

OSTEOPOROSIS AND EXERCISE

PUBLIC

Osteoporosis is a condition of low bone mass that leads to an increased risk of fracture. The spine, wrist, hip, humerus and ribs are the most common fracture sites but any bone can be affected. Of Australians over 50, 66% have low or very low bone mass; 42% of women and 27% of men will fracture after the age of 50.

WHAT CAUSES OSTEOPOROSIS?

Heredity and ageing are the primary causes of osteoporosis. Gradual bone loss begins around early middle age. The rate of loss accelerates for women at menopause. Inactivity, inadequate calcium and vitamin D, smoking, alcohol and chronic corticosteroid use increase the risk of osteoporosis. Falling is the greatest risk for fracture.

HOW DOES EXERCISE INFLUENCE BONE?

When a person becomes active or increases their level of activity, the bones modify their shape and/or size in order to withstand the new loads. Once a bone has adapted to an activity however, it ceases to change, therefore increasing exercise intensity and/or changing activities is necessary to continue to stimulate positive bone adaption.



WHAT EXERCISE IS BEST FOR OSTEOPOROSIS?

WEIGHT-BEARING EXERCISE: The maximisation of bone mass throughout life requires engagement in a wide variety of weight-bearing activities that will impart high impact forces on the bones. Examples include running (emphasising speed rather than duration), jumping and hopping (all directions), skipping, and sports that include those fundamental activities such as volleyball, basketball, netball, ballet, tennis, squash, racquetball, football, and field hockey.

RESISTANCE TRAINING: High intensity resistance training (80-85% 1RM) is required to stimulate notable bone adaptation through muscle loading. Even people with markedly low bone mass who are highly deconditioned or frail ("high risk") can strive for high intensity resistance training but should only do so with full supervision from an accredited exercise physiologist/physiotherapist. (As a percentage of an individual's maximum capacity, 85% 1RM is self-limiting.) The timeline of progression should be very slow with a focus on mobility and technique. Deep forward flexion, particularly loaded, should be avoided.

BALANCE TRAINING: Balance exercises will improve lower extremity neuromuscular function and thus prevent falls.



KEY CONSIDERATIONS WHEN EXERCISING

- The key to effective exercise for osteoporosis is supervision by trained experts
- Use it or lose it - gains in bone, muscle and balance from exercise will be lost if the exercise is stopped
- High intensity resistance training should not be attempted with uncontrolled cardiovascular disease
- Activities that involve twisting (golf) or abrupt unusual movements (squash) may cause fractures in a frail skeleton
- Pain beyond general muscle soreness after exercise should be investigated by a medical professional

EXERCISE RECOMMENDATIONS FOR OSTEOPOROTIC WOMEN AND MEN

Engage in a variety of exercises designed to maximise weight-bearing loading, muscle strength and balance.

IMPACT AND RESISTANCE TRAINING: (MUST BE SUPERVISED BY A QUALIFIED EXERCISE PROFESSIONAL)

Aim for 2 times per week, 30 mins per day

- High intensity (80-85% 1RM) weight-bearing resistance training (esp. back and leg exercises)
- Graduated impact activities such as heel drops and foot stamps leading to jumps

BALANCE TRAINING:

Aim for 4 times per week, 30 mins per day

- Tai chi, line dancing, ballroom dancing
- Challenging balance activities such as heel-to-toe walking on foam mats with arms above the head, stepping sideways over objects and walking backwards, walking on tip toe, and multi-tasking standing on one leg



REFERENCES AND FURTHER INFORMATION

Exercise is Medicine Australia

www.exerciseismedicine.com.au

Exercise Right www.exerciseright.com.au

Find an AEP www.essa.org.au

Find a Physio www.choose.physio

1. Beck BR, Daly RM, Fiatarone-Singh MA, Taaffe DR: Exercise and Sports Science Australia (ESSA) position statement

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2. Watson SL, Weeks BK, Weis L, Horan SA, and Beck BR: High-Intensity Resistance and Impact Training Improves Bone Mineral Density and Physical Function in Postmenopausal Women With Osteopenia and Osteoporosis: The LIFTMOR Randomized Controlled Trial. *J Bone Miner Res*, 2018 Feb;33(2):211-220.
3. Sherrington, C., et al., Effective exercise for the prevention of falls: a systematic review and meta-analysis. *J Am Geriatr Soc*, 2008. 56(12): p. 234-43.