. ≥3 units of alcohol daily; 12. enter the T-score if BMD scan is unknown and leave BMD field blank if BMD results are not available.

1. FRAX® Risk Assessment Tool, Canada. Accessed July 1, 2024. https://frax.shef.ac.uk/FRAX/tool.aspx?country=19; 2. Camacho PM, et al. *Endocr Pract*. 2020;26(Suppl 1):1-46; 3. Khan AA, et al. *J Obstet Gynaecol Can*. 2022;44(5):527-536.e5; 4. LeBoff MS, et al. *Osteoporos Int*. 2022;33:2049-2102; 5. The North American Menopause Society. *Menopause*. 2021;28:973-997; 6. Morin SN, et al. *CMAJ*. 2023;195(39):E1333-E1348; 7. Hoff M, et al. *Osteoporos Int*. 2017;28(10):2935-2944; 8. Shoback D, et al. *J Clin Endocrinol Metab*. 2020;105(3):dgaa048. 2021;28(9):973-997; 9. Qaseem A, et al. *Ann Intern Med*. 2023;176(2):224-238; 10. EVENITY® (romosozumab-aqqg). Product Monograph. Amgen Inc.; 2020; 11. Pr FORTEO® (teriparatide (rDNA origin) injection). Product Monograph. Eli Lilly and Co; 2021.

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