Exercise program gives older people the power to prevent osteoporosis

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A new exercise program trialled by Deakin University's Centre for Physical Activity and Nutrition Research in collaboration with the University of Melbourne could be the answer to reducing the risk of osteoporosis and fractures in people over 60 years.

Exercise is widely regarded as an effective way of improving bone and muscle health and reducing the risk of osteoporosis and fractures. However, not all forms of exercise are as effective as others, which prompted the Deakin researchers to trial a program that targets both bones and muscles on a range of levels.

Given that up to 60 per cent of older people who fracture a bone don't have osteoporosis, it is important that programs are developed which optimise multiple risk factors for fracture such as muscle strength, power and function as well as bone density," said Deakin's professor of exercise and ageing Robin Daly.

"There are a number of exercise programs run for older people that can improve muscle health, bone density or balance and mobility, but most don't result in improvements in all these fall and fracture related risk factors simultaneously. We developed and trialled a new multi-component program which focused on weight-bearing exercise and a new form of resistance training designed to optimise muscle power."

Muscle power refers to the body's ability to produce fast and forceful movements and is critical to optimising balance, mobility and reaction

time, all of which are important to reduce the risk of falls and fractures, research fellow Dr Jenny Gianoudis explained.

"Such rapid and forceful movements also place high loads on bones which may help to improve their strength. To develop muscle power you need to perform high speed movement exercises (also called power training) that are not normally seen in programs developed for older people.

"Optimising muscle power is important because many common daily tasks, such as the ability to get up from a chair, climb stairs and walk quickly are strongly related to muscle power. Even the ability to recover from a trip or a loss of balance has been shown to be strongly related to the ability to step rapidly or reach quickly for an object for support; factors associated with movement speed and thus power," Dr Gianoudis said.

The Osteo-cise: Strong Bones for Life program was run over 12 months and involved 162 men and women aged 60 years and over, half took part in the program, the other half only received information about osteoporosis. Both groups also received vitamin D and calcium supplements. After 12 months the researchers found that those taking part in the Osteo-cise program had significantly greater improvements in their bone density, muscle power, strength and balance.

Yarraville's Susan Boyce, a participant in the study, said that the program was a life-changing experience.

"I had never been to the gym before signing up for the Osteo-cise program and am so glad that I did. I could never have predicted that going to the gym would become a part of my lifestyle. When the program finished I didn't want to lose what I had gained, so I still go to the gym three times a week, and my husband (who didn't take part in the

program) has also joined me," Mrs Boyce said.

"I am now less tired and have more energy as well as more strength in my arms and legs. After a year I had also lost weight and could see from scans that the deterioration in my bone density had levelled off which is a great result.

"The whole Osteo-cise program was well run and suited the needs of older people who had never exercised before. The information sessions, along with the exercise program, were very helpful. It has made a huge difference to my life. I never believed that at 72 I would be jogging two kilometres and going to the gym three times a week, but I am so glad that I am."

Following the promising results, the researchers would like to see the Osteo-cise program rolled out more widely as an evidence-based community program for people at risk for osteoporosis and fractures.

"We believe that the package we have put together with Osteo-cise represents a promising community-based model to improve bone and muscle health and function in older adults at risk of osteoporosis, falls and fractures," Dr Gianoudis said.

The study has been accepted for publication in the *Journal of Bone and Mineral Research*.

This study evaluated the effectiveness of a multi-modal exercise program, Osteo-cise: Strong Bones for Life, that incorporated power training with an osteoporosis education and behavioural change program on improving the bone density, body composition, muscle strength and functional muscle performance of older adults.

It involved a 60 minute exercise program targeted at osteoporosis and

falls prevention; strategies to encourage participants to see exercise as a lifelong proposition and a series of community-based osteoporosis education seminars to educate participants on how they could actively take charge of their bone health. A control group was provided with information about osteoporosis. Both groups also received vitamin D and calcium supplements.

The exercise component was run through seven health and fitness centres in Melbourne. The exercises included lifting weights at high speed (power training), particularly focusing on the muscles around the hips, performing a diverse range of moderate impact weight-bearing activities (eg. step ups or mini jumps) and a number of high challenge balance exercises (e.g. using fit balls or standing on one leg).

More information: onlinelibrary.wiley.com/journal/10.1002/%28ISSN%291523-4681

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