

## Strength Training for Bone, Muscle, and Hormones

One of the hallmark features of aging is loss: loss of bone strength, muscle mass and strength and hormone production. Although the debate continues as to the cause of this loss, one thing is certain: the inclusion of regular strength training sessions will play an important role delaying and reducing age- or inactivity-associated loss experience.

### Bone Health

Weak bones, osteopenia (low bone mass that precedes osteoporosis), porous bone or brittle bones are all terms used to characterize the condition known as osteoporosis. It is important to understand that osteoporosis is not a disease in the clinical sense, but a condition. Osteoporosis typically begins with an unnoticed decrease in bone mass that leads to structural deterioration of bone tissue and an increased susceptibility to fractures of the hip, spine and wrist. In fact, any bone can become susceptible to change in strength, particularly with age.

Until the age of about 30 to 35 years, our bones are in a constant state of building. Bone strength, however, can be affected by such things as heredity, diet, sex hormones, physical activity, lifestyle choices, and the use of certain medications. Osteoporotic symptoms occur earlier and last longer in women (40-65 years) than men (from 65 years). Osteoporosis is less common in men than in women for several reasons. Men have larger skeletons, their bone loss starts later in life and progresses more slowly, and they do not experience the rapid bone loss that affects women when their estrogen production drops as a result of menopause. Despite these differences, men can be at high risk for this condition.

Osteoporosis is prevalent in America. Eight million women and two million men experience osteoporosis. Eighteen million others are at risk with low bone mass, and 1.5 million fractures occur annually because of osteoporosis. The cost of osteoporosis to Americans is increasing; according to the National Osteoporosis Foundation of America, more than 38 million dollars are spent daily on osteoporotic and associated fractures.

### Muscle Health

Sarcopenia, a loss of skeletal muscle mass, declining strength and muscle atrophy are terms that describe a decrease in muscle size and functional strength. The changes in muscle size and ultimately strength levels are related to the loss of muscle fibers and shrinking of remaining fibers. Under normal conditions human muscle strength in women and men reaches its peak between the ages of 20-30 years, after which it remains virtually unchanged for another 20 years, if there is no disease or injury. After this point muscular performance deteriorates at a rate of about five per cent per decade, amounting to a 30 to 40 per cent loss of functional strength over the adult life span. Variations in the rate of loss reflect the diversity of occupations, physical activity backgrounds, the muscles used, and type of muscle contractions.

The upside for graceful aging is the ability of elderly individuals to respond to exercise with large gains in strength, mobility and physical fitness. Exercise studies have repeatedly demonstrated the capacity of older muscle to adapt to specifically designed training programs, resulting in gains in both strength and muscle size regardless of age or gender. Because the independent performance of many daily living activities is strength-dependent, the maintenance of muscle size and functional strength should play an important role in the training regime for older adults.

