

Tai Chi for Strength and Endurance

Study Finds Increased Muscle Gains in Elderly Subjects

Tai chi chuan (*tai chi*) is one of the most popular forms of exercise in China (and arguably the world). Originally practiced as a form of martial arts, *tai chi* consists of breathing exercises performed in conjunction with a series of body postures. These movements, practiced in a slow, sequential pattern, are designed to improve balance and alignment and enhance agility and coordination. People who practice *tai chi* often report attaining feelings of inner peace and a heightened self-awareness.

Although the advantages of *tai chi* have been known for hundreds of years, only recently have its effects on the human body been studied scientifically. One such study was performed earlier this year by a group of scientists at the National Taiwan University Hospital in Taipei, the results of which were published in a recent issue of the *Archives of Physical Medicine and Rehabilitation*.¹ The researchers found that *tai chi* "may be beneficial to elderly individuals for muscular strength and endurance enhancement," and that it is safer, more cost-effective and easier to perform than other forms of exercise.

A research team led by Dr. Ching Lan evaluated the effects of *tai chi* on a group of 32 volunteers (15 men, 17 women) between the ages of 53-64. Subjects participated in a voluntary six-month *tai chi* program, which took place every morning in a park near the university.

Each session consisted of a 20-minute warmup period, 24 minutes of Yang *tai chi* training, and 10 minutes of cooldown exercises. Each set of *tai chi* included 108 postures, with some repeated body movements. During the exercise, subjects were led by a *tai chi* instructor and performed the same movements and postures at the same speed as the instructor.

Before the start of the program, the strength and endurance of each patient's knee extensor muscles were tested at various degrees, with patients undergoing several sets of extension-type exercises on their dominant and non-dominant legs. A dynamometer was used to measure changes in the muscle during both the concentric and eccentric phases of contraction.

Results and Conclusions

Both men and women appeared to show "significant" increases in muscle strength after participating in the *tai chi* program. In the male group, concentric knee extensor strength increased between 16.4-20.0% in the dominant leg and 15.1-19.7% in the non-dominant leg. Eccentric extensor strength increased between 15.1-23.7% in the dominant leg and 19.1-22.6% in the non-dominant leg.

Similar changes in strength were seen in the female group. Concentric knee extensor strength increased 13.5-19.3% in the dominant leg and 17.7-21.8% in the non-dominant leg; eccentric strength increased 18.6-23.7% in the dominant leg and 18.3-20.0% in the non-dominant leg.

While men and women experienced significant gains in extensor strength, increased extensor endurance levels were also reported for both groups. In men, endurance increased 9.6-18.8%; in the women, endurance increased 10.4-14.7%.

The researchers noted many advantages that *tai chi* may have over other conventional exercise routines. Unlike most physical activities, *tai chi* requires no specialized equipment and can be performed in a variety of locations, making it both practical and cost-effective.

"Low-technology exercises deserve more attention because they can be more easily implemented in the community," they said. "TCC is a low-technology approach to conditioning that can be implemented in the community with very low cost."

They also noted *tai chi* "seemed safe" compared to other exercises, particularly among elderly populations. For instance, while a small number of patients dropped out of the study because of lack of interest or health problems, none of the patients were forced to stop exercising because of injury. And while the different motions and postures can place considerable demand on the knee extensor muscles, most of the movements in *tai chi* are performed in a closed kinematic chain, which may prevent excess stress from being placed on the knee joints.

Some study limitations were also noted. As is the case with many pilot studies, no control group was used, weakening the scientists' overall findings. Lan's team also suggested that more than one test might be necessary to determine the strength of the subjects' extensor muscles because of a traditionally low reliability in test results among elderly patients.

Despite the limitations, it appears that *tai chi* does provide a benefit to its subjects, and that more studies are warranted to determine its effects not just among the elderly, but in a wide range of patients. As the researchers stated in their conclusion:

"TCC has the potential to reduce expenditures associated with poor health by facilitating a lifestyle that promotes wellness among people of all ages. From the perspective of exercise prescription, TCC is a promising alternative for strength training because of its efficacy and safety · Further controlled study is needed to validate this evidence."

Reference

1. Lan C, et al. Tai Chi Chuan to improve muscular strength and endurance in elderly individuals: a pilot study. *Arch Phys Med Rehabil* May 2000;81:604-607.