

Osteoporosis and Physical Activity

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Osteoporosis is the most common type of bone disease. In the USA, approximately 1.5 million fractures annually are attributable to osteoporosis [1]. It is a silent progressive disease that is characterized by a decrease in bone mass and density, can result in painful fractures [2]. Osteoporosis is defined as a bone mineral density (BMD) 2.5 SD (standard deviation) or more below the average value for premenopausal women (T score <-2.5 SD) [3]. Risk factors for osteoporosis include getting older, being female, being small and thin, low body weight, having a family history of osteoporosis, having osteopenia, low sex hormones or menopause, smoking, and some medications (oral corticosteroids and others). Osteopenia (Low bone mass) have hip BMD between 1 and 2.5 SD below the young adult reference mean (T-score less than -1 but above -2.5) [2,3].

Osteoporosis ("silent" disease - bone loss occurs without symptoms) is associated with a number of lifestyle factors. These factors can be splitted in two groups. The nutritional factors (intake of calcium, protein, dairy food, fruits and vegetables and vitamin D) and behavioural factors such as physical activity, smoking and alcohol consumption. Studies have shown that smoking and excessive alcohol intake increase risks osteoporosis [4]. Bone mineral density testing measures the bone mineral density. Treatment should be considered in individuals subsequently shown to have a high fracture risk. Prevention and treatment include calcium and vitamin D, lifestyle changes (exercise and diet), and osteoporosis medications (bisphosphonates, estrogen and estrogen receptor modulators, teriparatide, calcitonin, denosumab) [5].

Osteoporosis is associated normally with the elderly population [6], but Janz et al. [7] showed a positive effect of physical activity on bone strength and suggests benefits of childhood physical activity to the prevention of osteoporosis. Strophe et al. [8] showed that physical activity during growth increases bone mass and strength with benefits persistent, the authors concluded physical activity associated bone loading both during and after skeletal growth improve adult bone mass. Children and teens should get at least an hour of physical activity every day and adults should get at least 30 minutes of moderate physical activity every day.

Physical activity or exercise for preventing osteoporotic fractures is indicated. Baert et al. [9] researched the specific motivators for and barriers to physical activity (PA) in older adults with osteoporosis. The results showed to give a broad interpretation of what they considered as PA (practicing sports, physical work, and performing household activities), whereas the professionals seemed to mainly focus on therapeutic exercise as PA. This study emphasized physical activity education should involve not only the osteoporosis older but also their relatives and friends.

Disuse osteoporosis are often identified as decreased bone mass, it is a common in patients subjected to prolonged immobility and bed-rest [2,10]. Hakestad [11] et al. described rehabilitation program combining the use of weight vests and patient education in patients with low bone mineral density. Forty-two postmenopausal women with osteopenia attended the exercises program for 6 months. The rehabilitation program brought positive improvements in lower extremity function and femoral trochanter. Giangregorio et al. [12] emphasizes the importance about guidance on spine sparing techniques and fracture risk orientations for guide health care providers on assessment, exercise prescription, and safe movement for individuals with osteoporosis.

There is concern in the dose-bearing exercise in women with established osteoporosis because of pre-existing microfractures and discontinuity between bone beams, especially in the axial skeleton, preventing the worsening of these, the increased burden from physical activity [2,11]. The combination of different types of exercise have been proposed to provide not only elderly stimuli to increase bone mass, as well as the stimulus for increased functional capability, mainly by stimulating the balance, coordination, and gait, as increased functional capability can reduce the incidence of falls, and hence the incidence of fractures. The combination of strength training, balance the jump, and to prevent the functional declines in older women, gave positive effects on the tibia of the structure indicating that this combination of exercises can also play a preventive role in bone fragility. The exercises have been shown to be an effective method for preventing falls in elderly people, especially when the strength and balance training are combined [12].

There is also evidence that aerobic exercise, Load-lifting and resistance have positive effects on bone mineral density in the spine, gait and hip BMD of postmenopausal elderly. Madureira et al. [13] observed that a balance training program favored significantly improving quality of life, overall health and balance performance with reduced risks of falling. A combined program with resistance training, aerobic, balance and coordination run twice per week are beneficial for improving bone mass, muscle strength and ability to walk [14]. A systematic review showed that reducing the risk of falls in the elderly after a domiciliary program of muscle strengthening, combined with a re-education of balance. Smulders et al. [16] affirm that a fall prevention program for people with osteoporosis was effective in reducing the number of falls by improving balance and confidence. Therefore, these programs are valuable tools to improve mobility and independence of people with osteoporosis, preventing possible complications such as fractures [17,18].

In June 2015, the National Osteoporosis Foundation with the American Society for Nutrition concluded that there is strong evidence for the benefits of physical activity and calcium intake, moderately evidence for the benefits of vitamin D [19]. In conclusion, aerobics exercises, weightlifting and resistance exercises are all effective in increasing the BMD.

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