

## **OSTEOPOROSIS RISK FACTORS & TREATMENT OPTIONS**

### **WHAT IS OSTEOPOROSIS?**

Osteoporosis, or porous bone, is a disease characterized by low bone mass and structural deterioration of bone tissue, leading to bone fragility and an increased susceptibility to fractures of the hip, spine and wrist.

Wolff's Law (Julius Wolff, 1868) states that bone mass and density will be increased in areas of stress. The detrimental effect of immobilization and non-weight bearing environments is the significant reduction in bone density. In other words, "use it or lose it".

### **HOW PREVALENT IS OSTEOPOROSIS?**

The National Osteoporosis Foundation estimates that osteoporosis is a major public health threat for 44 million Americans (80 percent of whom are women). Of that total, 10 million are estimated to already have the disease and nearly 34 million are estimated to have low bone mass, placing them at an increased risk for osteoporosis.

- Eight million American women are estimated to have osteoporosis.
- More than two million men currently have osteoporosis.
- Women are four times more likely than men to develop the disease.
- 50 percent of women and 25 percent of men aged 50 and older will have an osteoporosis-related fracture in their lifetime.

Osteoporosis affects people of all ethnic backgrounds:

- Twenty percent of non-Hispanic white and Asian women aged 50 and older are estimated to have osteoporosis, and 52 percent of non-Hispanic white and Asian women aged 50 and older are estimated to have low bone mass.
- Ten percent of Hispanic women aged 50 and older are estimated to have the disease; an additional 49 percent aged 50 and older are estimated to have low bone mass.
- Five percent of African American women aged 50 and older are estimated to have the disease; an additional 35 percent have low bone mass.

Osteoporosis is responsible for more than 1.5 million fractures annually, including:

- 300,000 hip fractures (greatest morbidity and socioeconomic impact)
- 700,000 – 750,000 vertebral fractures
- 150,000 wrist fractures
- 300,000 fractures at other sites

- Having one vertebral fracture increases your chance of a second by 5X; two or more vertebral fractures increase chances of an additional fracture to 12X.
- Hip fractures in an older person increase the chance of death by 7X in 4 years.
- A vertebral fracture increases the chance of death by 9X in 4 years.
- One in five patients is no longer alive one year following an osteoporotic hip fracture:
  - Fifty percent of those people experiencing a hip fracture will be unable to walk without assistance
  - Twenty-eight percent of those people experiencing a hip fracture will require long-term care
  - Women age 65 or older with at least one vertebral fracture have a 23% higher mortality rate than women of the same age without fractures
  - The estimated national direct expenditures for hospitals and nursing homes for osteoporotic and associated fractures was \$17 billion in 2001 (37% of this cost was due to non-hip fractures), or \$47 million each day, and the cost is rising
  - Each vertebral fracture is estimated to generate, on average, \$8000-\$16,600 in hospitalization costs

#### **WHAT ARE THE SYMPTOMS?**

Osteoporosis is often called the "silent disease" because bone loss occurs without symptoms. People may not know they have osteoporosis until their bones become so weak that a sudden strain, bump or fall causes a fracture or a vertebra to collapse. Collapsed vertebrae may initially be felt or seen in the form of severe back pain, loss of height or spinal deformities such as kyphosis (stooped posture).

#### **WHAT ARE THE RISK FACTORS?**

Several factors can place one at risk for developing osteoporosis including:

- Being female
- Thin and/or small frame
- Advanced age
- A family history of osteoporosis
- Postmenopause (including early or surgically induced menopause)
- Abnormal absence of menstrual periods (amenorrhea)
- Nulliparity (having never borne children)
- Anorexia nervosa or bulimia
- A diet low in calcium
- Use of certain medications, such as corticosteroids and anticonvulsants
- Low testosterone levels in men
- An inactive lifestyle
- High caffeine intake
- Cigarette smoking
- Excessive use of alcohol
- Being Caucasian or Asian, although African Americans and Hispanic Americans are at significant risk.

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### **DETECTION: IS THERE A TEST TO TAKE?**

Osteoporosis can strike at any age. It can be prevented and treated. Specialized tests called bone density tests can measure bone density in various sites of the body. A bone density test can:

- Predict risk of future osteoporosis and hip fracture
- Detect osteoporosis before a fracture occurs
- Determine the rate of bone loss and/or monitor the effects of treatment if the test is conducted at intervals of one year or more

### **IS OSTEOPOROSIS PREVENTABLE?**

By about age 20, the average woman has acquired 98 percent of her skeletal mass. Building strong bones during childhood and adolescence may be the best defense against developing osteoporosis. There are four steps to prevent osteoporosis. No one step alone is enough to prevent the disease, but a combination of the following are recommended:

- A balanced diet rich in calcium (1200 mg daily for men and women over 50) and vitamin D (between 400 and 800 IU daily)
- Weight-bearing exercise (any exercise in which your bones and muscles work against gravity)
- A healthy lifestyle with no smoking or excessive alcohol intake
- Bone density testing and medication when appropriate

### **WHAT TREATMENTS ARE AVAILABLE?**

While early diagnosis and treatment provide the best options for patients with osteoporosis, current treatment options approved by the US Food and Drug Administration (FDA) for the prevention and treatment of postmenopausal osteoporosis include estrogens and progesterones hormone replacement therapy, alendronate, risedronate, bisphosphonates, raloxifene, selective estrogen receptor modulator, and recombinant parathyroid hormone. Calcitonin is approved for treatment only.

Hormone replacement therapy, bisphosphonates, and selective estrogen receptor modulators affect the bone remodeling cycle and are classified as anti-resorptive medications. Bone remodeling consists of two distinct stages: bone resorption and bone formation. During resorption, special cells on the bone's surface dissolve bone tissue and create small cavities. During formation, other cells fill the cavities with new bone tissue. Usually, bone resorption and bone formation are linked so that they occur in close sequence and remain balanced. When osteoporosis is present, the balance is altered and bone loss occurs. Anti-resorptive medications slow or stop the bone-resorbing portion of the bone-remodeling cycle but do not slow the bone-forming portion of the cycle. As a result, new formation continues at a greater rate than bone resorption, and bone density may increase.

Calcitonin is a naturally occurring hormone that is secreted by the parathyroid, thyroid, and thymus glands. It can increase the levels of calcium and potassium in bones and lower the level of calcium in blood. It is a protein, and is therefore ineffective if taken orally. It must be taken in the form of an injection or a nasal spray (most common). It is only used for the treatment, but not prevention, of postmenopausal osteoporosis. It is most frequently prescribed to women who are 5 or more years postmenopause.

Additional treatment options include bed rest, braces and, in the case of a broken or bone, fracture reduction and fixation to facilitate healing.

This fact sheet contains information from the National Osteoporosis Foundation ([www.nof.org](http://www.nof.org)) and the National Institute of Arthritis and Musculoskeletal and Skin Diseases ([www.niams.nih.gov](http://www.niams.nih.gov)).