



## Exercise: Use it and Lose it

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**Question:** I read that you don't recommend exercise for polio survivors who are getting weaker. But if I stop exercising and do nothing, won't I lose muscle tone, get flabby and become deconditioned and even weaker?

**Answer:** You're asking a good question but are using buzzwords that Americans hear on infomercials. It's vital that polio survivors understand what the research really says about exercise for newly weakened muscles and know the definitions of "muscle tone" and "deconditioned." We never tell polio survivors to "do nothing." Both The Post-Polio Institute and Warm Springs long-term follow-up studies find the same thing. All PPS symptoms, fatigue, pain and muscle weakness, decrease when polio survivors stop exercising and follow The Golden Rule:

If anything causes fatigue, weakness or pain, DON'T DO IT! (Or do much less of it.)

Unfortunately, those who recommend strengthening exercise to polio survivors quote from the conclusions of half a dozen small studies of leg muscle strengthening, apparently without having read them critically. The studies' conclusions say that exercise programs "lead to significant gains in strength." However, when you look at the responses of individual subjects the "significant gains in strength" are hard to find. Just over half of the studies' subjects had an increase in upper leg muscle strength of about 26%. One quarter had no change in strength while 21% actually had a decrease in strength of about 10%. So almost as often as not exercise either had no effect or actually decreased muscle strength.

What's more, only two studies asked whether exercise affected polio survivors' fatigue and their ability to function in their daily lives. In one study, strength increased by 36% but muscle fatigue also increased by 21%. In the other study, although muscle strength increased by 30%, there was no improvement in polio survivors' ability to do daily activities, and muscle fatigue increased as much as 300%! You have to ask what good comes from any small percentage increase in muscle strength that is not related to improved functional ability and that actually increases muscle fatigue more than strength.

And what of "muscle tone"? Most people think that muscle tone means muscles that are firm and have a nice shape. Muscle tone actually means that muscle fibers are ready to contract. Muscle tone is lost when motor neurons are damaged and can't turn on muscle fibers. Loss of tone can happen when polio survivors exercise too much and muscles become weaker when poliovirus-damaged motor neurons fail. Remember, PPS researcher Alan McComas found that polio survivors who have muscle weakness lose at least 7% of their motor neurons each year. This is why he concluded that "polio survivors should not engage in fatiguing exercise or activities that further stress metabolically damaged neurons that are already overworking."

Polio survivors' muscles get smaller lose tone if they're overused and the motor neurons that turn on the muscle fibers die. Arms and legs get flabby because of increased fat deposits, not a loss of muscle tone. Exercise does burn fat and at first causes muscles to increase in size. But polio survivors don't want bigger muscle fibers because they "further stress metabolically damaged neurons that are already overworking." The best way to prevent flabby arms and legs is to stop overusing and abusing your motor neurons and to follow the higher protein, low fat and lower carb Post-Polio Diet.

And what does "deconditioned" mean? Many polio survivors believe that there are only two ways to live: overusing and abusing or being a couch potato and becoming "deconditioned." Deconditioning is something that happens when astronauts live in space or you put someone to bed for weeks, removing the pull of gravity and causing a decrease in blood volume and blood pressure. Deconditioning can only happen if polio survivors never leave the couch, not if they take two daily rest breaks on the couch, take a ninety minute nap, stop strengthening exercising or use a power wheelchair.

However, polio survivors may need to "condition" their hearts, especially if they have had a heart attack. "Cardiopulmonary conditioning" uses exercise to strengthen the heart muscle (which was not affected by polio) and make it work more efficiently. However, there is no benefit to running on a treadmill or riding a bicycle to exercise the heart if you thereby stress and kill off poliovirus-damaged motor neurons. Some polio survivors can do heart conditioning by using their less affected limbs, usually their arms, in a carefully monitored program of paced and non-fatiguing exercise. But for many this type of exercise doesn't increase heart rate enough to get a conditioning effect and leads to fatigue and muscle weakness so it can't be continued for more than a few sessions.