

Heavy resistance training around retirement preserves vital leg strength years later, shows study

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Twelve months of heavy resistance training—exercise that makes muscles work against force—around the time of retirement preserves

vital leg strength years later, show the follow-up results of a clinical trial, published online in the open access journal *BMJ Open Sport & Exercise Medicine*.

Depletion of leg muscle strength is regarded as a strong predictor of death in older people, so it is important to maintain, say the researchers. Skeletal muscle mass and function naturally decline with advancing age, ultimately often interfering with mobility and autonomy in [older people](#), they note.

Resistance training, which can involve weights, body weight, or resistance bands, can help to counteract this loss, but most of the published research has involved relatively short periods of time (6-9 months) to monitor its effects.

The researchers therefore wanted to know whether a year of supervised [resistance training](#) with heavy loads would make any difference over the longer term. They followed up participants of the Live active Successful Ageing (LISA) study, a large randomized controlled trial, the results of which showed that strength can be maintained over 12 months after 1 year of heavy resistance training.

At the time, participants who had recently retired and were healthy and active were stratified by sex, weight (BMI), and the ability to get up from a chair without assistance.

They were randomly assigned either to 1 year of lifting heavy weights 3 times a week (149), or to moderate intensity training (154), involving circuits that incorporated body weight exercises and resistance bands 3 times a week, or to a comparison group (148), all of whom were encouraged to maintain their usual levels of physical activity.

Bone and [muscle strength](#) and levels of body fat were measured in all the

participants at the start of the trial, and then again after 1, 2, and 4 years.

After 4 years, 369 participants were available for assessment: 128/149 of those who had done the heavy weights resistance training; 126/154 of those completing moderate intensity training; and 115/148 of those in the comparison group. Eighty two people had dropped out, primarily due to lack of motivation or illness.

On average, participants were aged 71 (range 64–75) at year 4; 61% were women; and they were still active based on their daily physical activity, which averaged nearly 10,000 steps, as recorded by activity trackers.

After 4 years, there was no difference among the three groups in leg extensor power—the ability to kick a pedal as hard and as fast as possible—handgrip strength (a measure of overall strength), and lean leg mass (weight minus body fat), with decreases in all 3 indicators across the board.

Leg strength, however, was still preserved at the same level in the heavy weights resistance training group, but fell in the moderate intensity training and comparison groups, possibly because of nervous system changes in response to resistance training, suggest the researchers. And this difference was statistically significant.

As to visceral fat—the fat that is stored internally around the organs—levels of this remained the same in the heavy weights resistance training and moderate intensity exercise groups, but increased in the comparison group.

This implies that some parameters may not depend on weight load or exercise intensity in the long term, suggest the researchers.

They acknowledge that the study participants were healthier and more active than average despite having at least one long-term condition in 80% of cases, so aren't necessarily representative of the population as a whole.

But, they conclude, "This study provides evidence that resistance training with heavy loads at retirement age can have long-term effects over several years. The results, therefore, provide means for practitioners and policymakers to encourage older individuals to engage in heavy resistance training."

More information: Heavy resistance training at retirement age induces 4-year lasting beneficial effects in muscle strength: a long-term follow-up of an RCT, *BMJ Open Sport & Exercise Medicine* (2024). [DOI: 10.1136/bmjsem-2024-001899](https://doi.org/10.1136/bmjsem-2024-001899)

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