Osteopenia and Osteoporosis

Brown Health Services Patient Education Series

What is osteopenia and osteoporosis?
Osteoporosis, which means “porous bones,” is a condition of the skeleton in which the amount of calcium present in the bones slowly decreases to the point where the bones become less dense and more prone to fracture. Osteopenia refers to reduced bone mass of less severity then osteoporosis. Contrary to popular belief, osteopenia affects people of all genders and can occur in young people as well as elderly. It can occur in the college-aged population. People with eating disorders, high performance athletes or patients on certain medications or with certain medical conditions may be at the greatest risk. Even if you have no present high risk factors, building strong bones today may prevent osteoporosis from occurring in the future.

How does it occur?
Our skeleton provides structural support for our muscles and organs. In addition, it serves as a storage depot for 99% of the body’s calcium. The remaining 1% is free to circulate in the blood and is essential for crucial body functions including muscle contraction, nerve function and blood clotting.

Bone is not a lifeless structure. It is a living, growing tissue. In order to meet our body’s needs it is constantly being remodeled, broken down and reformed again. The breakdown is done by cells known as osteoclasts which dig holes into the bone, releasing the small amounts of calcium into the bloodstream that are necessary for other vital functions. Cells called osteoblasts then rebuild the skeleton, first by filling in the holes with collagen and then by laying down crystals of calcium and phosphorus.

From childhood to adulthood, bone is made faster than it is broken down and bones become larger and denser. Peak bone mass occurs by the mid 20’s. The remodeling process begins to change as early as age 35, so that bone is broken down faster than it is made. This results in precipitous bone loss after menopause. It is crucial that young adults “bank” enough calcium in their bones to draw on later in life to prevent osteoporosis.

Many factors affect the remodeling process. A deficiency of the hormone estrogen appears to increase bone loss. This occurs naturally after menopause but can also occur with surgical removal of the ovaries. Intense exercise such as marathon running affects hormonal levels and may lead to osteoporosis. Severe underweight and undernutrition problems that occur in patients with eating disorders can lead to hormonal deficiencies which cause amenorrhea (absence of menstrual periods) and severe osteoporosis. A person who has exceptionally dense bones to begin with will probably never lose enough calcium to reach the point where osteoporosis occurs. However, a person who has low bone density could easily develop osteoporosis despite losing only a relatively small amount of calcium.

What are the signs and symptoms of osteoporosis?
Early osteoporosis may have no symptoms. Symptoms occurring LATE in the disease include:
- Low back pain
- Neck pain
- Bone pain or tenderness
- Fractures of the vertebrae, wrists or hips following very minor trauma, stress fractures
- Loss of height over time (may be as much as 6 inches)
- Stooped posture

What factors increase your risk of developing osteoporosis?

- 80% of osteoporosis occurs in cis women.
- Increasing age: after age 60 all people are at risk for osteoporosis.
- Being postmenopausal, either due to natural or surgical menopause (decreased estrogen).
- Testosterone deficiency or estrogen deficiency due to abnormal absence of menstruation. This can occur in persons with eating disorders or in high performance athletes.
- Thin, slight body frame
- Smoking, alcohol use, high caffeine use, lack of exercise and low intake of calcium and vitamin D can all increase the risk of osteoporosis.
- Certain medications may increase risk including steroids, excessive thyroid medications, anticoagulants, antiepileptic drugs, and immunosuppressants.
- Certain metabolic diseases can cause secondary osteoporosis.

What tests can be done to confirm the diagnosis of osteoporosis?

Osteoporosis can be confirmed by bone-density testing. This is usually suggested for cis women over 65. Young people who have risk factors for osteoporosis such as having an eating disorder or loss of menstruation should also consider being tested.

Currently, the most accurate technique for determining bone density is dual x-ray absorptiometry (DEXA). The measurements are made by detecting the extent to which bones absorb photons that are generated by very low-level x-rays. This test is painless and quick. When the bone mineral density is 2.5 standard deviations below the average for young adults, a diagnosis of osteoporosis is made. If the bone mineral density is between 1 and 2.5 standard deviations below the norm, a patient is diagnosed with osteopenia, a slightly less advanced form of weakened bones. One standard deviation below the norm in a measurement of hip bone density is equivalent to adding 14 years to a person’s age-related risk of fracture.

How is osteoporosis treated?

Treatment cannot eliminate osteoporosis, but medicines may be able to slow down the loss of bone. Most of the medicines available today are primarily aimed at treating osteoporosis in the postmenopausal cis woman. Studies are presently underway investigating therapies for the younger patient with osteoporosis. Oral contraceptives have not been found to be effective in treating osteoporosis due to anorexia. Investigational studies are looking at insulin-like growth factor-1, testosterone, and a postmenopausal osteoporosis medication as possible therapeutic agents.

Increasing calcium intake to a minimum of 1200 mg per day, increasing vitamin D to 1000 IU per day and maintaining normal weight and exercise patterns to restore hormonal balance are thought to be helpful in preventing further bone loss.