a look at the effects of exercise on osteoporosis

As trained professionals are aware, regular moderate physical activity has many health benefits, including cardio-vascular, flexibility, strength and endurance, prevention of obesity and the prevention and treatment of depression and anxiety. However the effect of exercise on bone mineral density needs much more positive promotion. This is another area where public health interventions, including public funding for both sports facilities and activities will have real long-term benefit.

Regular exercise in childhood and adolescence makes peak bone density more easily achievable. Some studies have demonstrated a 40–60% reduction in hip fracture risk with increasing levels of physical activity. Promotion of sport in school is therefore imperative in long-term prevention.

Over and above the development of osteoporosis itself, primary fracture prevention in people with diagnosed osteoporosis / osteopaenia is feasible by removing some of the causes of falls or by reducing the impact of falls with hip protection. Fall prevention programmes aim also to improve strength, balance, co-ordination, mobility and flexibility. T’ai Chi has been the most frequently studied exercise. Effective programmes have been employed with persons of different ages and with varied physical abilities. There is clearly a role for T’ai Chi, Pilates and Yoga in falls prevention strategies both for the mainstream group activity and specialised one to one instructor of people with functional limitations.

Decisions regarding frequency, duration and intensity of exercise should of course be individual, based on current level of fitness, history of physical activity and history of injury. Women, particularly those with lower fitness levels, should begin participating in exercise at a lower level of frequency, duration, and intensity and progress slowly. Women who are sedentary and start a new exercise programme or activity might need to begin with intervals of activity as short as 5-10 minutes of light-intensity activity and gradually increase to the desired intensity and duration. Clients with osteoporosis and osteopaenia should be especially aware of and responsive to increasing muscle soreness, bone and joint pain and excessive fatigue as early
signs of potential injury. However, carefully structured exercises in women with established osteoporosis improve well-being, muscle strength, balance, and posture and may therefore decrease the risk of fracture.

**aerobic exercise**

Although aerobic exercise can increase women's bone density, it need not be high impact. Walking for about 30 minutes a day, three times a week is a good basis. In a review of 24 studies, it was found that regular exercisers gained an average of two percent more bone mass than non-exercisers. This review included studies of women 18 years and older, the majority being sedentary. In each study, some women were assigned to a 16-week aerobic exercise programme. Women who walked gained 0.4% bone mineral density in the lumbar vertebrae, whilst this measurement decreased by nearly two percent in the non-exercisers. Exercisers also had femoral increases of 1.4%, while non-exercisers recorded a loss of about 0.6%. Exercise benefits were similar pre- and post-menopausally.

Since weights also help bone density, the ideal exercise plan will also include weight training. Additionally, because exercise improves balance and co-ordination, it could also reduce the incidence of falls.

High-impact exercise stimulates bone mass most effectively. However, improvements have been demonstrated with walking, dancing, jogging, stair-climbing, racquet sports and hiking. One Greek study examined the effect six months of high-intensity exercise had on bone mass of the tibia in 56 postmenopausal women. Subjects were divided between one group that undertook 60 minutes of aerobics, bench, rope jumping and resistance training three times per week over a six-month period and the control group who took no exercise. Results in the exercisers showed improvements in total bone mass and lean muscle. Subjects were also tested for psychological well-being and functional fitness, and again showed significant improvements in the exercisers.

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**targeting**

Specific areas in the body can be targeted for improvement. Studies have illustrated in x-rays of arms of tennis players, that the bones in the playing arm are bigger and denser than the bones in the other arm. Elite female athlete runners have been shown to have significantly higher bone mineral densities in their lower limbs than rowers.

In a study of Chinese men and women over 60 years of age, data was collected on past and current physical activities, and the length of time spent on recreational activities. Results indicated that time spent on exercise was associated with increased bone mass. The most significant effect on bone health included running, T'ai Chi and flexibility work.

Resistance exercises are also effective in improving bone health. With free weights and machines, muscular strength can be used to improve muscle mass, posture, and balance and strengthen bone.

**making a difference**

If decreasing osteoporosis and fracture risk in the population can be achieved by increasing physical activity, smoking cessation, increasing dietary calcium, minimising the risks of falls and improving strength and balance then we as fitness professionals could have a very clear role in promoting bone health, improving the quality of life and saving lives.

Firstly, we are in a prime position to help young people understand the relationship between nutrition, physical activity, smoking, lifestyle and bone loss. In spite of evidence about the relationship between bone health and low body mass index, it is still fashionable in the West and sadly still largely promoted in the mass media. ‘Fat’ is still used as a derogatory term to describe women who have a healthy BMI of 19-25. We are in the privileged position of rolemodelling for younger people through the promotion of healthy BMI.

Secondly, the promotion of optimum bone health and muscle balance can become core to our exercise sessions and reinforce earlier health messages. Thirdly, by promoting balance and body awareness throughout life we may positively protect older people from the added risks of fracture through fall prevention.

There is a set of UK Government Recommendations which many of us already use as a basis for delivering health promoting messages, but for those of us who do not, there’s a challenge to try to incorporate each one of these whenever an appropriate opportunity arises.

- Adopt a healthy lifestyle to maintain bone health
- Stop smoking altogether
- Avoid excessive alcohol
- Get an adequate calcium and Vitamin D intake
- Exercise regularly
- Maintain a healthy body weight

**guidelines for healthy bones**
References
Abdy, S Osteoporosis Fact File. Professional Nurse 2001;17 155-156

Other Resources
National Osteoporosis Society (NOS), Camerton, Bath, BA2 0PJ.
Tel 01761-471771, www.nos.org.uk.
National Osteoporosis Foundation. www.nof.org/osteoporosis/bonehealth
Contact Details
Email: Barbara@contraceptioneducation.co.uk