

Frederick M. Maynard, MD

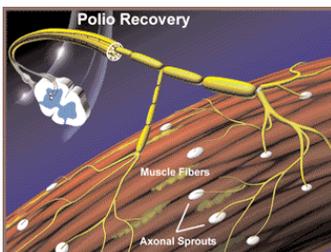
Welcome to *Ask Dr. Maynard*, a new feature of *Post-Polio Health*. Frederick M. Maynard, MD, a longtime member of PHI's Board of Directors, is a recently retired physiatrist, a specialist in physical medicine and rehabilitation. He dedicated a significant portion of his academic and clinical practice over the last 25 of his 40-year medical career to the unique problems of polio survivors.

If you have a question for Dr Maynard, please send it to info@post-polio.org, with "Ask Dr. Maynard" in the memo line. Select questions will be published in future issues, while others will be posted on www.post-polio.org.

Question: *I am aware that as polio survivors recovered from the initial bout with polio, we went through a process called denervation. Does this process of losing anterior horn cells (AHCs) and establishing new nerve pathways continue with post-polio syndrome?* GARY FREDERICKS

A: Denervation is actually not a process but a condition of muscle that has lost its connection to a motor nerve cell body (AHC). Death of an AHC results in a process of Wallerian degeneration of nerve axons (fibers), and results in atrophied denervated muscle fibers. Partially denervated muscles are weak, whereas completely denervated muscles are paralyzed.

When nerve fibers from AHCs that survived the poliovirus infection grow new sprouts, which reconnect to muscle fibers without a nerve supply, reinnervation is said to have occurred.



In most polio-weakened muscles there is a lifetime process of continuing new muscle fiber denervation and new re-innervation. In post-polio syndrome, the rate of denervation exceeds the rate of reinnervation, and new weakening is experienced.

Both normal aging and any ill health can slow down the process of reinnervation, which results in more denervated weakened muscle fibers. Post-polio syndrome may also result from something triggering a sudden speeding up of denervation, including new dying of AHCs.

Question: *As my leg muscles become weaker, I notice that now I use my toes more than my whole foot when I walk. A polio friend of mine has made the same observation about his method of walking. Is this coincidence or is there a connection between weak leg muscles and using toes more to walk?*

GARY FREDERICKS

A: The anterior tibialis muscle is the primary contracting muscle that normally picks up the foot at the ankle joint to help your toes clear the floor as you pick up your leg. To compensate for weakness in the anterior tibialis muscle, adjacent muscles (toe extensors) that act to move the toes upward also contribute to picking up the foot when they contract and shorten because their tendons go across the ankle. In fact, you are not walking more on your toes, but with the over-activity, the toe extensor muscles and the big toe in particular, are in an abnormal "cocked-up" position during the swing phase of walking. ▲

