The purpose of this research is to emphasize the bone benefits of exercise for elderly. The effect of physical activity on bones is measured by the increase or decrease of bone mass density (BMD). The improvement of bone mass is related with load intensity that includes strain magnitude and strain rate (1). The decrease of bone mineral content is direct related with the absence of load or lack of activity (2,3,4,11). Diet deficiency and menopause can also bring this mineral content to lower levels. (2,12)

The most used technique to measure the BMD is by dual energy x-ray absorptiometry (DXA).

In the past, exercise generally has been considered inappropriate for old individuals because of low expectations of benefit as well as exaggerated fears of exercise related injury. Then as the value of physical activities for helping treating a wide range of conditions became known this concept has been changed. Moderate to high intensity weight-bearing activities (plyometrics, gymnastics and high intensity resistance training) are the modalities that most effect bone mass. During childhood and adulthood these kinds of activities can be part of everyone’s routine and help to increase and/or maintain BMD. However with aging most of them must be avoided in order to decrease the impact and to partially eliminate the risk of fractures. (6,7,8,9,10)

For elderly the focus of exercise programs are the improvement of functional capacity, independence, balance, and decrease the risk of fractures. The best way to reach all these benefits is by maximizing the gain of BMD during the first three decades of life and minimizing the decline in BMD after the age of 40.

For women this process is even more complicated because after menopause mineral content loss is accelerated. Both aerobic power and muscle strength decline by as much as 10% to 20% with age. In terms of functional capacity, fitness level can reduce biological age by 10 – 20 years.

Exercise can be the key to maintain quality of life as well as extend the number of years of life expectancy.
BIOMECHANICS

The investigators tried to describe the mechanisms with which bones respond to different loads in different sites. Modeling, remodeling, resorption, and deformation are some of the ways that bone respond to different intensities of stress during exercise. These reactions depend on strain magnitude, rate, distribution, and cycles in the target bones. Mechanically bone adaptation can be regarded as part of a homeostatic mechanism that regulates the functional capacity. Different forces (compressive, tensile, bending, torsion, shear) will act against the skeleton that may or may not cause increase in the bone mass density. Despite this research regards to the response to physical activities for elderly, some articles tested people from different ages to measure the BMD response to exercise as well as assess the life-long effects of physical activity programs adherence. (5)

<table>
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<th>N</th>
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<td>63+/- 1</td>
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Exercise prescription for elderly does not have to differ much from younger individuals. With aging the odds of cardiovascular, metabolic diseases, and osteoporosis increase and precautions must be taken before start any exercise program. (12,13,11)

Weight-bearing activities should be emphasized. For those with to low functional capacity arrangements must be done. Exercise groups will decrease the rate of quitting. Recreation activities can be used but rules must be modified in order to avoid high levels of competition. Flexibility, stretching, and range of motion should use all available devices to help the participants (Swiss ball, rubber bands). Resistance training must focus more in the number of repetitions and use low resistance. (Kalistenics, free weights) Type of activity should vary as much as possible. Exercises must match the client’s preferences and simulate daily living activities.

(1) Effects of exercise involving predominantly either joint-reaction or ground reaction forces on bone mineral density in older women. Wendy M. J Bone and M R v12, n8, 1997.


