MedStar Health

Osteoporosis: Screening and Management

Clinical Practice Guideline

These guidelines are provided to help physicians and other clinicians make decisions about their patients' care. 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 chronic degenerative condition of bone similar to all other organ-based diseases in which organ-specific tissue is affected, and comparable to diseases of the heart, lung, kidney, and brain. As in these other conditions, early changes are usually silent until either a physiologic threshold is crossed or there is organ system failure, in this case, a low-trauma (fragility) fracture, debilitating, if not catastrophic consequences. Therefore, it is important to 1) screen all appropriate patients for bone health, 2) stratify each patient's level of risk, 3) when indicated, initiate therapies according to well-established protocols and 4) monitor bone health throughout the patient's life. Similarly, early identification and intervention can prevent progression and avoid organ-system failure, thereby preserving function and lowering the costs of care.

SCREENING TO IDENTIFY PATIENTS AT RISK AND MEASURING BONE HEALTH

Diagnosing Osteoporosis

Although clinical diagnosis is often made in individuals who sustain a low-trauma (fragility) fracture, particularly at the hip, wrist, rib, or vertebrae, it is preferable to identify patients at risk, assess Bone Mineral Density (BMD) and determine disease severity before failure. Of course, testing after a fracture can be performed to confirm the diagnosis, but the presence of a fragility fracture is sufficient cause for establishing the diagnosis and initiating therapy.

Screening for Osteoporosis

1. **Women aged 65 and older:** All women 65 and older should be offered screening for osteoporosis.
2. **Men aged 70 and older:** The USPSTF concludes that the evidence is insufficient to recommend screening for osteoporosis. The Bone Health and 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 (See FRAX Tool).
4. **Adults with a condition** (e.g., rheumatoid arthritis, ESRD, advanced heart or lung failure) **or taking a medication** (e.g., glucocorticoids $\geq$3 months; aromatase inhibitors or androgen deprivation therapy) associated with low bone mass or bone loss.
5. **Patients over 50 with a fragility fracture within 6 months** are highly recommended to guide treatment.

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RISK FACTORS FOR OSTEOPOROSIS AND OSTEOPOROTIC FRACTURES:

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 glucocorticoids. The FRAX™ algorithm is available at https://www.sheffield.ac.uk/FRAX/tool.aspx?country=9. The FRAX questionnaire and score are available on newer DXA scanners and is included in the reports.

Alternatively, factors associated with an increased risk of osteoporotic fracture can be characterized as modifiable or non-modifiable. 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 indicated.

NON MODIFIABLE	POTENTIALLY MODIFIABLE
Personal history of fracture as an adult	**Current cigarette smoking**
History of fracture in first-degree relative	Early menopause of bilateral oophorectomy
Female sex	Prolonged premenopausal amenorrhea (>1yr)
Poor health/frailty	Alcohol use (≥3 drinks/day)
Caucasian race	**Low body weight (<127lbs.)**
Advanced age	High intake aluminum containing antacids
Dementia	Excess vitamin A intake
	Vitamin D insufficiency
	High salt/caffiene 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).**

Diseases and Drugs Associated with an Increased Risk of Generalized Osteoporosis in Adults[#]

Diseases	Nutritional Conditions	Drugs	Disorders of Collagen Metabolism	Other
Hypogonadism	Inflammatory Bowel Disease/ Malabsorption Syndromes and Malnutrition	Vitamin D Toxicity	Osteogenesis Imperfecta	Rheumatoid Arthritis
Hyperadrenocorticism	Chronic Liver Disease	Phenytoin	Homocystinuria Due to Cystathionine Deficiency	Myeloma /some cancers
Thyrotoxicosis	Gastric Bypass Operations	Glucocorticoids*	Ehlers-Danlos Syndrome	Immobilization
Anorexia Nervosa	Vit. D Deficiency	Depo- medroxyprogesterone	Marfan Syndrome	ESRD
Hyperprolactinemia	Alcoholism	Phenobarbital		Renal Tubular Acidosis
Porphyria	Primary Biliary Cirrhosis	Excessive Thyroid Medication		Hypercalciuria
Hypophosphatemia		Heparin		COPD
Diabetes Mellitus Type 1		Gonadotropin- Releasing Hormone Agonists		Organ Transplantation
Pregnancy		Lithium		Sickle Cell Anemia
Hyperparathyroidism		Cancer Chemotherapy		Mastocytosis
Acromegaly		Proton Pump Inhibitors		Thalassemia
		Cyclosporine A and Tacrolimus		Muscular dystrophy and disuse states
		Aromatase inhibitors		

[#] Not an exhaustive list
[*] Glucocorticoids ($\geq$ 5 mg/d of prednisone or equivalent for $\geq$3 mos.)

Evaluating the patient for risk of falling (See Falls Guideline)

Falls and the risk of a fall are an important part of the evaluation since most osteoporosis-related fractures result from falls. The most important of these seems 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, depression/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.

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 (i.e., 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.

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.**

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 (Standard Deviation) 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.**

RISK STRATIFICATION AND IMPLICATIONS:

Low Risk	Moderate Risk	High Risk	Very High Risk
No Prior fracture, T-Score ≥ -1, and FRAX probabilities <20% MOF, <3% Hip	No prior fracture, and T-Score between -1 and -2.5 and FRAX probabilities <20% MOF, <3% Hip	Older single prior fracture (> 2 years earlier), *or* T-Score ≤-2.5, or T-Score -1 to -2.5 with FRAX probabilities ≥20% MOF or ≥3% Hip	High Imminent Risk: Recent Fracture Multiple Fractures T-Score < -3.0, FRAX probabilities ≥30% MOF or ≥4.5% hip, especially if additional factors
Non-pharmacologic treatment; No pharmacologic treatment needed	Some may benefit from sequential antiresorptive monotherapy especially those with BMD close to -2.5 • Estrogens in early menopausal • Raloxifene 50s to 60s • Bisphosphonates mid/late 60s	**Goal: Improve BMD to T-Score > -2.5 and Reduce Fracture Risk** • Younger women may benefit from estrogens/raloxifene especially if spine T-Score low and hip >-2.5 • Usually bisphosphonates or denosumab • Anabolic agents appropriate for some	**Goal: Reduce fractures rapidly; Improve BMD rapidly to target T-score at least above -2.5** • Anabolics optimal as initial therapy • Follow with potent Antiresorptives

Modified from:
Camacho PM et al. Endocrine Practice 2020. AACE/ACE Clinical Practice Guidelines
Shoback D et al, JCEM 2020 Endocrine Society Guidelines.
Kanis JA, et al. Osteoporosis Int 2020;31:1-12 IOF Algorithm
LeBoff M, et al, Osteoporosis Int 2022 BHOF Clinician's Guide
NAMS Position Statement Menopause. 2021;28(9):973-997

INITIATION OF THERAPY

Baseline Laboratory Testing Prior to Initiation of Therapy:

Complete chemistry profile (including alkaline phosphatase)
Complete blood count
Calcium, phosphorous
25-hydroxyvitamin D
Additional laboratory testing may be considered, if indicated.

Initial Treatment Algorithm:

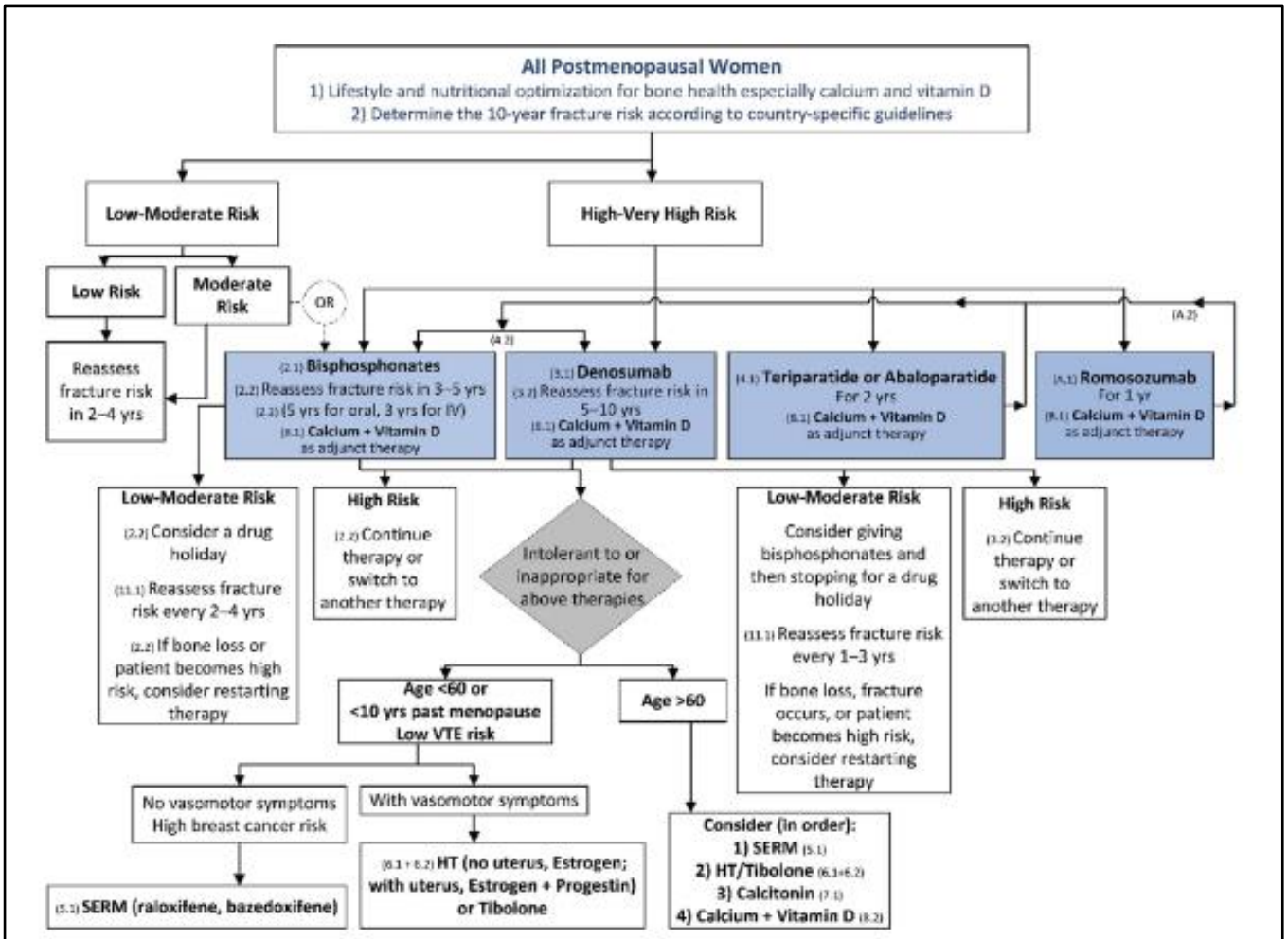

Figure 1. Updated algorithm for management of postmenopausal osteoporosis. Note: We considered that a determination of fracture risk would include measurement of lumbar spine and hip BMD and inserting femoral neck BMD value into the fracture risk assessment (FRAX) tool. Using that FRAX algorithm, we define the following risk categories: (1) *low risk* includes no prior hip or spine fractures, a BMD T-score at the hip and spine both above −1.0, a 10-year hip fracture risk < 3%, and 10-year risk of major osteoporotic fractures < 20%; (2) *moderate risk* includes no prior hip or spine fractures, a BMD T-score at the hip and spine both above −2.5, and 10-year hip fracture risk < 3% or risk of major osteoporotic fractures < 20%; (3) *high risk* includes a prior spine or hip fracture, or a BMD T-score at the hip or spine of −2.5 or below, or 10-year hip fracture risk ≥ 3%, or risk of major osteoporotic fracture risk ≥ 20%; and (4) *very high risk* includes multiple spine fractures and a BMD T-score at the hip or spine of −2.5 or below.

Ref: Pauline M. Camacho, Steven M. Petak, Neil Binkley, et al. AMERICAN ASSOCIATION OF CLINICAL ENDOCRINOLOGISTS/ AMERICAN COLLEGE OF ENDOCRINOLOGY CLINICAL PRACTICE GUIDELINES FOR THE DIAGNOSIS AND TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS—2020 UPDATE, http://www.endocrine practice.org. DOI: 10.4158/GL-2020-0524SUPPL

Table. Medications Licensed in the United States for Treatment of Osteoporosis

Drug Name (Class)	Route; Frequency	Types of Fractures Examined in Randomized Clinical Trials at Long-Term Follow-up (>36 mo)				Average Annual Medicare Spending Per Beneficiary in 2019	FDA Warning
		Hip	Clinical Vertebral	Any Clinical	Radiographic Vertebral		
Antiresorptive drugs							
Alendronate (bisphosphonate)*†‡	By mouth (tablet or solution); once a day (10 mg) or once a week (70 mg)§	Yes	No	Yes	Yes	$793–$1306 (brand-name); $39 (generic)	Upper gastrointestinal irritation; osteonecrosis of the jaw; atypical femur fractures; severe bone, joint, and muscle pain
Risedronate (bisphosphonate)*†‡	By mouth; once a day, once a week, or 2 d in a row once per month§	Yes	No	No	Yes	$2036–$2732 (brand-name); $604 (generic)	Upper gastrointestinal irritation; osteonecrosis of the jaw; atypical femur fractures; severe bone, joint, and muscle pain
Ibandronate (bisphosphonate)*‡	By mouth; once a month§	No	No	No	Yes	$1379 (brand-name); $220 (generic)	Upper gastrointestinal irritation; osteonecrosis of the jaw; atypical femur fractures; severe bone, joint, and muscle pain
Zoledronate (bisphosphonate)*†‡	Intravenous; once a year§	Yes	Yes	Yes	Yes	$855 (brand-name); $316–$987 (generic)	Osteonecrosis of the jaw; atypical femur fractures; severe bone, joint, and muscle pain
Denosumab (RANK ligand inhibitor)†‖	By injection (subcutaneous); every 6 mo¶	Yes	Yes	Yes	Yes	$1913–$12 241 (brand-name)	Dermatologic reactions and serious infection, including skin infections; suppression of bone turnover contributing to adverse outcomes, such as osteonecrosis of the jaw, atypical fractures, and delayed fracture healing
Anabolic drugs							
Abaloparatide (parathyroid hormone–related protein)‖	By injection (subcutaneous); once a day	No	No	Yes**	Yes**	$9873 (brand-name)	Hereditary osteosarcoma disorders††
Teriparatide (recombinant human parathyroid hormone)‖‡‡	By injection (subcutaneous); once a day	Yes**	Yes**	Yes**	Yes**	$22 156 (brand-name)	Hereditary osteosarcoma disorders††
Romosozumab (sclerostin inhibitor)‖	By injection (subcutaneous); once a month for 12 mo§§	No	Yes**	Yes**	Yes**	$5574 (brand-name)	Cardiovascular risk Stroke history or risk‖‖
Estrogen agonist on bones							
Raloxifene (selective estrogen receptor modulator)*‡	By mouth; once a day	Yes	Yes	Yes	Yes	$1730 (brand-name); $593 (generic)	Stroke history or risk Thromboembolism history or risk¶¶

FDA = U.S. Food and Drug Administration; RANK = receptor activator of nuclear factor κB.
* Indicated for treatment of osteoporosis in postmenopausal females.
† Indicated for males. Bisphosphonates have been approved for males with primary osteoporosis based on improvement in bone mineral density, and denosumab is approved for males with secondary osteoporosis based on a reduction in risk for vertebral fractures (19).
‡ Indicated for the prevention of osteoporosis in postmenopausal females with low bone mass.
§ All patients receiving bisphosphonate therapy should have the need for continued therapy reevaluated periodically. Patients at low risk for fracture should be considered for drug discontinuation after 3 to 5 years of use. Patients who discontinue therapy should have their risk for fracture reevaluated periodically.
‖ Indicated for postmenopausal females with osteoporosis who are at high risk for fracture, defined as a history of osteoporotic fracture or multiple risk factors for fracture or patients who have failed or are intolerant to other available osteoporosis therapy.
¶ Denosumab discontinuation is associated with multiple vertebral fractures in some patients (20).
** Short-term follow-up (12 to 36 months).
†† Dose-dependent increase in incidence of osteosarcoma in preclinical studies.
‡‡ Indicated for males; increase in bone mass in males with primary or hypogonadal osteoporosis who are at high risk for fracture.
§§ Use of romosozumab should be limited to 12 monthly doses because the anabolic effect wanes after 12 monthly doses (21).
‖‖ The analysis of the FDA Adverse Event Reporting System suggested higher risk for major adverse cardiovascular events associated with romosozumab (22). The current FDA safety warnings recommend avoiding use of romosozumab in patients with high risk for major cardiovascular events (21).
¶¶ Higher risk for venous thromboembolism and fatal stroke in females who have documented coronary heart disease or are at increased risk for major coronary events (23).

Ref: Amir Qaseem, MD, PhD, MHA, et al Pharmacologic Treatment of Primary Osteoporosis or Low Bone Mass to Prevent Fractures in Adults: A Living Clinical Guideline from the American College of Physicians https://doi.org/10.7326/M22-1034

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Treatment Considerations:

- There is accumulating evidence that BMD and fracture outcomes are significantly influenced by the order in which antifracture agents are administered.
- When sequential treatment is considered, **anabolic therapy followed by an antiresorptive agent is preferred.**
- An anabolic agent administered following anti-resorptive therapy has demonstrably less impact on BMD and fracture risk than if the anabolic is administered first.
- Anabolic therapy after a potent anti-resorptive agent may be followed by a delay or attenuation of effect or even bone loss (hip BMD loss and strength)
    - Especially marked with denosumab followed by teriparatide (DATA-Switch)

Adjunctive treatment modalities include the following:

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 (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, balance, and muscle- strengthening exercise to reduce the risk of falls and fractures. Includes walking, jogging, stair climbing, dancing, and tennis. Weightlifting 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.

MONITOR BONE HEALTH THROUGHOUT THE PATIENT'S LIFETIME

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 repeating BMD measurement at 1 - 2 yr. intervals if results change management.

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 x-ray evidence of osteoporosis, osteopenia, or vertebral fracture
    - Individuals receiving, or planning to receive, long-term glucocorticoid therapy in a daily dose of $\geq$ 5 mg prednisone or equivalent for $\geq$3 months.
- Individuals with primary hyperparathyroidism
- Individuals are being monitored to assess the response or efficacy of an approved osteoporosis drug therapy.

DURATION OF TREATMENT:

Optimal duration of pharmacologic therapy should be individualized based on fracture risk and choice of medication. Treatment with alendronate and zoledronic acid have been demonstrated to be safe and effective for 10 and 6 yrs. respectively; there is no indication for a drug holiday with these medications However, the benefits of both bisphosphonates and non-bisphosphonates wane upon discontinuation.

However, per BHOF Guidelines it is reasonable to consider a bisphosphonate "drug holiday" after 3 to 5 years in people who are at modest risk of fracture. Rare safety concerns related to bisphosphonates (osteonecrosis of the jaw and atypical femur fractures) become more frequent after 5 yrs. of use. For those who are at high risk for fracture, continuous treatment with bisphosphonate or an alternative therapy should be considered. A drug holiday does **not** equal drug retirement. Monitoring after discontinuation of bisphosphonate treatment and re-initiation of anti-fracture therapy needs to be addressed and individualized to provide the best patient outcomes.

Management of osteoporosis on long term bisphosphonate therapy.

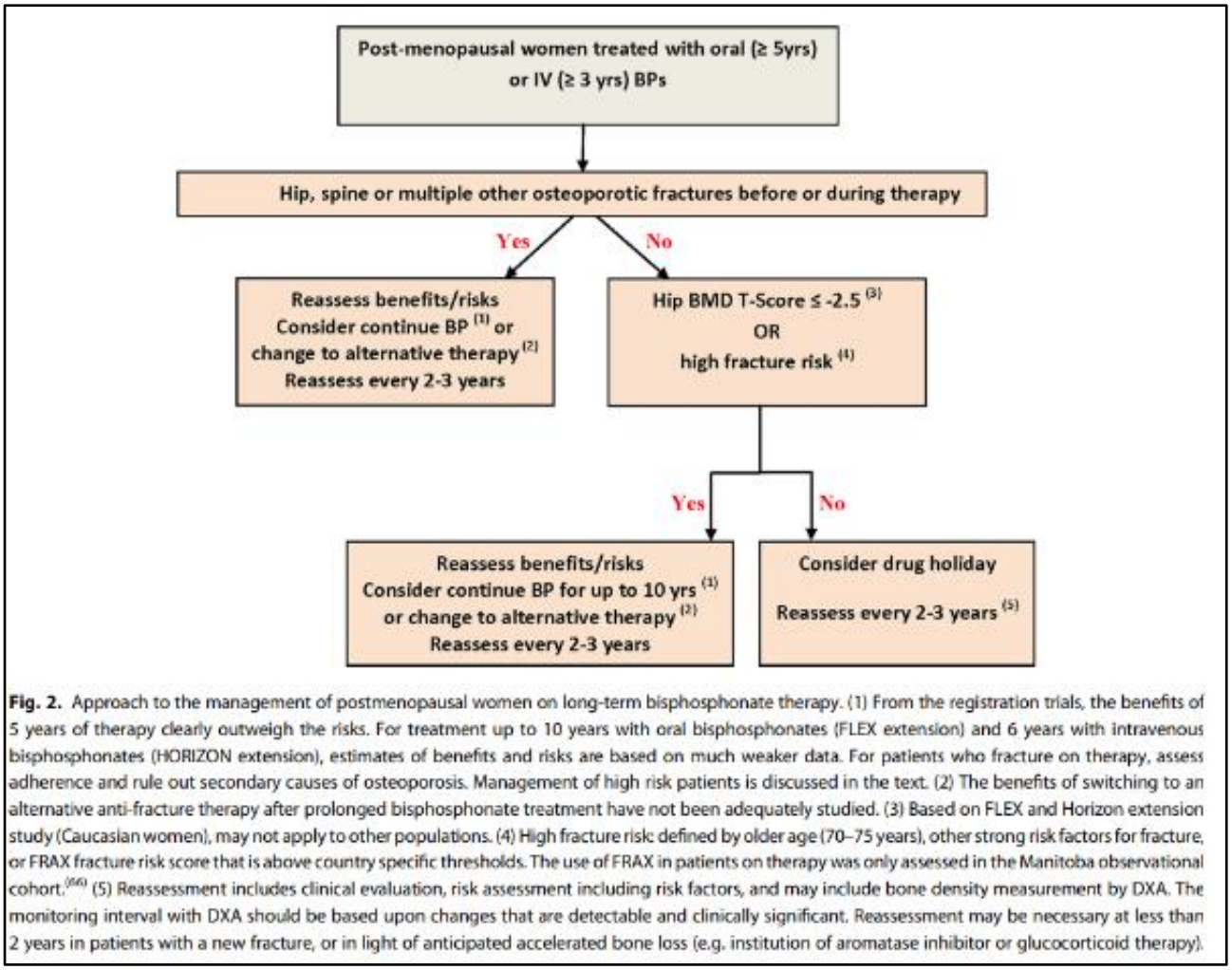


Fig. 2. Approach to the management of postmenopausal women on long-term bisphosphonate therapy. (1) From the registration trials, the benefits of 5 years of therapy clearly outweigh the risks. For treatment up to 10 years with oral bisphosphonates (FLEX extension) and 6 years with intravenous bisphosphonates (HORIZON extension), estimates of benefits and risks are based on much weaker data. For patients who fracture on therapy, assess adherence and rule out secondary causes of osteoporosis. Management of high risk patients is discussed in the text. (2) The benefits of switching to an alternative anti-fracture therapy after prolonged bisphosphonate treatment have not been adequately studied. (3) Based on FLEX and Horizon extension study (Caucasian women), may not apply to other populations. (4) High fracture risk: defined by older age (70–75 years), other strong risk factors for fracture, or FRAX fracture risk score that is above country specific thresholds. The use of FRAX in patients on therapy was only assessed in the Manitoba observational cohort.[66] (5) Reassessment includes clinical evaluation, risk assessment including risk factors, and may include bone density measurement by DXA. The monitoring interval with DXA should be based upon changes that are detectable and clinically significant. Reassessment may be necessary at less than 2 years in patients with a new fracture, or in light of anticipated accelerated bone loss (e.g. institution of aromatase inhibitor or glucocorticoid therapy).

Ref: Robert A Adler, Ghada El-Hajj Fuleihan, Douglas C Bauer, et al. Managing Osteoporosis in Patients on Long-Term Bisphosphonate Treatment: Report of a Task Force of the American Society for Bone and Mineral Research. Journal of Bone and Mineral Research, Vol. 31, No. 1, January 2016, pp 16–35 DOI: 10.1002/jbmr.2708

Considerations for seeking consultation with an osteoporosis specialist:

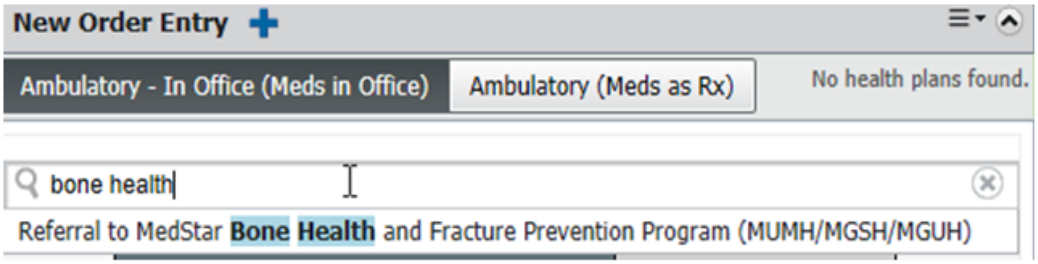
1. Decline in bone mineral density of 2 - 5% while on oral bisphosphonates.
2. Fragility fracture while on therapy
3. Bone Health concerns in the transgender patient
4. ESRD on dialysis
5. Transition after long term donosumab.

Referral to a regional Bone Health and Fracture Prevention Program can be generated in MedConnect:

- Open the patient's chart.
- Select a recent clinic encounter that is relative to the program locations.
- From the dark blue Menu, click +Add on the Orders component.
- Search **'Bone Health'** and select the order, "Referral to MedStar Bone Health and Fracture Prevention Program (MUMH/MGSH/MGUH)."
- Click the Orders for signature box, then type in the ordering provider name and communication type then click OK.
- Complete the necessary order entry fields and click Sign.

Placing a referral order:

Search **'Bone Health'** and select the order, **Referral to MedStar Bone Health and Fracture Prevention Program (MUMH/MGSH/MGUH).**



ADDITIONAL SAFETY CONCERNS:

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.

FINAL THOUGHTS:

- Retaining the diagnosis as an active problem is consistent with other chronic diseases, e.g., DM, HTN, etc.)
- Adverse consequences of changing diagnosis to "osteopenia" if BMD improves, include:
  - False sense of security
  - Stopping medication that is still needed.
  - Potential loss of insurance coverage for medication
  - Change in allowable frequency of BMD testing.
- **Osteoporosis is a chronic disease and as such, requires lifelong *management.***

RESOURCES FOR PATIENTS:

Patient accessible:
https://www.bonehealthandosteoporosis.org/patients/what-is-osteoporosis/
https://www.rheumatology.org/I-Am-A/Patient-Caregiver/Diseases-Conditions/Osteoporosis

Clinician accessible:
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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2. Osteoporosis to Prevent Fractures: Screening. June 2018. https://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/osteoporosis screening1?ds=1&s=osteoporosis
3. https://www.medicare.gov/coverage/bone-density.html
4. https://www.aafp.org/family-physician/patient-care/clinical-recommendations/all-clinical-recommendations/cw-osteoporosis.html
5. American Association of Oral and Maxillofacial Surgeons' Position Paper on Medication-Related Osteonecrosis of the Jaws-2022 Update Salvatore L Ruggiero [1], Thomas B Dodson [2], Tara Aghaloo [3], Eric R Carlson [4], Brent B Ward [5], Deepak Kademani [6] PMID: 35300956 DOI: 10.1016/j.joms.2022.02.008
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8. Pharmacologic Treatment of Primary Osteoporosis or Low Bone Mass to Prevent Fractures in Adults: A Living Clinical Guideline from the American College of Physicians. Amir Qaseem, MD, PhD, MHA, Lauri A. Hicks, DO et al. https://doi.org/10.7326/M22-1034
9. American Association of Clinical Endocrinologists/American College of Endocrinology Clinical Practice Guidelines for the Diagnosis and Treatment of Postmenopausal Osteoporosis-2020 Update; Pauline M. Camacho; Steven M. Petak, Neil Binkley et al.; Doi 10.4158/GL-2020-0524SUPPL
10. Managing Osteoporosis in Patients on Long-Term Bisphosphonate Treatment: Report of a Tasj Force of the American Society for Bone and Mineral Research; 09 September 2015 https://doi.org/10.1002/jbmr.2708

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.