MedStar Health

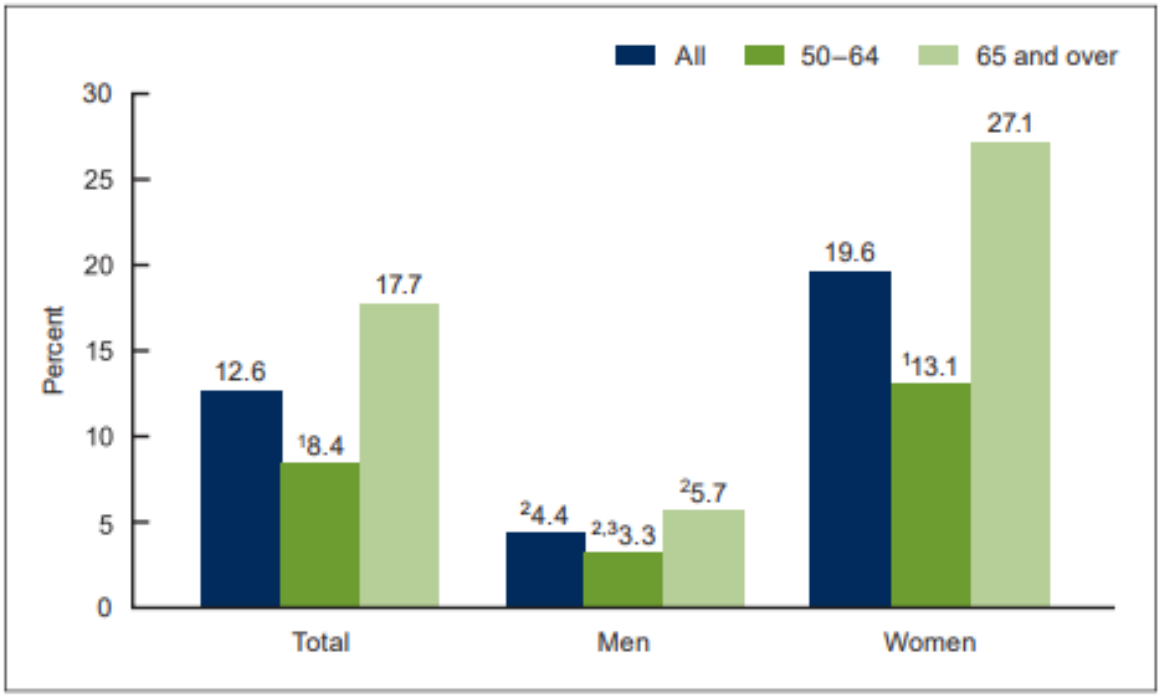
Osteoporosis: Screening and Management
Clinical Practice Guideline

These guidelines are provided to assist physicians and other clinicians in making decisions regarding the care of their patients. They are not a substitute for individual judgment brought to each clinical situation by the patient's primary care provider-in collaboration with the patient. As with all clinical reference resources, they reflect the best understanding of the science of medicine at the time of publication, but should be used with the clear understanding that continued research may result in new knowledge and recommendations.

Introduction

Osteoporosis is a silent disease whose first clinical manifestation is usually a fracture, sometimes a major and disabling one. NHANES data from 2017-2018 reveal that 27.1% of women and 5.7% of men 65 and over have osteoporosis at the lumbar spine or hip.[1] One out of every two white women will experience an osteoporotic fracture at some point in her lifetime. One in five men will have an osteoporosis related fracture in his lifetime. Osteoporosis is less common in African American women though represents the same risk of fracture once it occurs.[2]

Figure 1. Prevalence of osteoporosis among adults aged 50 and over, by sex and age: United States, 2017–2018



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Definition

Osteoporosis is a disease characterized by low bone mass, microarchitectural disruption, and increased skeletal fragility. The World Health Organization (WHO) defines osteoporosis as a bone mineral density measured by DEXA that is 2.5 or more standard deviations below the young adult reference mean.

Risk Factors for Osteoporosis and Osteoporotic Fractures

The factors associated with an increased risk of osteoporotic fracture can be characterized as modifiable or nonmodifiable. In general, the more risk factors a patient has, the greater the risk of fracture. If one or more risk factors are present, bone mineral density (BMD) testing may be indicated to determine whether therapy is appropriate.

Non-Modifiable	Potentially Modifiable
▪ **Personal history of fracture as an adult**	▪ **Current cigarette smoking**
▪ **History of fracture in first-degree relative**	▪ Early menopause or bilateral oophorrectomy
▪ Female sex	▪ Prolonged premenopausal amenorrhea
	▪ (>1 year)
▪ Poor health/ frailty	▪ Alcohol (3 or more drinks/day)
▪ Caucasian race	▪ **Low body weight (<127 lbs)**
▪ Advanced age	▪ High intake Aluminum containing antacids
▪ Dementia	▪ Excess Vitamin A intake
	▪ Vitamin D insufficiency
	▪ High salt or caffeine intake
	▪ Low calcium intake (lifelong)
	▪ Impaired eyesight despite adequate correction
	▪ Poor health/frailty
	▪ Recurrent falls
	▪ Inadequate physical activity/immobilization

Note that poor health and frailty, which may or may not be modifiable, appear under both headings. **The four items in boldface—personal or family history of fracture, smoking, and low body weight—were demonstrated in a large, ongoing, prospective US Study to be key factors in determining the risk of hip fracture (independent of bone density).**

Osteoporosis Risk Assessment Tools

Multiple tools exist to assess osteoporosis risk. All perform similarly though not all have been validated in diverse populations. The following tools are available in MedConnect in the "Calculator" section:

ORAI—Osteoporosis Risk Asessment Index

Age (years)	
≥75	15
65-74	9
55-64	5
45-54	0
Weight (kg)	
<60	9
60-69	3
≥70	0
No current estrogen use	2

Threshold for increased risk ≥ 9

https://www.physio-pedia.com/The_Osteoporosis_Risk_Assessment_Instrument_(ORAI)

Osteoporosis Risk SCORE (Simple Calculated Osteoporosis Risk Estimate)

Non-black race	5 points
Rheumatoid arthritis	4 points
Prior rib/wrist/hip fracture	4 points per fracture, max 12 points
Never used estrogen	1 point
Age in years	3*age/10
Weight in pounds	-1*weight/10

Threshold for increased risk ≥6

Osteoporosis Self-assessment Tool for Women

- 2* (weight in kg-age). Threshold for increased risk <1

Osteoporosis Self-assessment Tool for Men

- 2* (weight in kg-age). Threshold for increased risk <4

ADDITIONAL RISK ASSESSMENT : WHO FRACTURE RISK ALGORITHM (FRAX)

FRAX™ was developed to calculate the 10-year probability of a hip fracture and the 10-year probability of a major osteoporotic fracture (defined as clinical vertebral, hip, forearm or humerus fracture) taking into account femoral neck BMD and the clinical risk factors: age, gender, history of Rheumatoid arthritis, h/o prior fracture, parental history of hip fracture, current smoking, BMI, alcohol intake and prior use of glucocorticosteroids. The FRAX™ algorithm is available at https://www.sheffield.ac.uk/FRAX/tool.aspx?country=9. Incorporation of the FRAX questionnaire is available on newer DXA scanners.

Diseases and Drugs Associated With an Increased Risk of Generalized Osteoporosis in Adults#

Diseases	Nutritional Conditions	Drugs	Disorders Of Collagen Metabolism	Other
Hypogonadism Hyperadrenocorticism Thyrotoxicosis Anorexia Nervosa Hyperprolactinemia Porphyria Hypophatasia In Adults Diabetes Mellitus Type 1 Pregnancy Hyperparathyroidism Acromegaly	Inf Bowel Disease, Malabsorption Syndromes and Malnutrition Chronic Liver Disease Gastric By pass Operations Vit. D Deficiency Alcoholism Primary Biliary Cirrhosis	Vitamin D Toxicity Phenytoin Glucocorticoids* Depo-medroxyprogesterone Phenobarbitol Excessive Thyroid Medication Heparin Gonadotropin-Releasing Hormone Agonists Lithium Cancer Chemotherapy Proton Pump Inhibitors Cyclosporine A and Tacrolimus Aromatase inhibitors	Osteogenesis Imperfecta Homocystinuria Due To Cystathionine Deficiency Ehlers-Danlos Syndrome Marfan Syndrome	Rheumatoid Arthritis Myeloma And Some Cancers Immobilization End stage renal disease Renal Tubular Acidosis Hypercalciuria COPD Organ Transplantation Sickle Cell Anemia Mastocytosis Thalassemia Muscular dystrophy and disuse states

Not an exhaustive list
*Glucocorticoids (≥ 5 mg/d of prednisone or equivalent for ≥ 3 mo)

Evaluating the patient for risk of falling

Falls and the risk of a fall are an important part of the evaluation since the majority of osteoporosis-related fractures result from falls. The most important of these seem to be a personal history of falling, along with muscle weakness and gait, balance and visual deficits.

Environmental issues of concern which can often be modified to reduce risk include: lack of assistive devices in bathrooms, loose throw rugs, low level lighting, obstacles in the walking path, and slippery outdoor conditions.

Medical conditions may also increase the risk of fall. They include: previous fall, age, anxiety, arrhythmias, dehydration/orthostatic hypotension, female gender, impaired transfer and mobility, reduced proprioception, muscle weakness, malnutrition, diminished mental acuity/cognitive functioning, urge incontinence, medications that cause sedation, kyphosis, and poor vision.

Diagnosing Osteoporosis

A clinical diagnosis can often be made in at-risk individuals who sustain a low-trauma fracture, particularly at the hip or vertebrae. Bone mineral density testing should be performed to confirm the diagnosis and determine disease severity. Alternatively, the diagnosis of osteoporosis is established by measurement of BMD by DEXA with a T score lower than -2.5. Laboratory testing to exclude secondary causes of osteoporosis should be considered as appropriate.

Screening for Osteoporosis

1. **Women aged 65 and older**: All women 65 and older should be screened for osteoporosis, regardless of risk factors
2. **Men age 70 and older**: The USPSTF concludes that the evidence is insufficient to recommend screening for osteoporosis. The National Osteoporosis Foundation, the American College of Physicians and the Endocrine Society, however, recommend screening.
3. **Postmenopausal women younger than 65 and men over age 50 at increased risk:** screening is , recommended. Multiple risk assessment tools are available to estimate risk.
4. **Adults with a condition** (e.g., rheumatoid arthritis) **or taking a medication** (e.g., glucocorticoids in a daily dose ≥ 5 mg prednisone or equivalent for ≥ three months) associated with low bone mass or bone loss

Re-screening Intervals for Osteoporosis

There are no official guidelines regarding repeat screening in patients without osteoporosis on baseline measurement. Data from the Study of Osteoporotic Fractures, however, suggest that for women with normal or slightly low BMD at baseline, the interval between baseline testing and development of osteoporosis was approximately 17 yrs. For women with moderately low (T score -1.50—1.99) bone mass at baseline, transition to osteoporosis occurred at 4.7 yrs, and with low (T score -2.00—2.49) bone mass at baseline, transition to osteoporosis occurred at 1.1 yrs. This data suggests that re-screening intervals should be individualized.[9]

BMD TESTING

Bone mineral density (BMD) measurement can be used to establish or confirm a diagnosis of osteoporosis, predict future fracture risk, and monitor changes in BMD due to medical conditions or therapy. BMD has a continuous, graded, inverse relationship to the risk of fracture: **The lower the BMD, the greater the risk**. Some patients (ie, those over 70 with multiple risk factors) are at sufficiently high risk for osteoporosis that treatment is warranted without BMD testing. The decision to test for BMD should be based on an individual's risk profile, and testing is never indicated unless the results could influence a treatment decision.

BMD TESTING TECHNIQUES

1. Central DXA or DEXA measures bone mineral density in the lumbar spine and hip—the most common sites for osteoporotic fractures. DXA scans can be completed in a few minutes with radiation exposure that is approximately one tenth that of a standard chest x-ray. This is the most reliable measurement for both men and women. Osteoporosis treatment trials use central DXA to determine eligibility for study enrollment. **Treatment guidelines recommend using BMD measured by central DXA to diagnose osteoporosis, predict fracture risk and monitor the response to therapy.**

2. Quantitative computed tomography (QCT). QCT measures trabecular and cortical bone density at several sites in the body, but is most commonly used to measure trabecular bone density in the spine and hip. Radiation exposure and cost are higher than with DEXA . The primary role of quantitative CT is in clinical research and to follow therapeutic response to therapy.

3. Quantitative Ultrasound densitometry (QUS). Quantitative ultrasound densitometry (QUS) does not measure BMD directly but rather speed of sound (SOS) and/or broadband ultrasound attenuation (BUA) at the heel, tibia, patella and other peripheral skeletal sites. Validated heel QUS devices predict fractures in postmenopausal women (vertebral, hip and overall fracture risk) and in men 65 and older (hip and non-vertebral fractures). QUS is not associated with any radiation exposure.It does not, however, have adequate sensitivity or specificity to confirm or exclude DXA diagnosed osteoporosis and cannot be used to monitor patients due to a lack of precision. Its primary role is in fracture prediction in regons that do not have access to DEXA

BONE MINERAL DENSITY MEASUREMENT AND CLASSIFICATION

Bone Mineral Density is usually expressed in absolute terms of grams of mineral per square centimeter (g/cm^2) (technically known as areal BMD to distinguish it from volumetric BMD which is grams of mineral per cubic centimeter), and as a relationship to two norms: compared to the expected BMD for the patient's age and sex (Z-score), or compared to young normal adults of the same sex (T-score). The difference between the patient's score and the norm is expressed in standard deviations (SD) above or below the mean. Usually, 1 SD equals 10 to 15 percent of the BMD value in g/cm2. Depending upon the skeletal site, a decline in BMD expressed in absolute terms (g/cm^2) or in standard deviations (T-scores or Z-scores) begins during young adulthood, accelerates in women at menopause and continues to progress in postmenopausal women and men age 50 and older. The BMD diagnosis of normal, low bone mass, osteoporosis and severe or established osteoporosis is based on the WHO diagnostic classification. Although available technologies measuring central (spine and hip) and peripheral skeletal sites (forearm, heel, fingers) provide site-specific and global (overall risk at any skeletal site) assessment of future fracture risk, DXA measurement at the hip is the best predictor of future hip fracture risk.

In postmenopausal women and men age 50 years and older, the WHO diagnostic T-score criteria (normal, low bone mass and osteoporosis) are applied to BMD measurement by central DXA at the lumbar spine and femoral neck. BMD measured by DXA at the one-third (33 percent) radius site can be used for diagnosing osteoporosis when the hip and spine cannot be measured.

World Health Organization definitions based on BMD measurement at the spine, hip or forearm by DEXA

Bone Mass	Definition	T-Score
Normal	Within 1 SD of a young normal adult	T-score above -1
Low bone mass (osteopenia)	Between 1 and 2.5 SD below that of a young normal adult	T-score between -1 and -2.5
Osteoporosis	2.5 SD or more below that of a young normal adult. Patients in this group who have already experienced one or more fractures are deemed to have severe or established osteoporosis.	T-score at or below -2.5

- *Although these definitions are necessary to establish the presence of osteoporosis, they should not be used as the sole determinant of treatment decisions.*

BMD measurement is not recommended in children or adolescents and is not routinely indicated in healthy young men or premenopausal women.

Medicare Part B covers BMD testing every 24 months and more often if medically necessary in the following situations:

- Estrogen deficient women at clinical risk for osteoporosis
- Individuals with xray evidence of osteoporosis, osteopenia or vertebral fracture
- Individuals receiving, or planning to receive, long-term glucocorticoid therapy in a daily dose ≥ 5 mg prednisone or equivalent for ≥ three months
- Individuals with primary hyperparathyroidism
- Individuals being monitored to assess the response or efficacy of an approved osteoporosis drug therapy

Initial Treatment:

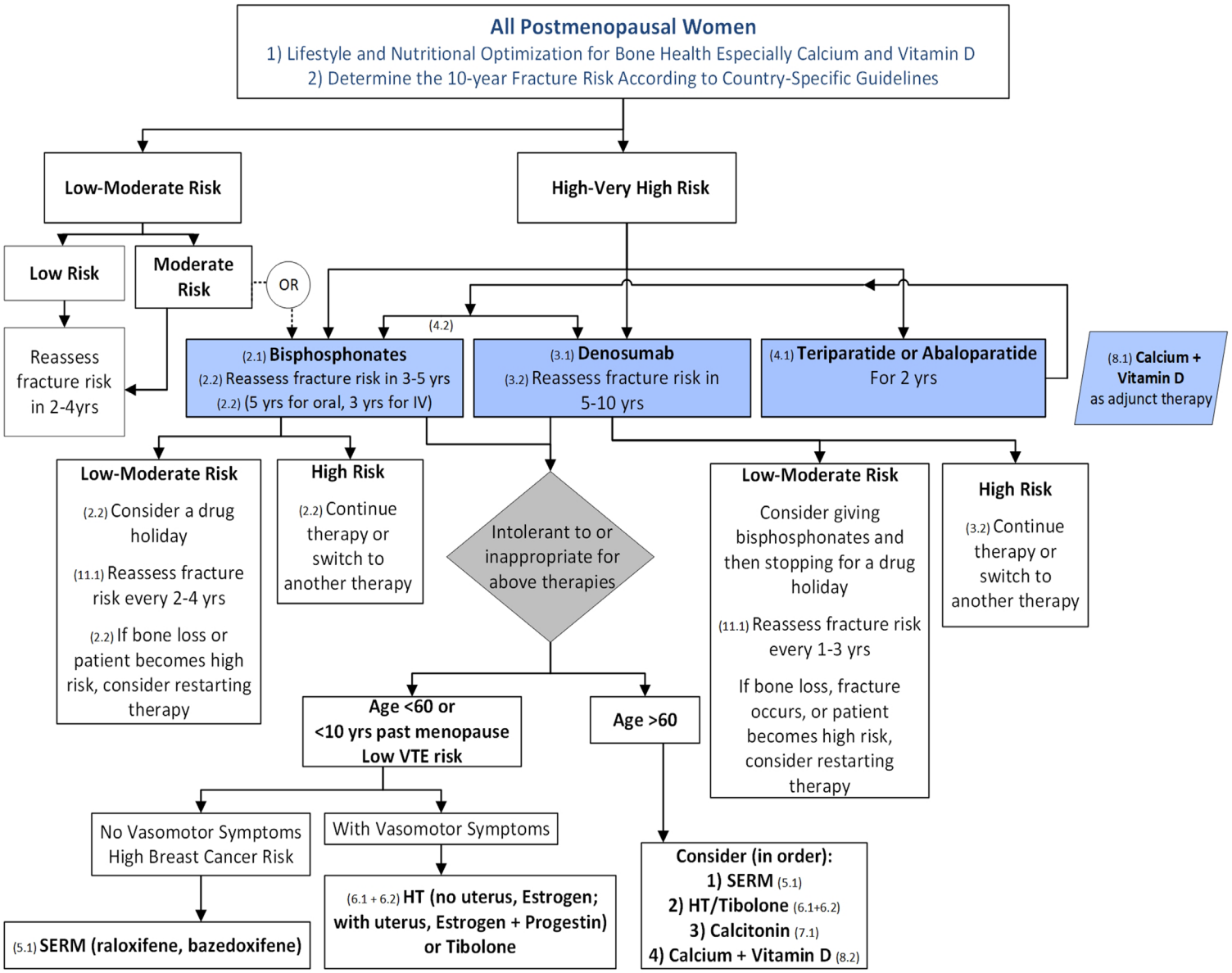
Postmenopausal women and men age 50 and older presenting with the following should be considered for treatment:

- A hip or vertebral (clinical or morphometric) fracture
- T-score ≤ -2.5 at the femoral neck or spine after appropriate evaluation to exclude secondary causes
- Low bone mass (T-score between -1.0 and -2.5 at the femoral neck or spine) and a 10-year probability of a hip fracture ≥ 3% or a 10-year probability of a major osteoporosis-related fracture ≥ 20% based on the US-adapted WHO algorithm (FRAX) or other risk assessment tool.

Treatment modalities include the following:

- Calcium and vitamin D: The Institute of Medicine recommends a total daily elemental calcium intake (in food plus supplementation) of 1000 mg for all adults 19-50 and men up to age 70, and 1200 mg for women > 50 years old and men > 70 years old. The IOM recommends a daily vitamin D intake of 600 IU daily for men and women up to age 70 and 800 IU for those > 70 years old.
- Lifestyle modification: Recommend regular weight-bearing and muscle-strengthening exercise to reduce the risk of falls and fractures. Advise patients to avoid tobacco smoking and to keep alcohol intake moderate.
- Medication: Current FDA-approved pharmacologic options for osteoporosis prevention and/or treatment are bisphosphonates (alendronate, ibandronate, risedronate and zoledronic acid), calcitonin, estrogens and/or hormone therapy, parathyroid hormone (teriparatide), denosumab and estrogen agonist/antagonist (raloxifene). See Table for details.

Algorithm for the Management of Postmenopausal Osteoporosis



Pharmacological Management of Osteoporosis in Postmenopausal Women: An Endocrine Society Clinical Practice Guideline JCEM 2019; 104(5): 1595-1622.

Follow Up for patients on treatment:

Patient should be seen regularly to:

- Assess adherence to medicine
- Assess adequacy of calcium and vitamin D intake
- Reinforce lifestyle recommendations
- Monitor for side effects of therapy
- Monitor for signs and symptoms of vertebral fracture (back pain, loss of height, etc.)
- Consider repeat BMD measurement at 2 yr intervals if results would change management

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Duration of treatment

Optimal duration of pharmacologic therapy is currently undefined and should be individualized based on fracture risk.

Benefits of nonbisphosphonates wane upon discontinuation. Benefits of bisphosphonates on BMD and fracture risk may persist for several years after medication cessation. In addition, alendronate and zoledronic acid have been demonstrated to be safe and effective for 10 and 6 yrs respectively. Per NOF Guidelines it is reasonable to discontinue biphosphonates after 3 to 5 years in people who appear to be at modest risk of fracture after the initial treatment period. For those who appear to be at high risk for fracture, continue treatment with a biphosphonate or an alternative therapy should be considered.

Progression on Treatment

Management of the patient who progresses on treatment is not clear cut, and consultation with an endocrinologist or rheumatologist may be appropriate. Common situations:

1. Decline in bone mineral density ≥ 5% on oral bisphosphonates--consider change to iv zoledronic acid, denosumab or anabolic therapy
2. Fracture on therapy—consider change to anabolic therapy

Safety concerns

Rare safety concerns related to bisphosphonates (osteonecrosis of the jaw and atypical femur fractures) become more frequent after 5 yrs of use. There is less data on the risks associated with Denosumab. The American Association of Oral and Maxillofacial Surgeons recommends performing extractions and implants as usual in patients who have been treated with oral bisphosphonates for less than four years and are not otherwise at risk for osteonecrosis of the jaw. They suggest discontinuing bisphosphonates for two months prior to performing the dental surgery if a patient has been treated for more than four years or has other risks for osteonecrosis. Bisphosphonates may be restarted when the bone has healed.

Table: FDA-approved pharmacologic options for osteoporosis prevention and/or treatment

The anti-fracture benefits of FDA-approved drugs have mostly been studied in women with postmenopausal osteoporosis. There are limited fracture data in glucocorticoid-induced osteoporosis and no fracture data in men.

Drug	Indication	Dosing	Outcomes	Special Considerations	Cost*
Bisphosphonates					
Alendronate (Fosamax®, Binosto®)	Prevention (females) y) Treatment Treatment secondary to glucocor-ticoids	5 mg/day or 35 mg/wk 10 mg/day or 70 mg/wk	Reduces the incidence of fracture at the spine, hip, and wrist by about 50% over 3 yrs in patients with osteoporosis with or without prior spine fracture.	Must be taken on an empty stomach, first thing in the morning, with a large glass of water, sitting upright for at least 30 min. after administration and until after the first food the day to reduce esophageal irritation. . Swallow regular tablet with 6-8 oz of water; do not chew Dissolve effervescent tablet in 4 oz of room temperature water; wait at least 5 minutes	Tablet: 5mg: $88 10mg: $88 35mg: $82 70mg: $82 Binosto (70 mg only): $360

		10 mg/day or 70 mg/wk		after effervescence stops; stir solution for at least 10 seconds; then drink. Cannot be taken at the same time as calcium as it hinders absorption. Approved for treatment to increase bone mass in men and women with both osteoporosis and osteoporosis from glucocorticoids Renal function must be monitored	
Alendronate + D (Fosamax® + D)	Treatment	70 mg/wk with 2800 IU vitamin D_3 or 70mg/wk with 5600 IU vitamin D_3			$208
Ibandronate oral (Boniva®)	Prevention and Treatment	150 mg/month	Reduces the incidence of spine fractures by about 50% over 3 yrs.	Should be taken on the same day each month, at least 60 minutesbefore the first food, drink (other than water) or medication of the day. Must be taken on an empty stomach, first thing in the morning with a glass of water. Patients must remain upright for at least 60 minutes after taking medication to reduce esophageal irritaton. Monitor renal function	$165

Drug	Indication	Dosing	Outcomes	Special Considerations	Cost
Ibandronate IV (Boniva®)	Treatment	3 mg every 3 months administered over a period of 15-30 seconds	No data	Intended for intravenous administration only. Should not be administered in patients with severe renal impairment (SCr >2.3 mg/dL) or CrCl < 30 mL/min. Jaw osteonecrosis has been reported with intravenous bisphosphonates. Most common side effects are flu-like symptoms.	$169
Risedronate (Actonel®, Atelvia®)	Prevention and treatment (post-menopausal females) Treatment (males)	Immediate release: 5 mg/day or 35 mg/wk or 150mg/month Delayed release: 35mg once weekly (treatment only) 35 mg/wk (IR)	Risedronate reduces the incidence of spine fractures by 41-49% and non-spine fractures by 36% over 3 yrs in patients with a prior spine fracture.	Avoid with renal insufficiency. Cannot be taken at the same time as calcium, magnesium or iron-containing compounds as it hinders absorption. Space by at least 30 min. Immediate release tabs must be taken on an empty stomach, first thing in the morning, with a large glass of water, sitting upright for at least 30 minutes after administration and until after the first food of the day. Do not crush or chew. Delayed release tabs must be taken with at least 4oz of water immediately after breakfast, sitting upright for at least 30 minutes after administration. Do not cut, split, crush, or chew. Approved for treatment to increase bone mass in men and women with both osteoporosis and osteoporosis from glucocorticoids.	5mg IR: $266 35mg IR: $248 35mg EC: $248 IR150mg: $319
	Treatment secondary to gluco-corticoids	5mg/day		Actonel with Calcium is a co- package product containing Actonel (risedronate sodium tablets, 35 mg) which are taken once weekly and calcium	

Drug	Indication	Dosing	Outcomes	Special Considerations	Cost
Zoledronic acid (Reclast®)	Treatment (including secondary to gluco-corticoids) Prevention	5 mg by IV infusion over at least 15 min once a year 5mg by IV infusion over at least 15 minutes once every 2 years	Reduces the incidence of vertebral fractures by about 70%, hip fractures by about 41% and non- vertebral fractures by 25% over 3 years.	Patients may be pretreated with acetaminophen to reduce the risk of an acute phase reaction (arthralgia, headache, myalgia, fever) with occurrence rates of 32% after first dose and 7% after 2nd dose and 3% after third dose Monitor renal function	5mg/100 mL: $420
Calcitonin					
Calcitonin (Miacalcin®)	Treatment	200 units in one nostril daily or 100 units SC or IM daily	May reduce risk of vertebral fracture by 33%.	Indicated for women who are at least 5 years postmenopausal. Calcitonin is generally considered to be a safe but somewhat less effective intervention for osteoporosis. Causes esophageal irritation. Can cause rhinitis and epistaxis. If using nasal spray, must be primed before first use only; alternate nostrils daily.	$119/ bottle
Estrogen/Hormone Therapy					
HRT	Prevention		Women's Health Initiative found 5 yrs of therapy with one of the HRT (Pempro) reduced risk of vertebral and hip fractures by 24% and other fracture by 23%.	Since HRT may be associated with a modest increase in risk of breast cancer with long-term use and deep vein thrombosis, women with a history of, or at significant risk for, these conditions may be exceptions.	$$

Parathyroid Hormone					
Teriparatide (Forteo®)	Treatment	20 mcg daily SQ	Reduces risk of spine fractures by 65% and other fractures by 53% after 18 months of therapy. .	To be used in postmenopausal women with high risk of fracture. Also to increase bone mass in men with primary or secondary osteoporosis at high risk of fracture. Available as a 2.4 mL pen which holds 30 doses. One pen can be used for 30 days and then must be discarded. Initial administration may cause orthostatis – patient should be able to sit or lie down if needed Osteosarcoma in animals models has been reported and therefore should not be administered to people having a baseline risk of developing this condition. prior XRT, etc (Boxed Max use 2 years, including any efficacy have not been demonstrated beyond 2 yrs of treatment. Antiresorptive therapy must be started on discontinuation to prevent bone density decline.	$2970/ pen

Abaloparatide (Tymlos®)	Treatment	80 mcg daily SQ	Reduces risk of spine fractures by 86% by 18 months of therapy and other fractures by 2% after 19 months of therapy	To be used in postmenopausal women. Available as a 1.56mL pen that holds 30 doses. One pen can be used for 30 days and then must be discarded. Initial administration may cause orthostasis – patient should be able to sit down or lie down if needed Should be administered in the abdomen at approximately the same time every day. Osteosarcoma in animals has been reported and therefore this medication should not be administered to patients having a high baseline risk (Boxed Warning) Maximum use 2 years, including any other parathyroid hormone analogs. (Boxed Warning).	$2546/pen (brand name only)
Selective Estrogen Receptor Modulator					
Raloxifene (Evista®)	Prevention and Treatment	60 mg/day	Reduces the risk of spine fracture by 30% in patients with and by 55% in patients without a prior spine fracture, over 3 yrs.	In addition, an increase in hot flashes is observed (~6% over placebo). May cause an increased chance of uterine cancer. Increased risk of deep vein thrombosis, pulmonary embolism, and stroke. Women with past or active history of VTE should not take this medication. (Boxed Warning).	$240
Receptor Activator of Nuclear Factor kappa-B Ligand					
Denosumab (Prolia®)	Treatment	60 mg SQ every 6 mos	Reduces the risk of fractures by 35% in a subset of women with more severe disease.	Denosumab may cause hypocalemia. Hypocalcemia must be corrected before	$1625/inj (brand only)

				starting denosumab. It may increase the risk of serious skin infections and skin rash. If and when denosumab is stopped, bone loss can be rapid and alternative agents should be considered to maintain BMD.	
Sclerosin Inhibitor					
Romosozumab (Evenity®)	Treatment	Two consecutive 105mg injections SQ monthly(210 mg total)	Reduces risk of spine fractures by 73% after 12 months of treatment.	Treatment for postmenopausal females Treatment duration up to 12 months Boxed Warning for increased risk of myocardial infarction (MI), stroke, and cardiovascular death. Do not start in patients who have had an MI or stroke in the last year. Must take with adequate calcium and vitamin D supplementation during treatment.	$2319/ two prefilled syringes

AWP for 30 days of generic oral medicine and one syringe or infusion of parenteral medicine unless otherwise specified

HRT or estrogen replacement therapy should be considered for menopausal symptoms but should not be used to treat only osteoporosis unless all other modalities have been exhausted.

Patient Education:

Counsel all patients on the risk factors for osteoporosis.

Adequate Intake of Calcium and Vitamin D: Advise all patients to obtain an adequate intake of dietary elemental calcium (at least 1200 mg/d, including supplements if necessary) for women over 50 and men over 70 and 1000 mg/d for younger men and women and vitamin D_3 (600 IU per day for individuals under age 70, and 800 IU per day for adults age 70 and older). Vitamin D3 is the form of vitamin D that best supports bone health. Vitamin D can be obtained from fortified milk, egg yolks, saltwater fish, liver and supplements.

Regular Weight Bearing Exercise: Recommend regular weight-bearing and muscle- strengthening exercise to reduce the risk of falls and fractures. Includes walking, jogging, stair climbing, dancing, and tennis. Weight lifting improves muscle mass and bone strength.

Avoidance of Tobacco Use and Alcohol Abuse: Advise patients to avoid tobacco smoking and to keep alcohol intake moderate.

Resources for patients:

www.nof.org/resources/bonebasics
https://www.rheumatology.org/I-Am-A/Patient-Caregiver/Diseases-Conditions/Osteoporosis
https://www.uptodate.com/contents/osteoporosis-the-basics?source=see_link
https://www.uptodate.com/contents/medicines-for-osteoporosis-the-basics?source=related_link

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Management of Osteoporosis Clinical Practice Guideline was initiated in 2007.

Clinical Guidelines are reviewed every two years by a committee of experts in the field. Updates to guidelines occur more frequently as needed when new scientific evidence or national standards are published.

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