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Guideline recommendations apply to populations of patients. Clinical judgment is necessary to design treatment plans for individual patients.

Approved by the National Guideline Directors
November 2010
Guideline

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The Guidelines Summary is organized as follows:

I. Screening with Dual Energy X-Ray Absorptiometry (DXA)
II. Bone Mineral Density (BMD) Measurement Sites
III. Absolute Fracture Risk
IV. Nonpharmacologic Interventions
V. Screening for Vitamin D Deficiency
VI. Dietary and Pharmacologic Interventions
VII. Monitoring Treatment
I. Screening with Dual Energy X-Ray Absorptiometry (DXA)

Postmenopausal Women
1A. A bone mineral density (BMD) test by DXA is recommended for postmenopausal women aged 65 or older who are not on drug treatment for osteoporosis.  

Evidence-based: B

1B. For postmenopausal women under age 65, a BMD test by DXA is an option when selected risk factors are present.  

Consensus-based

NOTE: In addition to advancing age and female sex, risk factors in the FRAX* model include low body mass index (BMI), personal history of fragility fracture after age 50, parental history of hip fracture, rheumatoid arthritis, long-term exposure to systemic corticosteroids (3 months or more at doses \( \geq 5 \text{ mg} \)), high alcohol intake (about 3 ounces per day), cigarette smoking, and other causes of secondary osteoporosis (e.g., type 1 diabetes, osteogenesis imperfecta in adults, untreated long-standing hyperthyroidism, hypogonadism or premature menopause (< 45 years), chronic malnutrition, or malabsorption and chronic liver disease). It is useful to review the FRAX model and risk factors with patients.

1C. For individuals under age 65 who are at high risk, such as those with a prior fragility fracture after age 50 or glucocorticoid use for 3 months or more at doses \( \geq 5 \text{ mg} \), refer to the Fracture Risk Assessment Tool (FRAX) to estimate individual fracture risk.  

Consensus-based

Premenopausal Women:
1D. Routine screening for osteoporosis with a BMD test by DXA is not recommended for premenopausal women.  

Consensus-based

Men:
1E. Screening with DXA is an option for men aged 70 or older with risk factors.  

Consensus-based

* FRAX risk charts can be accessed on the FRAX web site: (http://www.shef.ac.uk/FRAX/).
**Optimal screening frequency:**
1F. The recommended retesting interval for women not currently on treatment is 5 years. Varying the interval is an option in the presence or absence of risk factors. *Consensus-based*

NOTE: For a healthy 50-year-old woman with a T-score of -1.1, it may take 10 to 20 years to drop to a T-score of -2.5.

II. **Bone Mineral Density (BMD) Measurement Sites**

2A. When BMD testing is indicated, the total proximal femur (total hip), femoral neck, and lumbar spine are recommended measurement sites for DXA to predict risk of osteoporotic fracture in women and men. *Evidence-based: B*

2B. The lowest T-score from the measurements of the total hip, femoral neck, and lumbar spine (L1 to L4, composite score) is recommended to establish a diagnosis of osteoporosis (T-score ≤ -2.5) or low BMD (T-score between -1.0 and -2.5). *Consensus-based*

2C. DXA of the forearm (distal one-third of the radius) is an option for patients in whom hip and spine BMD cannot be measured or interpreted. *Evidence-based: B*

III. **Absolute Fracture Risk**

3A. The Fracture Risk Assessment Tool (FRAX*) is strongly recommended for assessing absolute fracture risk in women or men before initiation of treatment. *Evidence-based: A*

NOTE: FRAX is not designed to assess fracture risk in patients on bisphosphonate treatment.

3B. Pharmacologic treatment for osteoporosis in women or men is recommended when the 10-year probability of hip fracture reaches 3%. *Consensus-based*

3C. Pharmacologic treatment for osteoporosis in women or men is optional when the 10-year probability of hip fracture is < 3%. *Consensus-based*

NOTE: The safety and efficacy of long-term use of bisphosphonates for more than 5 to 10 years are uncertain; therefore, the decision to start open-ended treatment in younger patients should be considered carefully.

* FRAX risk charts can be accessed on the FRAX web site: (http://www.shef.ac.uk/FRAX/).
IV. Nonpharmacologic Interventions

4A. The following lifestyle changes are recommended for all adults:
   • Exercise – regular weight-bearing and muscle-building exercise
   • Smoking cessation

   Consensus-based

4B. Home safety proofing is recommended for postmenopausal women and men at risk of falling. Consensus-based

   NOTE: Home safety proofing includes removing rugs, adding grab bars, establishing adequate lighting (e.g., nightlights), and securing electrical cord placement.

4C. The routine use of hip protectors is not recommended as an intervention for reducing the risk of hip fractures in postmenopausal women and men aged 50 or older.

   Evidence-based: D

V. Screening for Vitamin D Deficiency

5A. Screening for vitamin D deficiency is not recommended for identifying vitamin D deficiency in adults aged 50 years or older without osteoporosis. Consensus-based

5B. Testing for vitamin D deficiency and supplementation with vitamin D to an acceptable level of $\geq 30$ ng/ml before initiating bisphosphonate therapy is recommended.

   Consensus-based
VI. Dietary and Pharmacologic Interventions

Preventive measures for all women and men:

6A. Total daily intake of calcium is recommended for all pre- or postmenopausal women and older men (1,000 mg/day for premenopausal women; 1,200 mg/day for postmenopausal women and men aged 50 or older). Many individuals require supplemental calcium therapy. Evidence-based: B

6B. Total daily intake of vitamin D (at least 1,000 IU/day), preferably vitamin D₃, is recommended for all pre- or postmenopausal women and men aged 50 or older. Consensus-based

NOTE:
- Calcium carbonate contains the most elemental calcium per dose. It should be taken with food to enhance absorption.
- Calcium citrate contains less elemental calcium than the carbonate salt, but it is better absorbed and may be preferred in patients with reduced gastric acid production or high gastric pH requiring long-term H₂ antagonist or proton pump inhibitor therapy and in patients who have undergone bariatric surgery. It is more expensive and usually requires more tablets to be taken per day than calcium carbonate.

Preventive measures for women and men without osteoporosis:

6C. Hormone therapy solely for the prevention of osteoporosis is not recommended. Consensus-based

Treatment for postmenopausal women diagnosed with osteoporosis:

FIRST-LINE DRUG THERAPY:

6D. Alendronate (10 mg/day or 70 mg/week) is recommended as a first-line therapy for:
   - Postmenopausal women with a prior fragility fracture. Evidence-based: A
   - Women aged 65 or older with a diagnosis of osteoporosis (T-score ≤ -2.5). Evidence-based: A
   - Postmenopausal women with a FRAX* 10-year risk of hip fracture ≥ 3%. Consensus-based
   - Alendronate is an option for postmenopausal women under the age of 65 diagnosed with osteoporosis (T-score ≤ -2.5), but without a FRAX 10-year risk of hip fracture ≥ 3%. Consensus-based

* FRAX risk charts can be accessed on the FRAX web site: (http://www.shef.ac.uk/FRAX/).
6E. Risedronate (5 mg/day or 35 mg/week) is a recommended alternative to alendronate for the categories of patients described in 6D. *Evidence-based: A*

**NOTE:**
- Bisphosphonates are not recommended in women of childbearing age without adequate contraception.
- Bisphosphonates should be used with caution in patients with chronic kidney disease and reduced glomerular filtration rate.
- Screening for vitamin D deficiency and supplementation with vitamin D to an acceptable level of > 30 ng/ml before initiating bisphosphonate therapy is recommended. *(See Recommendation 5B: Consensus-based)*
- The major determinant of fracture risk reduction with bisphosphonate therapy is continuing to take the therapy.
- Short-term interruption of bisphosphonates is not associated with rapidly rising risk of fracture. Some patients not at high risk for fracture may not need to continue long-term bisphosphonate therapy.

**SECOND-LINE DRUG THERAPY:** *(The following medications are for use only when alendronate and risedronate are contraindicated or not tolerated in postmenopausal women.)*

6F. Raloxifene is an option for postmenopausal women with low risk for thrombotic complications. *Evidence-based: B*

**NOTE:** Raloxifene treatment may be particularly applicable to women at high risk for breast cancer.

6G. Ibandronate is an option for postmenopausal women over the age of 65 with a prior vertebral fracture. *(See notes for bisphosphonate therapy above.)* *Evidence-based: B*

6H. Nasal calcitonin is an option for postmenopausal women over the age of 65 with a prior vertebral fracture. *Evidence-based: B*

**NOTE:** For all second-line therapies listed above, evidence has not demonstrated a statistically significant decrease in the incidence of hip fractures.
THIRD-LINE DRUG THERAPY: *(The following medications are for use only when other treatment modalities are contraindicated or not tolerated in postmenopausal women at high risk of fractures.)*

6I. Zoledronic acid (intravenous 5 mg annually) is an option for postmenopausal women over the age of 65 with high risk and a prior vertebral fracture. *(See notes for bisphosphonate therapy above.)* Evidence-based: B

6J. Teriparatide (recombinant PTH) by daily injection is an anabolic agent that may be an option for high-risk women not tolerant of or responsive to other agents. It should be used only after specialist evaluation. Evidence-based: B

**Preventive measures for premenopausal women**

6K. There is no recommendation for or against treatment with any prescribed pharmacologic therapy for premenopausal women. Evidence-based: I

**Treatment for men**

6L. Alendronate (10 mg/day or 70 mg/week) is recommended as a first-line therapy for men aged 70 or older diagnosed with osteoporosis or with a FRAX* 10-year risk of hip fracture ≥ 3%. Consensus-based

6M. Pharmacologic treatment for osteoporosis is optional in men under the age of 70 who are diagnosed with osteoporosis (T-score ≤ -2.5) but without a FRAX 10-year risk of hip fracture ≥ 3%. Consensus-based

**Treatment for men and women taking corticosteroid therapy:**

6N. Alendronate (10 mg/day or 70 mg/week) or risedronate (5 mg/day or 35 mg/week) is recommended as first-line therapy for men and women who are taking oral corticosteroid medication at a dose of ≥ 5 mg/day prednisone or equivalent for a duration of 3 months or more and have a FRAX 10-year risk of hip fracture ≥ 3%. *(See notes for bisphosphonate therapy above.)* Consensus-based

6O. Teriparatide (recombinant PTH) by daily injection is an anabolic agent that is an option for treating osteoporosis in glucocorticoid-treated patients not tolerant of or responsive to other agents. It should be used only after specialist evaluation. Evidence-based: B

* FRAX risk charts can be accessed on the FRAX web site: (http://www.shef.ac.uk/FRAX/).
**Treatment Duration:**

6P. There is no recommendation on the optimal treatment durations for the pharmacologic management of osteoporosis. *Evidence-based: I*

NOTE: Based on consensus, the GDT concluded that short-term interruption of bisphosphonates is not associated with rapidly rising risk of fracture, and some patients not at high risk for fracture may not need to continue long-term bisphosphonate treatment beyond 5 years. Results from trials extending beyond 5 years have shown persistence of benefits.

**VII. Monitoring Treatment**

7A. Routine BMD testing by DXA is not recommended for monitoring the rate of bone loss after initiation of treatment in women or men. *Consensus-based*

NOTE: A major determinant of fracture risk reduction with bisphosphonate therapy is continuing to take the therapy.

7B. There is no recommendation for or against routine bone turnover testing with biochemical markers for monitoring women and men taking antiresorptive therapy for osteoporosis. *Evidence-based: I*