



## Osteoporosis Update: Prevention, Diagnosis, and Treatment

### What We Know About Osteoporosis

- ➔ Osteoporosis is a preventable disease, not a condition of aging
- ➔ Technology for accurate bone density measurement is available
- ➔ Safe and effective pharmacologic treatments are available and patient education is critical to prevent disease and encourage persistence with medication

### Learning Objectives

After completing this activity, participants should be better able to:

- ➔ Assess the risk factors associated with osteoporosis
- ➔ Manage osteoporosis in the context of comorbidities
- ➔ Evaluate nonpharmacologic preventive approaches as well as the efficacy and safety of pharmacologic management

### Osteoporosis: A Public Health Concern

Osteoporosis and osteopenia, conditions of low bone mineral density (BMD), affect 55% of Americans aged  $\geq 50$  years. This means that approximately 10 million Americans have osteoporosis and another 34 million are at risk. It is estimated that 12 million Americans will have osteoporosis by the year 2010, for a total of 52 million Americans with weakened bones.<sup>1</sup> Osteoporosis represents a major public health concern. In addition to the expected physical and quality-of-life limitations resulting from fractures, psychological consequences may impede recovery and decrease independence.<sup>2</sup> Disability is permanent in 60% of patients with osteoporosis-related hip fractures.<sup>2</sup> Moreover, there is an increased risk of death following hip<sup>2,3</sup> or vertebral fracture<sup>4</sup> compared with

**A new tool helps evaluate fracture risk and plan personalized treatment of osteoporosis**

**Should treatment of osteoporosis be discontinued if osteoporosis seems to be under control? See page 88**

persons of similar age. The National Osteoporosis Foundation (NOF) reports that in 2005, the cost of osteoporosis-related fractures was \$19 billion, a figure expected to reach \$25.3 billion by 2025.<sup>5</sup>

### Osteoporosis: Not Only in Older White Women

Among people aged  $\geq 50$  years, osteoporosis occurs more often in women than men (80% vs 20%). It disproportionately affects Caucasian and Asian women, among whom 20% have osteoporosis and 52% have low BMD. Approximately 10% of Hispanic women have osteoporosis, and 49% have osteopenia. African American women have higher BMD than all other women; osteoporosis is reported in only 5%, and osteopenia in 35%.<sup>5</sup> In addition, in all women aged  $\geq 35$  years, the incidence of osteoporotic fracture is far greater than the incidence of myocardial infarction (MI), stroke, and breast cancer combined (Figure 1).<sup>6-8</sup>

In men, osteoporosis is more likely to be secondary to causes such as corticosteroid treatment, excessive alcohol consumption, or hypogonadism.

**TABLE 1**

**T Scores:  
Normal to Osteoporotic**

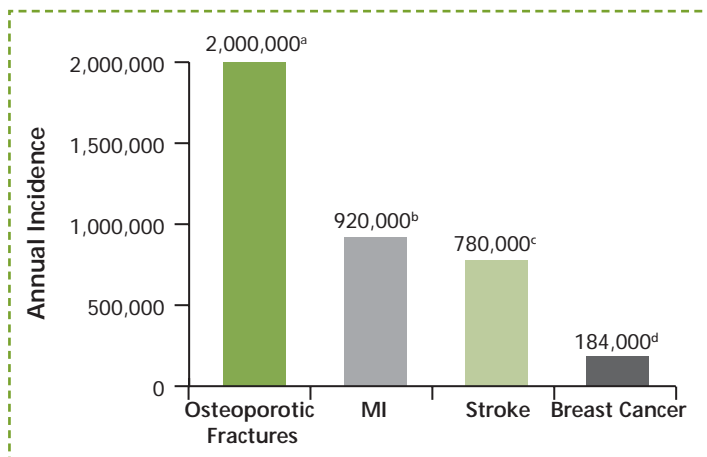
T Score	BMD Category
1.0	Normal BMD
0.5	
0	
-0.5	
-1.0	
-1.1	Osteopenia
-2.5	
-2.6	
-3.0	Osteoporosis
-3.5	
-4.0	
-4.0	

NOF Web site.<sup>14</sup>

### Diagnosing Osteoporosis Beyond Low BMD

Dual-energy x-ray absorptiometry (DEXA) scanning of the hip and spine can be used to establish or confirm the diagnosis of osteoporosis, predict fracture risk, and monitor response to therapy. This rapid, noninvasive procedure has long been the gold standard for assessment.<sup>12</sup>

The difference between the BMD value obtained in a DEXA scan and the mean value in normal young adults is termed the T score (Table 1). The lower the T score, the greater the fracture risk. To compensate



**Figure 1.** Osteoporotic fractures are more common than MI, stroke, and breast cancer combined.<sup>6-8</sup>  
<sup>a</sup>Annual incidence age  $\geq 50$  years; <sup>b</sup>both sexes, age<sup>2</sup>  $\geq 35$  years; <sup>c</sup>both sexes, all ages; <sup>d</sup>both sexes.

for any discrepancy between findings from the hip and spine, the lowest T score is used in diagnosis and treatment.<sup>13</sup> The number of standard deviations above or below what is expected for the same sex, age, weight, and ethnicity is the patient's Z score.<sup>14</sup>

Patterns of fracture risk indicate that BMD alone is not a reliable indication of fracture risk. The results of a recent study comparing osteoporosis and fracture risk in women of different ethnic groups<sup>15</sup> showed that while risk was strongly influenced by BMD, Asian women (who had the lowest BMD at every age) and black women (who had the highest BMD) had comparable rates of fracture risk. Again, an analysis of data from 149,524 postmenopausal white women in the National Osteoporosis Risk Assessment (NORA)<sup>16</sup> assessed baseline peripheral BMD at the heel, finger, or forearm and followed the cohort for 1 year to determine the incidence of new fractures. Among women with fractures, 82% had T scores better than  $-2.5$ . Clearly, bone mass alone cannot account for fracture risk.

Such findings have prompted researchers to broaden the definition of osteoporosis as compromised bone strength predisposing to greater fracture risk. Bone strength includes BMD and bone quality. The latter reflects bone architecture, turnover (remodeling), accumulated damage, and mineralization, all of which influence the risk of fracture.<sup>4,17</sup>

## Glucocorticoid Use and Fracture Risk

Glucocorticoid-induced osteoporosis (GIO) is a recognized risk when steroids are used for  $\geq 3$  months.<sup>9</sup> It can occur at any age, but is more likely in people  $>50$  years of age. With the knowledge that risk is greater among these patients, particularly among those taking prednisone  $\geq 7.5$  mg or its equivalent daily, clinicians should consider prescribing bone-sparing therapy. For patients who are taking a lower dose for a longer period of time, measurement of BMD to assess risk is warranted.<sup>9</sup>

The risks associated with corticosteroid therapy were described in a large retrospective cohort study<sup>10</sup> that compared data from the United Kingdom General Practice Research Database (GPRD) for approximately 250,000 oral corticosteroid users and their matched controls. Patients were assigned to low-, medium- or high-dose categories:  $<2.5$  mg/d, 2.5 to 7.5 mg/d, or  $\geq 7.5$  mg/d. There was a dose-related increase of risk for all fracture types, with the largest increases being frac-

tures of the hip and spine. The risk of hip fracture doubled in the high-dose group, and the risk of vertebral fracture increased to 5.18 in the high-dose group from 1.55 in the low-dose group. With the initiation of corticosteroid use, there was a rapid increase in risk that persisted as long as the patient was taking the agent. Risk decreased within a year of corticosteroid discontinuation.

In view of the increased risk of fracture with corticosteroid use, the American College of Rheumatology<sup>11</sup> updated its preventive and treatment recommendations for patients beginning or receiving long-term therapy for GIO with the equivalent of prednisone  $\geq 5$  mg/d. Recommendations include the following:

- Lifestyle modification, including smoking and drinking reduction or cessation and the initiation of load-bearing exercise
- Calcium and vitamin D supplementation
- Bisphosphonate use during long-term corticoid therapy

### Bone: A Dynamic Tissue

Bone turnover is a dynamic process of replacement and repair—resorption and formation—that occurs throughout life. At any stage of the process, different sites on the surface of the bone are in different stages of remodelling,<sup>3</sup> with about 80% of the bone surface always in the resting stage. Osteoclasts remove bone, forming a resorption pit that osteoblasts fill with collagen matrix, which becomes mineralized, forming new bone.

Osteoporosis results from an imbalance between resorption and formation during bone remodeling. The net loss of bone tissue and trabecular structures during this process changes the bone architecture.<sup>18</sup> Young, normal bone is dense with horizontal connecting struts. With osteoporosis, thinning of the trabeculae and decreased connectivity reduce trabecular strength and increase susceptibility to fracture. In postmenopausal women, diminishing estrogen levels lead to excessive bone resorption without a compensatory increase in bone formation.

The incidence of osteoporotic fractures shows an age-specific pattern that also reflects the relative proportion of trabecular bone at each site. The distal forearm and the vertebrae contain large amounts of trabecular bone.<sup>19</sup> An increase in Colles' fractures, starting perimenopausally, plateaus at about age 65. The incidence of vertebral fractures increases in a linear fashion beginning at age 40. In contrast, hip fractures are uncommon until age 70, when the incidence increases sharply.

### Who Should Be Evaluated for Osteoporosis?

According to the most recent recommendations from NOF,<sup>2</sup> BMD should be tested in:

- ➔ Women  $\geq 65$  years; men  $\geq 70$  years, regardless of the presence of clinical risk factors
- ➔ Postmenopausal women and men 50 to 70 years of age with clinical risk factors
- ➔ Perimenopausal women with low body weight, prior low-trauma fracture, or high-risk medication
- ➔ Men or women who have had a fracture after age 50; with a condition or taking a medication associated with bone loss; considering pharmacologic therapy for osteoporosis
- ➔ Postmenopausal women discontinuing estrogen

### Fracture Risk and FRAX

The World Health Organization (WHO) has developed FRAX<sup>TM</sup>, a tool that can be used to evaluate a patient's 10-year relative risk (RR) for osteoporotic fracture.<sup>20</sup> FRAX has been adopted by NOF.<sup>2</sup> Charts to determine risk are available at [www.shef.ac.uk/FRAX](http://www.shef.ac.uk/FRAX). Different versions of this tool have been adapted to the characteristics of population groups in North America, Europe, Asia, and Australia. The use of FRAX allows clinicians to target bone-strengthening treatment to the needs of individual patients.

FRAX uses measurement of BMD at the femoral neck, along with information about age, gender, weight, height, previous fracture status, parental history of hip fracture, use of oral glucocorticoids, smoking history, evidence of rheumatoid arthritis, presence of conditions associated with secondary osteoporosis, and consumption of  $\geq 3$  alcoholic drinks daily. Although not included in FRAX, measurement of testosterone levels in men and low vitamin D levels may also be of value in predicting fracture risk.<sup>21</sup>

## Managing Osteoporosis: Calcium, Vitamin D, and Exercise

Osteoporosis is a “silent” risk factor for fracture, just as asymptomatic hypertension is for stroke. Because there are rarely warning signs during the early phase of osteoporosis until fracture occurs, few people are diagnosed in time to receive effective therapy. It is important, therefore, to target persons at risk for fractures and develop appropriate treatment strategies.<sup>16</sup>

Clinical evaluation should include a medical history that reviews risk factors along with signs and symptoms. During the physical examination, height should be measured with a stadiometer. BMD testing is mandatory. Laboratory measurements of the biochemical markers of bone turnover in serum and urine are not indicative of the diagnosis, but can be used to assess fracture risk.<sup>2</sup>

Lifelong healthful habits from childhood can promote bone health and prevent osteoporosis. Proper nutrition includes a balanced diet with adequate intake of calcium, vitamin D, and protein. Calcium requirements are 800 mg/d for children aged 3 to 8, 1300 mg/d for children and adolescents aged 9 to 17, and 1200 to 1500 mg/d for adults.<sup>2</sup>

Adults aged  $\geq 50$  should maintain a daily intake of 800 to 1000 IU of vitamin D<sub>3</sub>. This form of vitamin D, cholecalciferol, enhances calcium absorption and is more potent than vitamin D<sub>2</sub>, ergocalciferol. If a patient is not getting enough calcium and/or vitamin D through diet and sunlight exposure, supplementation should be considered.<sup>2</sup> The results of a meta-analysis of randomized, controlled trials of the effects of vitamin D supplementation on hip and nonvertebral fractures<sup>22</sup> showed that vitamin D at a dose of 700 to 800 IU/d reduced the relative risk of hip and nonvertebral fractures in ambulatory and institutionalized elderly people by 26% and 23%, respectively. By contrast, a dose of 400 IU/d did not reduce risk.

Physical activity, particularly load-bearing and muscle-strengthening exercise, also can slow the loss of BMD. Some experts suggest that exercise may do more than promote a modest increase in BMD. By increasing agility, muscle strength, posture, and balance, a person may be less likely to fall or may fall differently with less risk of injury than a frailer person. Exercise also improves overall function and can help a patient remain independent. Patients should be encouraged to stop smoking and to consume less than 2 alcoholic drinks a day.<sup>2</sup>

## Pharmacologic Therapy for Osteoporosis

In randomized clinical trials, pharmacologic therapy improved BMD and decreased the rate of vertebral fractures compared with treatment with calcium and vitamin D. Agents used to treat osteoporosis include antiresorptive agents (bisphosphonates, estrogen, selective estrogen receptor modulators [SERMs], and salmon calcitonin) and the anabolic agent, parathyroid hormone (PTH). Table 2 lists osteoporosis-related indications for these agents.<sup>23-30</sup>

### *Bisphosphonates*

The most commonly prescribed bisphosphonates—alendronate, risedronate, and ibandronate—increase BMD and are considered first-line therapy for osteoporosis. The multicenter, randomized, placebo-controlled Fosamax International Trial (FOSIT)<sup>31</sup> and

**TABLE 2**

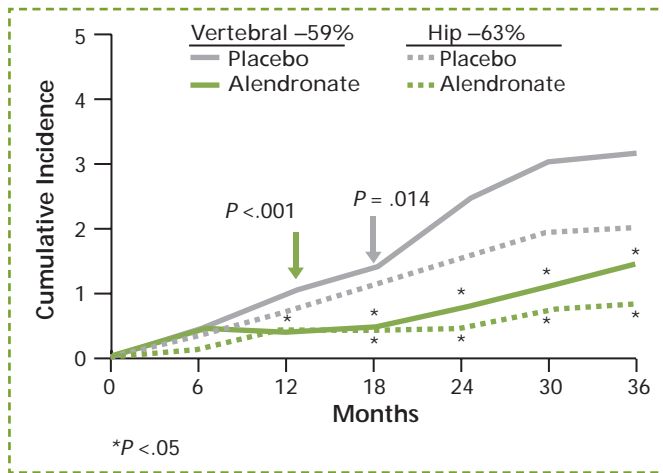
**Agents for Osteoporosis: Indications**

	Treatment/ Prevention of Postmenopausal Osteoporosis	Treatment of Osteoporosis in Men	Treatment/ Prevention of GIO in Men and Women	Reduction in Risk of Invasive Breast Cancer in Postmenopausal Women
Alendronate	X	X	X	
Risedronate	X	X	X	
Ibandronate	X			
Zoledronic acid	X			
SERM: raloxifene	X			X
Estrogen	X (Prevention)			
Calcitonin	X (Treatment)			
Parathyroid hormone: teriparatide	X (Treatment)	X		

Product information.<sup>23-30</sup>

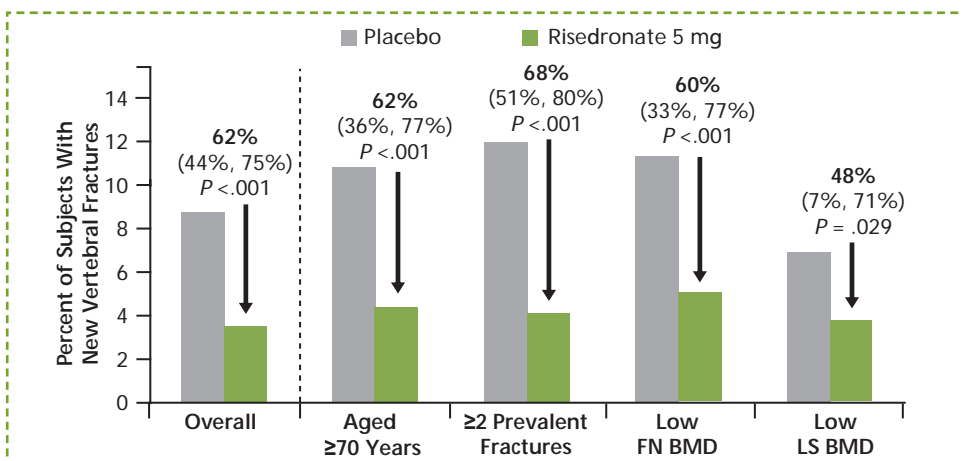
Fracture Intervention Trial (FIT) 1 and 2<sup>32</sup> evaluated the effects of alendronate 5 to 10 mg daily in postmenopausal women with osteoporosis. Alendronate treatment produced significant progressive increases in BMD. In the FIT trials, there was a 59% reduction in the risk of vertebral fracture ( $P < .001$ ) at 12 months and a 63% reduction in the risk of hip fracture ( $P = .014$ ) at 18 months (Figure 2).<sup>32</sup> Alendronate is available in once-daily and once-weekly formulations.

The efficacy of risedronate has been assessed by the Vertebral Efficacy With Risedronate Therapy (VERT)<sup>33</sup> and Hip Intervention Program (HIP)<sup>34</sup> investigators. In the multicenter, randomized, double-blind, placebo-controlled North American and multinational VERT trials of postmenopausal women with  $\geq 1$  vertebral fracture, treatment with risedronate 5 mg daily decreased the rate of new vertebral fractures by 62% ( $P < .001$ ) compared with placebo. As shown in Figure 3, subgroup analyses yielded similar decreases in the incidence of new vertebral fractures.<sup>33</sup> In the HIP study, risedronate decreased hip fracture compared with placebo in women aged 70 to 79 years with confirmed osteoporosis, but not in women of the same age with unknown BMD status. Risedronate is available in daily, weekly, and monthly formulations.



**Figure 2.** Alendronate decreases the cumulative incidence of symptomatic vertebral and hip fractures (FIT 1 and 2).<sup>32</sup>

The Monthly Oral ibandronate In LadiEs (MOBILE)<sup>35</sup> and Dosing Intravenous Administration (DIVA)<sup>36</sup> studies demonstrated the efficacy of ibandronate in the treatment of postmenopausal osteoporosis. MOBILE reported 2-year evidence that once-monthly dosing is as effective as daily dosing in increasing total hip, femoral neck, and trochanter BMD, with the most pronounced effect at the 150-mg dose ( $P < .05$ ). DIVA compared intravenous (IV) ibandronate doses of 2 mg every 2 months or 3 mg every 3 months to a daily 2.5-mg oral regimen in postmenopausal women. Both IV doses were superior to the oral regimen ( $P < .001$ ). In an earlier study, oral ibandronate administered daily or intermittently with a between-dose interval  $>2$  months reduced vertebral fracture risk at 3 years by 52% and 50%, respectively.<sup>36</sup> No evidence is available to show efficacy with ibandronate in the prevention of hip fractures.



**Figure 3.** Risedronate reduces risk of vertebral fracture in high-risk subjects in 1 year.<sup>33</sup> FN = femoral neck; LS = lumbar spine.

Zoledronic acid recently was approved for once-yearly treatment of osteoporosis. As reported in the Health Outcomes and Reduced Incidence with Zoledronic acid ONce yearly (HORIZON) Pivotal Fracture Trial findings, in addition to reducing the risk of vertebral and hip fractures by 70% and 41%, respectively,<sup>37</sup> infusion of zoledronic acid within 90 days of repair of a low-trauma hip fracture reduced the rate of new clinical fractures and was associated with improved survival.<sup>38</sup>

In clinical trials, the frequency and intensity of gastrointestinal (GI) side effects of bisphosphonates are similar to those of placebo, but in clinical practice GI side effects are often reported. Patients have experienced esophagitis, gastritis, and diarrhea. Serious complications are less common when the agents are used as recommended; however, patients known to have esophageal disease should avoid oral bisphosphonates.<sup>39</sup>

Concerns have been raised about osteonecrosis of the jaw as a potential adverse effect of bisphosphonate therapy. This rare condition has been seen mainly in patients with cancer who are receiving high-dose IV bisphosphonate treatment, and 60% of cases occurred after dental surgery.<sup>40</sup>

### ***Estrogen/Hormone Replacement Therapy***

While hormone replacement therapy (HRT) reduces fracture risk and is approved by the US Food and Drug Administration (FDA) for prevention of postmenopausal osteoporosis, the risks associated with such therapy, particularly treatment with unopposed estrogen, outweigh the benefits. There are increased risks for venous thromboembolism, coronary heart disease, stroke, and breast cancer, as well as endometrial cancer in women with an intact uterus. Considering the availability of other effective agents, the US Preventive Services Task Force has recommended against prescribing HRT.<sup>41</sup>

### ***SERMs***

The SERM raloxifene binds to estrogen receptors and acts like an estrogen agonist on the bone. SERMs are safer than estrogen use. Although risk of thromboembolism is higher than with placebo, raloxifene use is protective against breast cancer and has been approved for this indication. The multicenter, randomized, controlled Multiple Outcomes of Raloxifene Evaluation (MORE) trial evaluated the effects of 2 doses of raloxifene on BMD in postmenopausal women with osteoporosis for up to 3 years. At the 60-mg dose, raloxifene use increased BMD by 2.1% and 2.6% at the femoral neck and spine, respectively. Women taking the 120-mg dose had increases of 2.4% and 2.7%, respectively ( $P < .001$  for all comparisons). Compared with placebo, risk for vertebral fractures decreased by 30% to 50% among women treated with raloxifene for 36 months, a risk reduction that was statistically significant for women with or without vertebral fractures at baseline.<sup>42</sup>

### ***Calcitonin***

Although calcitonin decreases bone resorption, the effect may diminish over time. It can reduce pain, which may make it a good choice for patients with acute vertebral compression fractures.<sup>43</sup> The results of Prevent Recurrence of Osteoporotic Fractures (PROOF),<sup>44</sup> a 5-year double-blind, randomized, placebo-controlled study to evaluate the effects of 3 doses of salmon calcitonin nasal spray, showed reduction in the relative risk

of developing a new vertebral fracture in all groups, but this reached significance only in the 200-IU group (RR = .67;  $P = .03$ ). The risk of nonvertebral fractures was significantly lower only in the 100-IU group (RR = .64;  $P < .05$ ). Calcitonin 200 IU is approved for the treatment of osteoporosis.

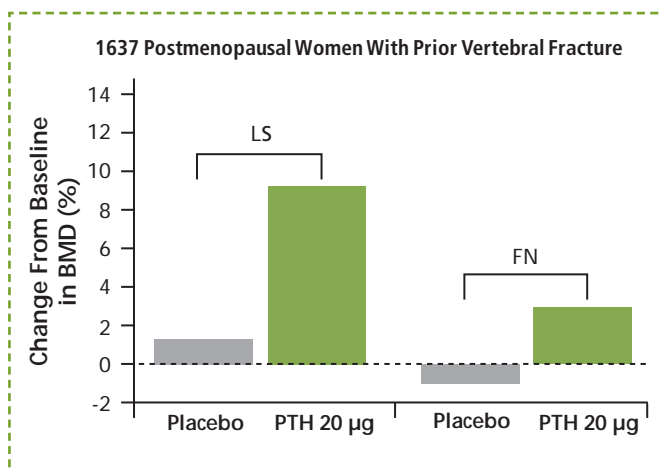
### Parathyroid Hormone (PTH)

Teriparatide is an anabolic agent that acts by stimulating bone formation when given as a once-daily injection.<sup>44,45</sup> In a large multinational, double-blind, placebo-controlled trial, teriparatide 20  $\mu\text{g}$  reduced the risk of vertebral and nonvertebral fractures by 65% ( $P < .001$ ) and 53% ( $P < .05$ ), respectively (Figure 4).<sup>45</sup> Teriparatide is indicated for the treatment of osteoporosis in postmenopausal women at high risk for fracture and in men at high risk for fracture because of primary or hypogonadal osteoporosis. Because this agent is injected daily, is expensive, and may increase the risk of osteosarcoma, it should be prescribed only for patients with severe or established osteoporosis who cannot tolerate a bisphosphonate.<sup>43</sup>

### Adherence and Persistence

Osteoporosis is a chronic disease, yet up to half of patients who are prescribed therapy fail to take their medications. As a result, they needlessly suffer falls and fractures, often requiring hospitalization.<sup>46</sup> A recent study comparing the effects of discontinuing alendronate after 5 years with the effect of continuing for 10 years<sup>47</sup> reported declines in BMD at the hip and spine, although the decline never reached below pretreatment levels. Therefore, it would probably be advantageous for women at very high fracture risk to remain on therapy. Another cohort analysis of bisphosphonate adherence<sup>48</sup> reported lower fracture rates with increased adherence.

Issues of adherence have led to the development of new formulations that allow once-weekly or once-monthly dosing. Injectable formulations also are being evaluated. Success with treatment is dependent on 2 conditions: persistence—how long the patient takes the medication—and adherence—the patient takes the medication as prescribed. Most



**Figure 4.** PTH improves BMD over 18 months.<sup>45</sup> PTH = parathyroid hormone.

patients who stop taking the medication drop out in the first year of therapy.<sup>46</sup> They may admit to forgetfulness, blame cost or adverse effects, or cite the absence of symptoms. Patients may not understand the seriousness of their condition or may be daunted by the complexity of the regimen due, in part, to failure of communication between patient and clinician.<sup>46,49</sup>

### Preventing Falls

Even when medical conditions are under control and diet and exercise are on target, personal and environmental factors may increase the chance of falling, and falls increase the risk of fracture. Clinicians can help patients reduce risk by taking measures to increase patient awareness and vigilance.<sup>50</sup>

Clinicians should warn patients about medical conditions that could affect balance or vision and review medications for side effects. Sensory and neurologic problems, such as hearing, visual acuity, and peripheral neuropathy, should be corrected. Assistive devices as needed, such as walkers, reachers, lifters, and hip pads should be prescribed. A professional service may be recommended to evaluate the home environment to make it as fall-proof as possible. Improving lighting, anchoring or getting rid of throw rugs, installing grab bars and a raised toilet seat in a bathroom, removing wires and other obstacles to walking, and covering slippery surfaces indoors and outdoors all can reduce the risk for falls at home.

### PCE Takeaways

- Osteoporosis is increasingly common and burdensome with age
- Prevention should begin early with healthy nutrition and exercise
- Bone density should be measured in patients at risk for osteoporosis
- Vitamin D<sub>3</sub> and calcium supplementation is advised
- Agents approved for treatment of osteoporosis have demonstrated efficacy in improving BMD and decreasing fracture rates
- Antiresorptive therapies include alendronate, risedronate, ibandronate, and zoledronic acid
- Other treatment options include calcitonin and PTH

## CASE STUDY

### A 57-Year-Old Postmenopausal Asian Woman With a Family History of Fracture

#### Presentation

A 57-year-old Asian woman, postmenopausal for 5 years, presents for her annual physical examination. She has not had HRT. Her mother had a hip fracture at age 76. The patient's diet is balanced, but does not include dairy, as she is lactose intolerant. She walks 20 minutes daily, and smokes 10 cigarettes a day.

#### Physical Examination

- ➔ BMI: 18.5 kg/m<sup>2</sup>
- ➔ Height: 5 ft 2 in
- ➔ Weight: 101 lb
- ➔ Vital signs stable

#### Medical and Treatment History

- ➔ Gastroesophageal reflux disease (GERD) and ulcerative colitis
- ➔ Proton pump inhibitor (PPI) daily for 5 years
- ➔ Mesalamine for ulcerative colitis
- ➔ Systemic steroids orally 3 or 4 times for limited periods
- ➔ No known drug allergies

#### Clinical Decision Point

*Should this patient have a DEXA scan?*

- ➔ No, she is <65 years of age
- ➔ Yes, she is 5 years postmenopausal
- ➔ Yes, she has multiple risk factors for osteoporosis

#### Comment

This patient has several major risk factors (RR  $\geq 2$ ) for osteoporosis, including hip fracture in a parent, the use of a glucocorticoid, malabsorption, and a borderline BMI (risk increases with BMI <18 kg/m<sup>2</sup>). In addition, she has several moderate (RR 1-2) risk factors: estrogen deficiency, low calcium intake (<500 mg/d), and smoking. She is referred for a DEXA scan.

#### Clinical Decision Point

*With T scores of -1.9 lumbar spine and -.9 femoral neck as indicated by a DEXA scan, does this patient have osteoporosis?*

- ➔ Yes
- ➔ No
- ➔ Not enough information

#### Comment

As the lowest score is used for diagnosis, this patient has osteopenia of the spine based on her lumbar spine score of -1.9.

#### Clinical Decision Point

*What treatment should be recommended for this patient?*

- ➔ Ca<sup>+</sup> 1200-1500 mg/d
- ➔ Ca<sup>+</sup> 1200-1500 mg/d plus 800 IU vitamin D
- ➔ All of the above plus smoking cessation and consider adding a bisphosphonate

#### Comment

Several nonpharmacologic approaches to the patient with osteopenia are recommended. According to the National Institutes of Health, adequate calcium intake for a 57-year-old woman is 1200 mg/d. Vitamin D supplementation and increased protein should be suggested, as should load-bearing exercise. If the patient drinks, alcohol intake should be minimized, and she should be encouraged to quit smoking. In addition, this patient's house should be fall-proofed, with installation of grab bars in the bathroom; and removal or anchoring of hazards such as extension cords, carpeting, and area rugs. If the patient is prone to falls, a hip protector also may be suggested.

The use of antiresorptive therapy with a bisphosphonate can increase bone mass over a 3- to 5-year period. The incidence of fractures of the spine, hip, and wrist is reduced by 40% to 65% with bisphosphonate treatment, depending on the site and agent being evaluated.

## Questions From Symposium Participants



➔ **Q:** If a patient has a T score of  $-2.5$  while on steroid therapy, is the DEXA scan likely to improve if the steroids are stopped?

**A:** Dramatic changes in BMD are seen about 90 days after steroids are started and about 90 days after they are stopped. Even though BMD may improve on steroid withdrawal, pharmacologic treatment to strengthen the bone should be considered because the patient meets the criteria for osteopenia.

➔ **Q:** Can medication be discontinued with follow-up observation in patients with osteoporosis whose condition appears to be under control?

**A:** To date, only the FLEX study has examined discontinuation of therapy after 5 years of treatment. In this study, patients who stopped therapy had a decrease in bone density at the spine after stopping therapy. If therapy is stopped, DEXA scans should be performed every 24 months to monitor spinal bone density. Osteoporosis is a lifelong condition and treatment, generally, should also be lifelong.

➔ **Q:** Should vitamin D levels be assessed, particularly in patients diagnosed with osteoporosis?

**A:** Vitamin D testing should be considered if there is a concern. The vitamin D level can be used to determine the dose of a vitamin D supplement.

➔ **Q:** How should a patient who has had an acute fracture despite bisphosphonate treatment be managed?

**A:** Try to identify the cause of treatment failure by asking the following: Is the patient taking the medication? Is the medication appropriate for the patient? Is there a drug interaction? Has a fall occurred? Is there a risk of elder abuse? Is there a secondary cause of osteoporosis?

➔ **Q:** Is there a genetic component to osteoporosis?

**A:** There is a genetic component, but it has not been identified, nor has its impact.

➔ **Q:** Should a DEXA scan be performed earlier in a patient with a family history of osteoporosis?

**A:** Yes. It doesn't make sense to wait until the horse is out of the barn, particularly when there is a history of early fractures. The goal is to keep the bone architecture as strong as possible, as early as possible. The means are available to do this.

➔ **Q:** Is treatment appropriate for a woman who has undergone surgical menopause, or should the decision to treat be based on age?

**A:** A woman who has undergone surgical menopause should be considered postmenopausal, regardless of age. Therefore, clinicians should think of such women differently from their age-matched peers and treat accordingly.

➔ **Q:** Is it a fall or osteoporosis that causes the fracture?

**A:** It is both osteoporosis and falls that cause fractures. Most fractures occur when a person with decreased bone density and decreased bone quality suffers a fall.

➔ **Q:** At what age would you consider doing a bone density scan for men who don't appear to be at high risk according to the categories discussed?

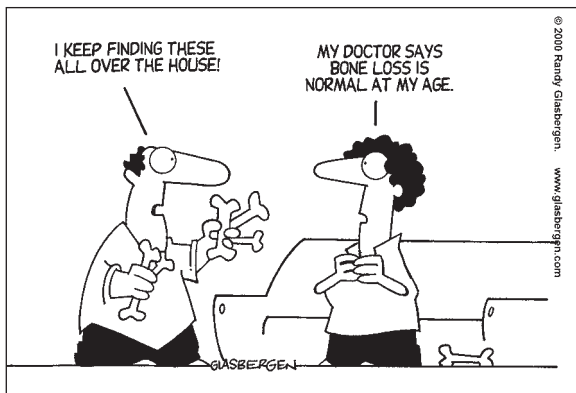
**A:** The DEXA scan is recommended for men at age 70—earlier if they have risk factors.

➔ **Q:** A patient was switched from a brand name bisphosphonate to a generic and has developed leg cramps. Could this reaction be a result of the switch?

**A:** In theory, there should be no difference between the generic and branded drugs; therefore, switching to a generic should not cause leg cramps. One way to tell if it is due to the switch is to take the patient off the drug for a couple of weeks and then reintroduce it. Genetic polymorphism could explain a response to a different preparation.

➔ **Q:** What is the connection between soda consumption and osteoporosis?

**A:** The link isn't entirely clear and there may, in fact, be several important factors. Soda consumption may take the place of more healthful drinks such as calcium-enriched fruit juices and milk. Caffeine may play a role, as it has been associated with an increased risk for osteoporosis. Finally, soda consumption may alter the body's acid balance and interfere with the supply of calcium. From the public health viewpoint, excessive soda consumption has been implicated in issues such as childhood obesity and dental caries.



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