Osteoporosis: Exercise and safe movement

Yvonne Zarowny, BScPT

Physical activity can help individuals achieve peak bone mass and mediate the rate of bone loss that occurs with aging.[1] Bone is continually remodeling with a cycle of resorption and new formation. Physical activity or exercise places a mechanical strain on the bone, stimulating the formation of more bone. Bone density, posture, muscle strength, flexibility, cardiovascular fitness and balance all improve with exercise. There is reduced risk of falling and fracture with an active lifestyle, which helps people live independently and maintain a better quality of life.[2-5]

Weight-bearing and muscle-strengthening are the 2 types of exercise that help build stronger bones.[1,6] Any activity during which our feet and legs support and carry our body weight is considered weight-bearing and is the best type of exercise to maintain bone mass.[6] High-impact exercises, including running, jumping, skipping rope and hiking, have the greatest effect on bone growth[1] and are most effective for prevention of osteoporosis. These should be avoided, however, if there is an osteoporosis diagnosis, fracture risk or balance issues.[1] In these cases, a low-impact activity such as brisk walking would be a better alternative.[2] Weight-bearing exercise should be done for a total of 30 minutes daily, in 1 or more sessions. Non-weight-bearing activities such as swimming, aqua-aerobics and cycling are beneficial for cardiovascular fitness, but have little effect on bone health.[7]

Strengthening exercises place internal stress on the bone where the muscle attaches and have a localized effect on bone health in the area where the muscle is being strengthened.[4,7] The exercises should target the major muscles in the upper and lower extremities and trunk, as well as the wrist, hip and spine, as these are the areas of the greatest incidence of fracture.[6] Free weights, elastic bands, body weight or exercise machines can be used to create resistance. Strengthening exercises should be done 3 to 4 times a week with 2 to 3 sets of 8 to 10 repetitions of each exercise, with sufficient resistance to tire the muscle after 10 repetitions.[2,5,6]

Bones become stronger when they are forced to respond to activity that differs from what they experience on a regular basis.[6,9] Variety may be incorporated into both the weight-bearing and

strengthening routines. The optimal time frame for changing an exercise program has not been determined; however, if the exercise requires minimal effort, a change is needed in the intensity or the resistance used.

Balance and posture exercises are also important. Balance exercises challenge our stability in the standing position, strengthen our legs and reduce the risk of falling. Posture exercises help to strengthen trunk muscles, reduce the rounding of the spine and help overcome the effects of gravity on the spine.[7]

It is critical for patients with osteoporosis to avoid putting the spine in a forward bent or "C" shaped position that occurs with sit-ups, toe touches, some yoga and Pilates positions, donning or doffing shoes and socks, and many household activities.[2] This position creates excessive compression on the vertebral body and could lead to a compression fracture.[3,4,7,10]

Education in effective exercise and safe movement is important in the management of osteoporosis to reduce the risk of injury for the patient. Consultation with a licensed physical therapist can address specific issues. ■

Yvonne Zarowny is a physical therapist at the Grey Nuns Community Hospital, Department of Rehabilitation Medicine, Edmonton, AB. Contact yvonne.zarowny@covenanthealth.ca.

References

1. Guadalupe-Grau A, Fuentes T, Guerra B, et al. Exercise and bone mass in adults. *Sports Med* 2009;39(6):439-68.

2. Bonner FJ Jr,Sinaki M, Grabois M, et al. Health professional's guide to rehabilitation of the patient with osteoporosis. *Osteoporos Int* 2003;14(Suppl 2):S1-S22.

3. Sinaki M. Critical appraisal of physical rehabilitation measures after osteoporotic vertebral fracture. *Osteoporos Int* 2003;14:773-9.

4. Magee DJ, Zachazewski JE, Quillen WS. *Pathology and intervention in musculoskeletal rehabilitation*. St. Louis (MO): Saunders Elsevier; 2009.

5. Kaplan RJ, Vo AN, Stitik TP, et al. Rehabilitation of orthopedic and rheumatologic disorders. 1. Assessment, treatment, and rehabilitation. *Arch Phys Med Rehabil* 2005;86(Suppl 1):S40-S47.

6. Zehnacker CH, Bemis-Dougherty A. Effect of weighted exercises on bone mineral density in post menopausal women: a systematic review. *J Geriatric Phys Ther* 2007;30(2):79-88.

7. Sinaki M, Pfeifer M, Preisinger E, et al. The role of exercise in the treatment of osteoporosis. *Curr Osteoporos Rep* 2010;8(3):138-44.

8. Pfeifer M, Sinaki M, Geusens P, et al. Musculoskeletal rehabilitation in osteoporosis: a review. *J Bone Miner Res* 2004;19:1208-14.

9. International Osteoporosis Foundation. Invest in your bones — move it or lose it. Available: www.iofbonehealth.org/download/osteofound/filemanager/publications/pdf/move_it_or_lose_it_en.pdf (accessed March 11, 2011).

10. Meeks S. *Walk tall! An exercise program for the prevention and treatment of osteoporosis*. Gainesville (FL): Triad; 1999.