

Clinical Practice Guideline Osteoporosis Screening and Treatment

Osteoporosis is a condition of decreased bone mass, leading to bone fragility and an increased susceptibility to fractures. While osteoporosis is often thought of as an older person's disease it can strike at any age.

Of the 10 million Americans estimated to have osteoporosis, eighty percent of those affected by this bone disease are women, while twenty percent are men. Given its influence on the risk of fracture, osteoporosis may significantly affect life expectancy and quality of life.

Diagnosis

The diagnosis of osteoporosis is based upon measurements obtained from densitometry. This measurement is called bone mineral density test or **BMD**.

The result of this BMD test is reported as a **T-score**. According to the criteria established by the World Health Organization (WHO), osteoporosis is defined as a BMD that lies 2.5 standard deviations or more below that of a healthy young female. However, the use of the T-score alone is inappropriate in identifying patients at high fracture risk in need of interventions, since age is as great a risk factor as BMD.

BMD test results also includes a **Z-score** which compares a patient's bone density to what is normal in someone of the same age and body size. Z-scores can help to determine when to treat patients who are osteopenic.

Practitioners generally do not use a Z-score to diagnose osteoporosis in post-menopausal women and men age 50 or older. Among older adults, low bone mineral density is common, so Z-scores can be misleading as this group of people is at greatest risk of breaking a bone.

FRAX® is the World Health Organization Fracture Risk Assessment Tool. FRAX® is used to calculate the 10-year probability of a hip fracture and the 10-year probability of a major osteoporotic fracture. Healthcare providers can use this tool for postmenopausal women and men ≥ 50 years of age who are not currently or previously treated with pharmacotherapy for osteoporosis. The FRAX® algorithm is available at www.nof.org and at www.shef.ac.uk/FRAX. Another web based tool utilized to assist in calculating the absolute fracture risk is available at <http://riskcalculator.fore.org/>. The use of BMD measurements, together with clinical risk factors provides practitioners with a mechanism for the effective and efficient delivery of health care in the management of osteoporosis.

Risk Factors for Osteoporosis and Osteoporotic Fracture

(Refer to NOF Clinician's Guide for a complete list)

- Advancing age
- Caucasian or Asian Race
- Previous Osteoporotic Fracture
- Long-term glucocorticoid therapy ($\geq 5\text{mg/d}$ of prednisone or equivalent for ≥ 3 months [ever])
- Parental history of hip fracture
- Low body weight ($< 58\text{kg}$) or low BMI
- Lifestyle factors (smoking, excessive alcohol intake [≥ 3 drinks/day], sedentary lifestyle)
- Rheumatic and autoimmune diseases (e.g., Ankylosing Spondylitis, Lupus, Rheumatoid Arthritis)
- Endocrine Disorders (e.g., Adrenal insufficiency, Cushing's syndrome, Diabetes mellitus type I or II)
- Hypogonadal states (e.g., Androgen insensitivity, premature menopause)
- Gastrointestinal disorders (e.g., Celiac, Gastric bypass, Inflammatory Bowel disease)
- Hematologic disorders (e.g., Multiple Myeloma, Leukemias & Lymphomas, Hemophilia)
- Genetic factors (e.g., Cystic Fibrosis, Ehlers-Danlos, and Hemochromatosis)
- Other Conditions and diseases (COPD, CHF, Depression, and ESRD)
- Low calcium intake (lifelong) and/or Vitamin D deficiency
- Medications (e.g., anticonvulsants, aromatase inhibitors, barbiturates, lithium, methotrexate, proton pump inhibitors, serotonin reuptake inhibitors, thiazolidinediones)

Risk Factors for Falls Include

- Age, female gender, dementia, poor health/fragility, recent falls, poor vision

Screening Bone Mineral Density (BMD) is recommended for

- Women age 65 or older (**Grade 2B***)
- Postmenopausal women less than 65 years of age if one of the above risk factors is present (**Grade 2B***)
- May consider screening Men with risk factors.

Bone Density Definitions:

Normal	Osteopenia	Osteoporosis
T-score ≥ -1.0	T-score between -1.0 and -2.5	History of fragility fracture or a T-score ≤ -2.5 at any site (lumbar spine, femoral neck, greater trochanter, or total hip)
<p>➤ WHO diagnostic T-score criteria are applied to BMD measurement by central DXA at the lumbar spine and femoral neck for postmenopausal women and men 50 years of age or older.</p> <p>➤ Preferred Method of BMD Testing:</p> <ul style="list-style-type: none"> • DXA (dual-energy, x-ray absorptiometry) • DXA of hip and spine (Grade 2C**), however measurement of the hip alone could be sufficient in older individuals. 		

***Strength of recommendation:** 1=generally should be performed; 2=may be reasonable to perform; 3=generally should not be performed.

****Levels of evidence reflect the best available literature in support of an intervention or test:** A=randomized controlled trials; B=controlled trials, no randomization; C=observational trials; D=opinion of expert panel.

Lifestyle and Dietary Changes

Calcium —Encourage patients to get calcium rich foods from sources when possible. Supplements can be used when adequate dietary intake cannot be achieved. The Institute of Medicine recommends 1,000mg/day of calcium in men age 50-70 and 1,200mg/day for women age 51 and older and men age 71 and older. The recommended intake is 1000mg/day for those ages 19-50.

Vitamin D—Vitamin D rich foods and supplements are good vitamin D sources. The National Osteoporosis Foundation recommends 800 to 1,000 international units/day for those ≥ 50 years of age. Patients at risk of deficiency should be tested. Low serum 25(OH)D levels should be treated with vitamin D supplements sufficient to bring the level to 30ng/mL. The safe upper limit for Vitamin D intake is 4,000 international units/day for the general adult population.

Exercise—Emphasize the importance of regular weight-bearing and muscle-strengthening exercise. Benefits include improved agility, strength, posture, and balance.

Tobacco—Strongly encourage cessation of and avoidance of tobacco smoking given its detrimental effects on the skeleton and overall health. Recommend smoking cessation programs.

Alcohol—Discourage excessive alcohol consumption (≥ 3 drinks a day).

Fall Prevention—Review prescription medications for side effects that may affect balance. Check and correct any vision and/or hearing issues. Encourage exercise to improve/maintain muscle strength and balance. Encourage use of a cane or walker, when appropriate. Refer for home safety evaluation.

Treatment with pharmacologic options

On a case-to-case basis consider:

- BMD Measurements
- Clinical risk factors
- Comorbidities
- FRAX® results
- Clinical judgment

Consider Treatment for High Risk patients:

- T-score of ≤ -2.5 at the femoral neck, total hip or lumbar spine
- Hip or spine fracture
- Low bone mass (T-score between -1.0 and -2.5) and a 10-year probability of hip fracture $\geq 3\%$ based on FRAX®
- Low bone mass and a 10-year probability of a major osteoporosis-related fracture $\geq 20\%$ based on FRAX®

Pharmacologic Options:

- Consider oral bisphosphonate, if not otherwise contraindicated, generic is available¹.
- If not tolerated or ineffective, consider other agents.
- Consider referral to endocrine or bone and mineral metabolism specialist if patient does not tolerate treatment or shows progression or recurrent fracture after 2 years on treatment.

¹Use caution in patients with active upper GI disorders. Avoid use if esophageal abnormalities (eg. Stricture or achalasia) delay esophageal emptying. Take medications on an empty stomach with water, remain upright, no food or beverage for 30 minutes (60 minutes for ibandronate)

FDA-Approved Osteoporosis Therapies	
Description	Medications
Bisphosphonates	alendronate, risedronate, ibandronate, zoledronic acid
Estrogens	conjugated estrogens, conjugated estrogens synthetic, esterified estrogens, estradiol, estradiol acetate, estradiol cypionate, estradiol valerate, estropipate
Other agents	calcitonin, raloxifene, denosumab, teriparatide
Sex hormone combinations	conjugated estrogens/medroxy-progesterone, estradiol/levonorgestrel, estradiol/norethindrone, estradiol/norgestimate, ethinyl estradiol/norethindrone

Follow-up

Patients treated with pharmacologic agents

- BMD testing performed, in general, every 2 years.
- Repeat BMD measurements may be most valuable for individual patients on therapy or with underlying clinical factors that might lead to accelerated bone loss.
- Repeat BMD measurements should be obtained on the same equipment as baseline whenever possible

Patients not requiring pharmacologic intervention at the time of initial evaluation

- Clinical re-evaluation when medically appropriate.
- BMD testing to be performed no more than frequently than every 2 years.

References

U.S. Department of Health & Human Services. *AHRQ, Agency for Healthcare Research and Quality, U.S. Preventive Services Task Force (USPSTF); Screening for Osteoporosis in Postmenopausal Women.*

National Institutes of Health. *Osteoporosis and Related Bone Diseases National Resource Center* webpage at <http://www.osteo.org>

World Health Organization. *Diagnosis Criteria for Osteoporosis*

National Osteoporosis Foundation webpage at <http://www.nof.org>

American College of Physicians, *Screening for Osteoporosis in Men: A Clinical Practice Guideline from the American College of Physicians* webpage at <http://annals.org/article.aspx?articleid=740825>

Clinical Guidelines adopted by RMHP are based on clinical evidence at the time of publication. New information, evidence and practice standards may be available; therefore, always use best clinical judgment in their interpretation.

Adopted and Approved by Medical Advisory Committee September 23, 2014.