

## Bone Mass Reduction and Spinal Rehab

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In 2006, the first "Baby Boomers" (the generation born after 1945 and before 1965) will turn 60 years old.<sup>1</sup> As the aging U.S. population becomes less physically active, more of our patients will be affected by osteoporosis and its complications. We have a duty to identify those patients who are at risk of fractures, and to recommend options that will decrease that risk. For example, we can design exercise programs to prevent the spinal complications of osteoporosis, such as kyphosis, vertebral wedging, and compression fractures.

### Spinal Osteoporosis

Initially, there is a reduction in bone mass (osteopenia), which is considered a universal phenomenon of aging. Spinal X-rays often reveal osteopenia and osteoporosis. By the time changes are visible on X-ray, however, substantial bone loss already has occurred.

When the condition progresses to osteoporosis, bone strength is compromised, and fractures can develop with little or no trauma. The most common fractures due to osteoporosis are vertebral fractures, and yet less than a third of all vertebral fractures are diagnosed clinically.<sup>2</sup> These skeletal changes can have a significant impact on the extremities, postural stability, and the body's ability to handle subluxation complexes.

### Exercise Benefits for Bones and Posture

Physical activity and exercise have been shown to provide significant protection from osteoporosis<sup>3</sup> and fractures.<sup>4</sup> As detailed by the principle known as Wolff's Law, bone density and strength are functions of the magnitude and direction of the mechanical stresses that act on bone.<sup>5</sup> Assuming the availability of necessary nutrients, stimulus to the osteoblasts results in a net gain in bone mass.

Exercise is a form of repetitive loading that facilitates osteoblastic activity, thereby helping to maintain a positive balance between bone formation and bone resorption.<sup>6</sup> Even a moderate amount of exercise recommended for general wellness (a minimum of 30 minutes on most days) is helpful in preventing osteoporosis.<sup>7</sup>

Specific rehabilitative exercises should be recommended to relieve the postural strain on the spine and to prevent further wedging and compression fractures. Back-strengthening exercise constitutes a powerful intervention for reducing pain and increasing functional capacity.

All exercises may be more effective when done in an upright, weight-bearing position, due to the skeletal gravity effect. The stabilizing muscles, the co-contractors, and the antagonist muscles all learn to coordinate with the major movers during movements that are performed during closed-chain

exercising. This makes these types of exercises very valuable for the elderly - not just for increasing bone density, but also for preventing stumbles and falls.

Be advised: Some commonly used back exercises can cause more fractures. For patients with spinal osteoporosis, the most harmful activity places an anterior load on the vertebral bodies. Patient education must stress the dangers of lifting in flexion, and of performing flexion exercises. One exercise study<sup>8</sup> found an increase in new vertebral deformities when postmenopausal women performed flexion exercises (such as forward stretches and abdominal curls), while those who performed only spinal extension exercises had a major reduction in the number of vertebral compressions.

### Exercise Types

**Aerobic/endurance.** Walking and swimming are two of the most commonly recommended forms of exercise for the elderly. While improved aerobic capacity generally is beneficial for most older patients, we mustn't expect any skeletal improvement. Bone mineral density can be increased by walking, but only when it is done above the anaerobic threshold.<sup>9</sup> It is unlikely that most older women, especially sedentary women, will be willing to walk at this intensity. As for swimming, there is no significant difference in bone mass between women participating in a regular swimming program and women who don't swim.<sup>10</sup> This also is true of a standard weight-bearing, water-based exercise program (aquacise).<sup>11</sup>

**Impact/weight-bearing.** In order to create sufficient stimulus to increase bone density, exercise needs to be weight-bearing and have some impact. This can be as simple as step-training (10 minutes stepping up and down from an 8-inch-high step).<sup>3</sup> Use caution when recommending impact exercise to elderly patients.

**Resistance/strength.** High-intensity resistance training has been found to be safe and quite effective in increasing strength and function in the elderly.<sup>12</sup> Weight training in a submaximal controlled, supervised situation also can preserve<sup>13</sup> and even increase<sup>14</sup> bone deposition. Strength training recommendations should be an integral part of chiropractic treatment for older and osteoporotic patients. Exercise tubing is an excellent tool for strength training of the elderly, since the risks of injury are minimized, and a spotter or expensive equipment is not needed.

### References

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