



The Effects of Exercise on Fatigue and Stamina

By Matthew David Hansen, DPT, MPT, BSPTS

Science has documented the short- and long-term effects of exercise for both healthy and patient populations. But before beginning an exercise program, it must be tailored for each individual.

How many people living with an autoimmune disease or primary immunodeficiency have been told by family, friends or other acquaintances that they would feel stronger and more energetic if they could just exercise a little? Well, despite the possibility that exercise is the last thing that a patient feels like doing (or hearing), those well-wishers might actually be on to something.

The positive effects of long-term exercise on stamina (energy and strength that is enduring) are well-documented in a number of healthy and patient populations. What's more, several recent studies support the anecdotal observation that exercise has an immediate effect on energy levels as well. These findings are consistent, despite a number of potential physical and emotional causes that can be responsible for fatigue experienced by a patient, including infection, anemia and nutritional deficiencies, metabolic disorders, depression and/or anxiety, overstimulation of the adrenal glands caused by constant stress, medications and lack of sleep. Interestingly, studies seem to demonstrate a reduction in fatigue for those experiencing true (neuromuscular) weakness, where less force than normal is produced by a muscle, and for those experiencing perceived (non-muscular) weakness, where muscle strength is actually normal but a person feels that more effort is

required to exact a given amount of force. Consequently, results suggest multiple mechanisms for increased energy, including physical/physiological and psychological.

Regardless of the cause of fatigue, its symptoms, in addition to lack of energy, may include difficulty concentrating, irritability, poor rationalization, insomnia, apathy (lack of interest) and weakness, and they can be debilitating to the sufferer. Therefore, the right amount, intensity and type of exercise may be the action that "primes the pump" for a more energetic, productive and enjoyable life.

Long-Term Effects of Exercise

A University of Georgia (UGA) study affirms that sedentary people can decrease fatigue by up to 65 percent and improve energy levels by 20 percent by participating in regular low-intensity exercise. The study shows that fatigue and energy aren't necessarily exact opposites of each other. To illustrate this, think of the example of someone who feels fatigued during a long drive home from work at the end of the day, but also begins to feel energized as they get closer to home and the family, dinner or favorite television program that they know is waiting for them.

Investigators of the UGA study enlisted 36 volunteers who did not exercise regularly and had reported enduring

fatigue, yet did not meet the criteria for a medical condition (a sample that Patrick O'Connor, one of the study's co-authors, says represents approximately 25 percent of the general population). The subjects were placed into one of three groups: the first group exercised 20 minutes, three times a week for six weeks on an exercise bike at a moderate-intensity (comparable to a fast-paced walk with hills); the second group rode an exercise bike for 20 minutes over the same time period, but at a low-intensity (comparable

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to an easy walk); the third group (control group) did not perform any exercise. Both the low- and moderate-intensity exercise groups experienced a 20 percent increase in energy levels over the control group; however, somewhat surprisingly, the low-intensity group had a greater reduction in fatigue levels than the moderate-intensity group (65 percent compared to 49 percent, respectively). O'Connor declared: "It could be that moderate-intensity exercise is too much for people who are already fatigued, and that might contribute to them not getting as great an improvement as they would had they done the low-intensity exercise."

Although the right amount, intensity and type of exercise can increase energy and reduce fatigue, the fact is that overexertion is one of the greatest exacerbators of fatigue. In fact, intense and exhaustive exercise has been shown to suppress immune agents and increase the incidence of upper-respiratory tract infections (URTIs). Finding the balance point is the key. A recently released abstract of a scientific review, ahead of print, by researchers at Federal University of Sao Paulo, Brazil, proclaims: "Moderate exercise has been associated with significant disease protection and is a complementary treatment of many chronic diseases. . . The effects of chronic (i.e., long-term) exercise occur because physical training can induce several physiological, biochemical and psychological adaptations."

These modifications can include T cell proliferation, cytokine production and antibody response to vaccination; however, the primary mechanism of exercise that causes these changes still needs to be understood.

Short-Term Effects of Exercise

Our society is constantly searching for the next brand of "energy drink," soda, coffee or other artificial "pick-me-up" that will help us get through the day. Those who rely on these products daily may or may not acknowledge their addictive qualities and tendency to induce tolerance (more and more is needed to elicit the same effect). However, a number of studies have supported a potentially even more concerning symptom of persistent caffeine use for the immune-deficient population: inhibition of the immune system. For example, caffeine at levels that are relevant to normal human consumption has been reported to impair lymphocyte and antibody production and proliferation. Contrastingly, science has shown that moderate exercise can promote clear increases in the levels of energy-promoting and mood-enhancing neurotransmitters in the brains of animals that are placed in regular exercise conditions — without the negative effects on the immune system.

For instance, researchers at UGA reviewed and analyzed 70 randomized, controlled trials in a study on exercise and fatigue that involved 6,807 subjects. "More than 90 percent of the studies showed the same things: Sedentary people who completed a regular exercise program reported improved fatigue compared to groups that did not exercise." The effect of exercise on reducing fatigue was stronger than that of even stimulant medications used for the treatment of attention deficit hyperactivity disorder and narcolepsy, and benefited nearly every subgroup studied, including cancer patients and those with chronic conditions.

Another review, performed by Australian researchers, looked at 36 studies published between 1987 and 2006 that evaluated the effects of exercise and other non-drug techniques on fatigue in more than 1,700 patients with an autoimmune disease (multiple sclerosis, rheumatoid arthritis or systemic lupus erythematosus). The exercise programs that made up the studies began patients at a low-intensity level and, if they did not cause symptoms to worsen, were progressed to 15- to 30-minute sessions at least three times a week for up to 12 weeks. The authors of the paper reported that "aerobic exercise was effective, appropriate and feasible for reducing fatigue among adults with chronic autoimmune conditions." The exercises that helped decrease fatigue in the studies included low-impact

aerobics, brisk walking, cycling and jogging. Swimming and other exercises may also help, but there weren't enough studies in the sample that used these activities to demonstrate a statistically significant difference.

Professional literature is rich in evidence that supports the use of a graded light-to-moderate exercise program to reduce fatigue associated with a number of conditions, from chronic fatigue syndrome to post-bone marrow or stem cell transplantation. Nevertheless, the detrimental effects of a sedentary lifestyle (not exercising) are even better understood and documented. These effects include muscle wastage; loss of bone density; and increased risk of obesity, cardiovascular disease, diabetes and other complications. Inactivity also can lead to feelings of uselessness and dependence, and an otherwise poor self-image.

Recommendations

Perhaps family and friends are right about a little more exercise being able to improve a patient's energy levels. However, only the patient, along with the appropriate healthcare professionals, can determine what that exercise should be. It is the family's and friends' responsibility to be nonjudgmental and supportive. Any exercise program must be tailored for the individual and must consider issues that affect that person and the management of their diagnosis (e.g., joint pain, reduced mobility, dizziness, exacerbations). Nevertheless, the following recommendations can be applied to most situations:

- Experiment to discover the type of exercise that is right for you. It's important to find activities that you enjoy. It goes without saying that if you like what you are doing, you increase your chances of doing it.
- Remember that your tolerance for exercise may differ from day to day. Do what you can, and if you absolutely don't feel that you are able to be very active on a given day, don't be. Feelings of extreme fatigue are common around the time of an infusion and/or exacerbation of symptoms; rest up and plan on continuing your program the next day, even if you have to adapt it to how you are feeling.
- Get enough rest at night (usually recommended to be at least seven hours of uninterrupted sleep).
- Maintain a nutritionally balanced diet, and eat at regular intervals.
- Take time to regularly talk about your day, your hopes and your fears with a friend. Pent-up stress can lead to fatigue, anxiety and/or depression. Listening also can be very therapeutic and can help to put your own challenges in perspective.

- Keep an exercise journal of your activities that records how you felt immediately after and how you felt the next day. If a given amount, intensity or type of an exercise worsened your symptoms, try taking it back a notch the next time.

- Pace yourself, and stop exercising well before you feel exhaustion setting in.

- If you feel that an increase in activity or difficulty is in order, make small increases to only one component of your program at a time (e.g., frequency, duration, intensity). For example, if you walked 200 consecutive feet one day without any increase in your symptoms, try walking 225 feet the next day.

- Avoid excessive intake of alcohol and caffeine, and don't smoke.

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Although much remains to be discovered regarding the precise "hows and whys" of exercise's effect on fatigue and stamina, science has revealed what every individual human being rediscovers for themselves nearly every day: The body and the mind are intimately connected. The objective symptoms of the body and the subjective feelings of the mind can readily influence one another. Getting up and doing something active will likely have a holistic effect on someone's life, and if done properly, the outcome can be extremely positive. ■

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