Postpolio Syndrome and Rehabilitation

Polio is an acute viral infection of the central nervous system. In acute paralytic poliomyelitis, destruction of motor neurons results in muscle weakness and atrophy. It is estimated that 2% of all infected individuals developed acute paralytic poliomyelitis and that there are 1.6 million survivors of paralytic poliomyelitis. In a significant number of these individuals, new difficulties develop later in life that result either directly or indirectly from the original motor neuron loss. These new symptoms are referred to as postpolio syndrome (PPS). The most common symptoms in PPS include fatigue, weakness, atrophy, and joint or muscle pain. It is postulated that dysfunction of neuromuscular junction transmission and the degeneration of terminal axonal sprouts of enlarged motor units over time contribute to the fatigue and weakness seen in PPS. In many cases, residual neurologic loss and years of repetitive trauma result in joint instability and pain, as seen in the accompanying patient photographs (Figs. 1 and 2). This individual’s left knee hyperextension has allowed him to stabilize his limb and ambulate for years, but over time, it may become the source of pain and worsening function. Individuals with lower limb weakness will adjust their posture and compensate gait mechanics to maintain their standing balance and ambulatory status, such as the flexed posture and wide-based stance seen in this patient. Over time, asymmetrical limb weakness and muscle overuse result in muscle pain.

Approximately 20–40% of individuals with acute paralytic poliomyelitis will experience PPS, with symptoms beginning, on average, 35 yrs after the acute illness. Individuals with more severe neurologic deficits during their acute paralytic poliomyelitis will typically experience symptoms earlier. Criteria for the diagnosis of PPS include a previous episode of acute paralytic poliomyelitis; a period of neurologic recovery followed by a period of neurologic and functional stability; the onset of new neurologic weakness, which may or may not be accompanied by other problems such as fatigue, muscle or joint pain, atrophy, or decreased function; and the exclusion of medical orthopedic and neurologic conditions that could result in new symptoms. The use of electrodiagnostic studies, the period of neurologic and functional stability required, and recently, whether paralytic polio is required, have all been debated as criteria for the diagnosis of PPS. Treatment is symptomatic in nature and includes the spectrum of services offered through rehabilitation. Bracing of unstable joints, adaptive equipment, and functional training can improve symptoms and functional status. The role of exercise in patients with PPS has been approached cautiously because of reported cases of increasing weakness due to overuse. Nonfatiguing isotonic strengthening programs have resulted in strength gains in individuals with PPS. Likewise, significant gains have been made in PPS patients after aerobic exercise. However, the long-term effects of exercise on these patients are not known, and muscular overuse should be avoided in all postpolio patients. Consequently, exercise should be used judiciously in this patient population and possibly avoided in some, depending on degree of weakness, fatigue, and functional goals.

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REFERENCES


Figure 1: The degree of knee hyperextension and postural adjustments required to maintain mobility easily appreciated.

Figure 2: Knee hyperextension, ankle bracing, and assistive devices afford this acute paralytic poliomyelitis survivor continued mobility.