

# Is Exercise Beneficial for the Individual with ALS?

Spring 2006

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Most patients with ALS want to do as much as possible to help themselves, particularly in view of the limited efficacy of current treatments for ALS. One of the most common questions I am asked by patients with ALS and their families is whether physical therapy or exercise will be helpful. As with so many other topics related to ALS, the answer is less clear than we would like, resulting in some uncertainty as to whether exercise should be recommended in ALS, and if so, how vigorous it should be. A brief examination of some of the data and studies to date may help shed some light on the topic.

Why should anyone even question the value of exercise in ALS? The concerns arise from studies that have investigated whether a history of athletic activities or other vigorous physical activities in one's lifetime produces an increased risk of developing ALS. The evidence here is conflicting. Some studies have found that individuals who developed motor neuron diseases were more likely than others to have been thin, to have been varsity athletes in school, or to have performed heavy physical labor as part of their jobs. However, other studies have not found any association between participation in sports or heavy physical labor and the subsequent development of ALS. Certainly the benefits of physical activity are clear with respect to the heart, bones, and overall general health, and the risk that performing such activities will lead to ALS is not at all clear. Even if such activities increase the probability of ALS, the risk of developing ALS is still low. It's clear that we do not understand most of the factors that cause individuals to develop ALS, and there is simply no sense at this point in recommending to individuals that they avoid exercise to reduce their chance of developing ALS.

But what about the individual who already has ALS? Should he or she be encouraged to exercise? In an attempt to answer this question, one can look to studies done in patients with other neuromuscular disorders, which generally support the benefits of moderate exercise. For example, a study of 8 patients with facioscapulohumeral (FSH) muscular dystrophy revealed that low-intensity aerobic training produced improvements in maximal oxygen uptake and maximal workload with no signs of muscle damage, and also led to an improvement in performing activities of daily living. There is probably no benefit to exercising to the point of exhaustion, however, at least based on knowledge gained from other neuromuscular diseases. One study of 10 patients with slowly-progressive neuromuscular diseases (not ALS or other motor neuron diseases) monitored the effects of high-resistance exercise at a near-maximal effort, and found gains in some measures, losses in others. The authors concluded that a high-resistance exercise program may offer no advantages over moderate resistance training, and may have some negative effects.

Moving on to motor neuron diseases, animal studies have generally shown no harmful effects of

exercise in motor neuron disease. These have been conducted on mice who have been given a human gene that causes them to develop motor neuron disease (SOD1 transgenic mice). A lifetime of vigorous exercise in these mice did not lead to differences in disease onset, progression, or survival compared to less active mice.

There are a few studies in humans which have attempted to assess whether exercise is of benefit in ALS. In one study, a moderate exercise program for 15 minutes, twice daily, had short-term benefits in producing a slower rate of decline in measures of strength and spasticity, but did not improve muscle strength. Another study revealed some improvements in function and a slower clinical course in those who exercised regularly. Respiratory muscle training has been shown to produce some improvement in measurements of respiratory function over a 3 month period. Overall, it appears that moderate exercise can be beneficial in muscles that are not profoundly weak, but that extremely vigorous physical activity to the point of exhaustion should be avoided, particularly in very weak muscles. Currently, we believe that moderate exercise is a reasonable recommendation in ALS.

At our ALS center, we are attempting to clarify the value of exercise in ALS. A study will soon be starting under the direction of Dr. Kevin Scott to assess the effects of strength training in individuals with ALS. Persons interested in this study will be taught a series of exercises to perform regularly at home, and will have measurements of their strength, function, and quality of life performed at our center monthly over several months. In the future, we hope to undertake a study of aerobic exercise as well. We are hopeful that studies such as this will permit us to provide clearer answers to questions that so many of our patients ask about physical therapy and exercise.