

Osteoporosis and exercise

What is osteoporosis?

Osteoporosis is a condition where bone tissue has been lost and weakened so the bones are more likely to fracture. The spine, hip and wrist are the most common fracture sites but any bone can be affected. Osteoporosis will affect around two in every three women and one in six men over the age of 60.

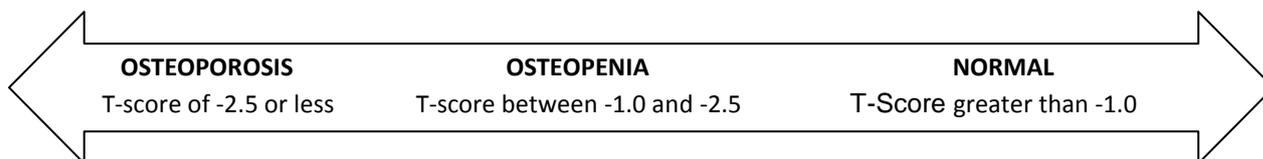
What causes osteoporosis?

Heredity and a tendency to lose bone as we age are the primary causes of osteoporosis. Gradual bone loss begins around 30-40 years of age. The rate of loss accelerates for women at the time of menopause as oestrogen is somewhat protective of bone up to that time. Immobilisation, and certain medical conditions or their treatments (e.g. corticosteroids) increase bone loss. Lifestyle behaviours such as inactivity and inadequate dietary calcium and vitamin D also increase the risk of osteoporosis. Loss of muscle strength and balance with age and disuse increase the risk of falling. Many osteoporotic fractures, including over 90% of hip fractures, occur as a direct result of a fall.

How is osteoporosis diagnosed?

Osteoporosis often remains undetected until a person suffers a fracture. The standard accepted method to diagnosis osteoporosis is dual-energy x-ray absorptiometry (DXA), a very low-dose x-ray examination. Scans are usually performed at the hip and spine and provide a T-Score which indicates how an individual's bone mass compares to the average bone mass of others of the same race and sex at age 20. The T-score is then used to describe a person as having 'normal', 'osteopenic' or 'osteoporotic' bone. A diagnosis of **osteopenia** indicates a patient has lower than average bone mass that could progress to osteoporosis with age if steps are not taken to reduce further bone loss. It is important to note that many individuals fracture when only osteopenic.

BONE MASS CLASSIFICATIONS by DXA T-Score



How does exercise help?

- In children and inactive adults with low bone mass, adding regular exercise improves bone
- In normally active adults, exercise helps to prevent typical age-related loss of bone
- Exercise can improve the shape and quality of bones in ways that make them stronger
- Exercise increases muscle strength and improves balance, which reduce the risk of falling

How does exercise influence bone?

When the skeleton is exposed to loads that are greater than normal (as when a person becomes active or increases their level of activity) the loaded bones deform slightly more than usual. The slight bending acts as a signal to bone to modify its shape and/or size so that this additional bending is minimised during future loading and the bone is protected from injury. Once a bone has adapted to an activity it ceases to change. Varying the types of loading (doing different activities) is therefore necessary to ensure that exercise continues to stimulate positive bone adaptation. Exercise will enhance bone development in childhood. A healthy adult skeleton tends to respond to exercise by reducing age-related loss rather than by growing substantial amounts of new bone.



What exercise is best for osteoporosis?

Weight bearing exercise People with normal or slightly low bone mass who wish to prevent osteoporosis should engage in a wide variety of high impact activities throughout life. A person with very low bone mass however is at increased risk of low trauma fracture and so should perform lower impact exercises such as Tai Chi, line dancing, stair climbing, and low-moderate impact aerobics. While unlikely to directly enhance bone, those exercises will improve lower extremity muscle function and balance with a goal to prevent fractures by reducing falls. Activities that involve notable twisting (golf) or abrupt movements (squash) may cause fractures in a frail skeleton. Time spent sitting and lying down during the day should be minimised.

Resistance training High weight (80% 1RM) resistance training will benefit the bones of individuals with normal bone mass but are not recommended for those with osteoporosis. For the latter group, moderate weight resistance training (such as can be lifted around 10 times before tiring) should be adopted to enhance muscle function. Overhead lifts and loaded deep forward bending (sit ups, toe touching, rowing) are not recommended with osteoporosis, however exercises to strengthen the back muscles are beneficial. Correct technique should be emphasised. Upright cycling at high loads will benefit the lower extremities but deep forward bending to hold very low handlebars is not recommended.

Caveats

- Any new exercise program should be initiated carefully and progress gradually
- Gains in bone from exercise in adulthood will be lost if the exercise is stopped
- High impact activities may not be practical for individuals with painful joints but gradual introduction is likely to be beneficial
- If pain over and above general muscle soreness is experienced after exercise, a physician or physiotherapist should be consulted

NON- OSTEOPOROTIC WOMEN AND MEN	OSTEOPOROTIC WOMEN AND MEN
<p>Aim for 4 times per week 30 minutes per day, preferably in 2 x 15 minute sessions.</p> <p>Engage in a variety of moderate to high intensity exercises designed to overload the skeleton such as:</p> <ul style="list-style-type: none"> • Running (not marathon) • Jumping (all directions) • Hopping (all directions) • Skipping • High impact aerobics • High weight (80% 1RM), low repetition resistance exercise • Volleyball, basketball, netball, ballet, tennis, squash, racquetball, football, field hockey 	<p>Aim for 4–5 times per week 40 mins per day.</p> <p>Engage in a variety of lower intensity exercises designed to optimise balance, muscle strength and endurance to prevent falls:</p> <ul style="list-style-type: none"> • Moderate weight resistance exercise; <i>including</i> back muscle strengthening; <i>excluding</i> loaded deep forward flexion exercises • Low-moderate impact aerobics • Stair climbing and descending • Line dancing (if not at high risk of falling) • Tai chi • Balance activities including; standing on one leg, heel-to-toe walking along a line, stepping sideways over objects, walking on tip toe

References and further information

Exercise is Medicine Australia www.exerciseismedicine.org.au

Find an Accredited Exercise Physiologist www.essa.org.au

Exercise Right www.exerciseright.com.au

Osteoporosis Australia www.osteoporosis.org.au

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