

## **Summary of Resistance Training Research**

It's common for adults to lose strength and muscle function with advanced age. This loss has significant impacts on health factors among older adults including; functional limitations, premature disabilities, increased risk for falls, and increased risk factors for age-related diseases.

Research has shown that resistance training (RT) prevents these losses, improves functional ability, and reduces risk factors for age-related diseases and disability.

Hurley & Roth (2000) published an extensive scientific review of studies examining the effects of RT on health status of older adults. These studies indicate that RT:

- produces substantial increases in the strength, mass, power and the quality of skeletal muscle
- helps older adults regain approximately two decades worth of age-associated losses in strength and muscle mass within the first couple of months of heavy resistance training
- can increase endurance performance
- normalizes blood pressure in those with high normal values
- reduces insulin resistance
- decreases both total and intra-abdominal fat
- increases resting metabolic rate in older men
- prevents the loss of bone mineral density with age
- reduces risk factors for falls
- may reduce pain and improve function in those with osteoarthritis in the knee region

More recent research continues to support these findings and the American Heart Association, American College of Sports Medicine, and the American Diabetes Association have all endorsed RT as an integral part of exercise programs to promote health and prevent disease.

In 2006, Braith and Stewart published an extensive scientific review of RT's role in preventing cardiovascular disease. They conclude that RT:

- improves insulin action
- reduces blood pressure
- reduces body fat
- helps prevent and manage musculoskeletal injuries and disorders, osteoporosis, and loss of skeletal muscle mass and strength associated with aging. (sarcopenia)
- reduces risk for falls and prevents or delays loss of physical function in frail and elderly persons
- reduces cardio vascular disease when moderate intensity RT is combined with exercises that increase heart rate for improved endurance (cardiovascular exercise)

## **Research on Strength versus Power**

Strength is the amount of force generated when you perform an action. Power has the element of force (strength) but also involves velocity – the speed at which the force can be generated. Functional ability is very closely tied to an older adults ability to live independently, so recent research is focusing on the role of power (strength x speed) in maintaining and improving functional ability.

A simple way to think about the role of power in function is to sit in a chair. Now rise from the chair very slowly to a count of 8. Sit back down. Now rise more quickly – like you normally would. Which is easier? Rising slowly requires strength. Rising more quickly requires power (i.e. strength x speed). Most functional tasks require power – going from sitting to standing, climbing stairs, walking. The speed component also helps you “catch yourself” to prevent a fall.

Here's a small sample of recent research into the role of power and functional abilities of older adults:

1) Miszko TA., et. al (2003)

Found that power training was more effective than strength training for improving physical function in community-dwelling older adults.

2) Henwood & Taaffe (2005)

Found that power training may be safely undertaken in healthy older adults and results in significant gains in muscle strength, muscle power, and physical performance. Such improvements can prolong functional independence and improve the quality of life.

3) Hruda KV, et.al (2003)

Found that progressive exercise training, even for persons aged 90+, increases muscle power and is associated with an improved performance of functional activities using the trained muscles.

4) Fielding RA, et. al (2002)

Found that for older women, high velocity resistance training improved strength and was more effective in improving peak power than was traditional low velocity training. They also found that Improvements in lower extremity peak power may have a better effect on improving or reducing age associated decline in physical functioning than other exercise interventions.

5) Foldvari BS, et. al (2000 )

Found that for older women, muscle power and physical activity levels were the strongest predictors of functional dependence. RT impacts both of these factors.

6) Orr R, et. al. (2006)

Found that for older adults with low muscle power and slow muscle contraction, power training improves balance, particularly using a low weight, high velocity regimen.

Power is closely associated with functional ability, especially for frail older adults. However, power training requires speed, an element some resistance training equipment simply cannot offer.

To learn more [click here](#)

### **Finding more research**

The following is a list of some journals that regularly publish articles on exercise and aging. Go to their websites to search for articles that are disease specific, focused on preventing falls or improving functional ability. You can also find articles on the overall impact of resistance training on health outcomes. Once you find a relevant article look through its reference list to find more articles on the topic.

- Journal of Physical Activity and Aging
- Journal of Gerontology
- Journal of American Geriatrics Society
- The Journals of Gerontology: Series A -Biological Sciences and Medical Sciences
- Canadian Journal of Applied Physiology
- Canadian Journal of Applied Sport Sciences
- Medical Science, Sports & Exercise
- Applied Physiology, Nutrition and Metabolism

The PubMed website at [www.pubmed.gov](http://www.pubmed.gov) is an excellent database. <http://tiny.cc/lsHdP> will take you to an article on resistance training and functional ability. Notice how PubMed lists other articles related to the topic.

Position papers and scientific reviews are excellent sources of information. They examine and compare numerous research studies and offer a summary of specific findings about how resistance training impacts health.

For pdf versions of two excellent scientific reviews [click here - Hurley/Roth 2000](#) or [click here - Braith/Stewart 2006](#)

For a brief overview of findings from both scientific reviews [click here](#)