

NEWTON WELLESLEY ORTHOPEDIC ASSOCIATES, INC.

OSTEOPOROSIS

Introduction

Osteoporosis is often called a silent disease, as there are no warning signs that patients have the disease until fractures occur. Unfortunately, once a patient begins to experience fractures, bone mass has been reduced to the point where the skeleton cannot withstand the stresses of everyday activities. Patients will also have missed the opportunity for preventative treatment in the early stages of the disease.

Physiology

Growth and development of the skeleton begins in the fetus and continues throughout an individual's teenage years. Along with growth, **remodeling** occurs, as bone is constantly adjusting its strength to areas where it is most needed. During the first 2 years of life, the rate of bone remodeling approaches 50%. In contrast, in an adult, the bone remodeling process declines to 5% per year and is mainly to maintain maximal **bone mineral density** and repair injuries. Once growth in height slows in late adolescence, bone mineral content rapidly increases and peaks at skeletal maturity around age 30. It is this period of time, between adolescence and skeletal maturity, that **outside factors** have a great influence in determining the bone mineral content of the skeleton for the remainder of adult life.

Environmental Risk Factors

- Inadequate calcium intake
- Eating disorders (anorexia, bulimia)
- Lactose intolerance
- Smoking
- Prolonged bedrest or immobilization
- Caucasian or Asian nationality
- Alcoholism
- Excessive intake of carbonated beverages

Medical Risk Factors

- Menopause
- Surgical menopause (Hysterectomy)
- Hyperparathyroidism
- Absence of menstrual periods
- Steroid use
- Hyperthyroidism
- Long-term heparin or dilantin use

Diagnosis

The majority of bone loss in women occurs **within the first 5 years** after menopause or surgical menopause (hysterectomy) due to the lack of **estrogen**. Bone loss occurs at the rate of 3% per year for the first 5 years, then at a rate of 1% per year. Since osteoporosis is not evident until it is advanced, **prevention** should be the focus for women and their physicians. At menopause, **all** women should be assessed for their risk of osteoporosis. If one or more risk factors is present, treatment should be instituted along with a baseline **bone density test**. For postmenopausal women who have already had a fracture of a vertebra, distal radius or femoral neck, a bone density test can confirm the diagnosis of osteoporosis and determine the severity of the disease. Women over age 65 should have a baseline bone density test regardless of any additional risk factors. *Premenopausal* women who have a history of stress fractures with any additional risk factors should have a baseline bone density test, as well as any screening laboratory studies indicated by the patient's medical history.

The **bone density test** measures the density of bone (**BMD**) at two sites - the **hip** and the **spine**. It is a painless test that only requires the patient to lie on the densitometer table for less than an hour while the machine performs its scan. The readings are based upon comparing the patient's BMD with that of a 25 year old female and also against age matched controls. Values that fall 2.5 standard deviations below average are considered **osteoporotic**. Values below average, but *less* than 2.5 standard deviations are considered to have decreased bone mass or **osteopenia**. Considering that a reduction of one standard deviation in BMD corresponds to a 14 year age increase for risk of hip fracture, and that there is a 30% risk of death in the first year after a hip fracture, early diagnosis and treatment of osteoporosis is imperative.

Treatment Options

Patients can reduce their risk factor for osteoporosis *throughout their lifetime* by ensuring an adequate intake of calcium and vitamin D, avoiding smoking and excessive alcohol or carbonated beverage intake, and participating in regular weight-bearing exercise.

- **Calcium intake** - Premenopausal women need 1200 mg. of calcium daily. After menopause, women need 1500 mg. of calcium daily if they are not on hormone replacement therapy. To test whether the supplement is readily useable by the body, place a tablet in a mixture of 50% water/50% vinegar. If it dissolves easily, then that brand is a good choice. The supplement should also have 400-800 mg of vitamin D included as this vitamin is essential for the absorption on calcium.
- **Smoking and alcohol intake** - Both of these habits accelerate menopause and the development of osteoporosis in addition to other health risks.
- **Exercise** - Regular weight-bearing exercise such as walking, jogging, aerobics, dance and weight training are strongly recommended. Unlike swimming, these activities place stress upon bone, stimulating it to increase its density in response, as well as *preventing* further bone density loss. Exercise also improves strength and balance, which prevents falls.

Medications

- **Hormone Replacement Therapy (HRT)** - is the best preventative therapy for osteoporosis. In addition to a reduction in the rate of osteoporotic fractures, HRT has the added benefits of reducing the risk of heart disease and lowering the incidence of alzheimers disease. Patients on HRT need regularly scheduled Pap tests and mammograms. Patients who are undecided or against HRT may benefit from having a baseline bone density test to help with the decision process. Patients with a history of breast cancer or clotting disorders are *not* candidates for HRT.
- **Raloxifene (Evista)** - is a **selective estrogen receptor modulator** used for osteoporosis *prevention*. Evista acts as estrogen would on bone density, although not to the same degree as HRT, but it does not stimulate breast or uterine tissue. Evista also improves lipid profiles, again not as much as HRT, but like HRT, it is also associated with a risk of blood clots.
- **Alendronate (Fosamax)** - is another **non-hormonal** treatment for osteoporosis. Fosamax is used for the prevention *and* treatment of osteoporosis and should be offered to postmenopausal women with a diagnosis of osteoporosis based on a bone density test or by the presence of compression fractures. Fosamax does not prevent heart disease and its dosing instructions must be followed strictly to avoid gastrointestinal side effects.
- **Calcitonin nasal spray** - is a hormone that inhibits bone resorption and is indicated for patients who are at least 5 years postmenopausal, or who have a diagnosis of osteoporosis. Calcitonin is given as a nasal spray that is administered once a day. It increases the bone density in the spine and can decrease the pain of vertebral compression fractures. It is not as effective as HRT or Fosamax in treating osteoporosis, but may be used if patients are not willing or able to tolerate other therapies.

Conclusion

Osteoporosis can be a disease with severe health and economic repercussions. It is a *preventable* disease with proper patient education and screening. We would be happy to discuss any questions or concerns you may have after reviewing the information in this handout.