



# The Research File

Information for professionals from the Canadian Fitness and Lifestyle Research Institute

## Strength Training for Older Adults

Many of the problems with activities of daily living seen in older adults could be alleviated by improving strength. As people age, they lose muscle mass and strength. As a result, many older individuals have impaired mobility, an increased risk of falls and hip fractures, and trouble accomplishing everyday tasks independently.

Older people can maximize their quality of life by keeping fit and mobile through physical activity. Research suggests that even very old individuals can increase their strength in response to resistance training.

Strength research distinguishes between strength training and endurance training:

- **Strength training** is the progressive overloading of the neuromuscular system using high resistance to increase **muscular strength**, or the ability to perform a maximal contraction. Typical strength training involves performing sets of 10 RM (repetition maximum). In RM jargon, 1 RM represents the maximum weight an individual can lift just once *and not more than once*; 10 RM represents the weight an individual can lift exactly 10 times.
- **Endurance training** involves the use of a lower intensity than strength training. Lower weights and more repetitions are

used to improve **muscular endurance**—the ability to perform a number of contractions or to hold a single contraction.

### Improvements in Strength and Endurance

Most investigators report increases in strength after resistance training in older subjects. Studies involving low-intensity training in older adults report strength increases under 20%. In comparison, high-intensity training results in increases of up to 227% in the ability to perform 1 RM. In general, 12 weeks of high-intensity resistance training are sufficient to produce a large increase in strength. A return to a sedentary lifestyle leads to rapid and significant declines in strength, however.

In addition to increasing strength, high-intensity resistance training in older adults improves endurance. In one study, subjects increased their ability to lift their initial maximal weight from 1 repetition to 7–19 repetitions. Functionally, this could mean improved ability in activities that require muscular endurance (such as carrying a heavy object) rather than muscular strength (such as lifting objects whose weight is at the limit of one's ability).

### More Benefits

Another study of 72- to 98-year-old nursing home residents assessed the potential of strength training to bring about functional changes. High-intensity strength training resulted in an increase in muscle strength and size, as well as increases in walking speed

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and stair-climbing ability. The percentage increase in functional changes was estimated at 8% to 51%.

Other potential benefits of strength training for older adults include improving gastrointestinal transit time, glucose tolerance, cardiovascular response to high-intensity lifting, and clinical measures of functional mobility and flexibility, and decreasing joint stiffness. These results are considered tentative until more conclusive research has been done.

### From Research to Practice

The ultimate objective of strength training for most older adults is to have an improvement in the performance of daily physical activities and in health. It is encouraging that even very old nursing home residents with multiple chronic conditions have been able to safely and successfully complete strength training programs.

An excellent opportunity exists for the health and recreation community to act as a major source of information and promotion of physical activity for this rapidly growing segment of the population. The results of high-resistance strength training clearly indicate that we should never accept aging as an unalterable process of decline and loss.

### For More Info...

Porter, M.M. & Vandervoort, A.A. (1995). High-intensity strength training for the older adult—A review. *Topics in Geriatric Rehabilitation, 10*(3), 61–74.

## Tips for Strength Training

Practitioners can help older adults to improve muscular strength and muscle mass by following a few pointers:

- Screen participants. Exclude or limit participation in a strength training program for individuals who show unstable cardiovascular disease, other unstable chronic conditions such as uncontrolled diabetes, a recent bone or joint injury, cognitive impairment, and any condition that prevents strong muscular contractions.
- Suggest more than one set of eight repetitions at 70% to 80% of 1 RM per training session. Some older individuals may take several weeks to reach this target.
- Rely on 8 RM sets for monitoring both intensity and strength improvement. Doing a proper weight-lifting exercise is a learned motor skill, so the results from 1 RM testing might not be a good measure of strength, especially at the beginning of training.
- Allow at least 48 hours between sessions for a particular muscle group so that adaptation can occur.

