

What Having Had Polio Causes, Might Cause and Does Not Cause

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Introduction: As time has elapsed since the major poliomyelitis epidemics ended, following the widespread introduction of the polio vaccines, persons affected by polio, their families and their health-care providers seem to have less and less clear understanding about what symptoms are caused by polio, which are associated with polio and which are not. Many healthcare providers in practice today have had little experience or training in the care of polio survivors, and they studied the basic pathology that the poliovirus causes years ago.

Organizations, such as Post-Polio Health International, which exist to provide information to polio survivors, are frequently asked questions about various symptoms and the relationship to the acute polio. Post-polio groups and expert professionals have indicated that many individuals have been given incorrect or confusing information.

Attributing symptoms or changes in functioning to one's previous polio when the symptom is, in fact, due to a disease or condition that should be treated by an entirely different medical regime than polio/post-polio is not only not helpful but may be dangerous. Polio clinics can help with symptoms that are polio related and can help a person sort out what is and is not related to polio. The primary care physician can treat the non-polio related symptoms, and can also manage polio-related symptoms with guidance from knowledgeable post-polio professionals.

The intent of this article is to provide basic information about what the poliovirus does to the human body and to provide a general framework to guide patients, families and health-care providers as they encounter new

symptoms and try to understand them. Often a symptom can be caused by many different mechanisms and sometimes even by a combination of factors.

This article is *not* meant to be all-inclusive and list every possible cause/disease but to discuss the most common and most frequent conditions. As polio survivors age, especially as they approach the second half of their lives, other medical issues can emerge that may make it difficult to determine *exactly* what is causing what. Polio survivors should inform their healthcare providers about their prior history of polio because it can directly or indirectly affect their current medical condition.

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What does the poliovirus do (pathology)?

The diseases that were called “infantile paralysis,” acute poliomyelitis or acute polio encephalomyelitis, or simply “polio” were all caused by one of the three polioviruses (type 1, type 2 and type 3). The exact virus causing a person’s disease can now be identified in the laboratory but each of the viruses can cause a similar pattern of disease when they infect an individual. As used here, poliovirus or virus refers to one or more of the three polioviruses.

The virus causes a “flu-like” illness with nausea/vomiting/diarrhea, a fever and perhaps a headache and muscle aches, and, in a small percentage of individuals, varying degrees of paralysis. The majority of persons infected with the virus had only the flu-like illness, did not develop any paralysis and were thereafter immune to that virus.

Less than 5 percent of all individuals that were infected with the virus developed paralysis of muscles ranging from a few muscles to nearly all the muscles of their body; some people died as a result of the infection. The virus circulates in the cerebrospinal fluid all around the brain and up and down the spinal cord. In the spinal cord, the virus attacked the anterior horn cells (the nerve cells that go out to the muscle and tell the muscle what to do) but did not affect the nerves that go back to the spinal cord with messages about touch, pain, temperature sensation or position sense (where the body part is in space, i.e., “is

my foot on the floor or in midair? Or is my foot on a flat surface or a slanted surface?”)

The poliovirus primarily affected nerves leading to voluntary muscles. Those are muscles that you can control with thought, such as, “I think I’ll point with my right index finger.” This may include the muscles involved in taking a deep breath, in swallowing, of the face, of the trunk and abdomen and the limbs. There is lack of consensus among medical professionals about how much the poliovirus affected non-voluntary muscles such as those in the bladder or gastrointestinal tract. The poliovirus did not seem to cause permanent damage to the heart (cardiac) muscle.

What symptoms/signs are likely related to polio (primary effects)?

■ **Atrophy (muscle wasting).** The “skinny arm” or “skinny leg” is a result of the muscle or part of the muscle not getting the message from the nerve that it should contract or move. Related to this is the possible shortening of the limb. In a growing child, bone grows as a result of the muscle pull on it and/or weight bearing. Therefore, many who contracted polio as a growing child may have one arm or leg or foot that is shorter and smaller than the non-affected/less affected limb.

■ **New weakness.** In the more than 40 percent of polio survivors who develop post-polio syndrome, increasing muscle weakness in muscles previously affected or

new weakness in muscles that were thought not to have been affected is one of the defining features of the condition.

■ **Loss/absence of reflexes at a joint.** For example, when the healthcare provider hits your knee with the reflex hammer and it does not “kick” out. But rarely, a polio survivor may have an exaggerated response or hyperactive reflex.

■ **Muscle fatigue/decreased endurance.** When a muscle does not have a full supply of “motor units” it may still be able to function for a limited number of repetitions but it “wears out” sooner. The person may be able to “sprint” but could not run a mile and certainly not a marathon.

■ **Muscular pain.** Polio survivors generally describe this as an “achy, burning or sore feeling.” It is thought to be due to overuse of the muscle(s) in the area. Individuals who had acute polio when they were old enough to remember the event say it feels similar to the muscle pain that occurred with the acute polio. Others describe it differently, but polio-related muscular pain is rarely sharp and stabbing.

■ **Biomechanical problems.** These are problems related to abnormal positions of a limb around a joint, e.g., one leg being shorter than the other or abnormal curvature(s) of the spine. This can cause mechanical low back pain, increase the likelihood of “wear and tear” arthritis in a joint or a

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chronic tendonitis/bursitis or even nerve compression problems.

■ **“Polio cold” leg or arm.** There are several theories about what causes it, but it is real! Generally the person doesn’t perceive the limb as feeling as cold as it feels when it is touched. It occurs when the environment is cold – such as in winter or in an air-conditioned room. Unless the person has other reasons such as poor arterial circulation from diabetic vascular disease or severe hardening of the arteries that causes poor blood flow in the arteries, “polio cold” leg or arm will not cause delayed healing of fractures or injuries. It is mostly an inconvenience to the individual and his/her bed partner.

■ **Some problems with breathing.** These include decreased ability to move enough air in and out to get ample oxygen into the lungs or to exhale enough carbon dioxide due to new respiratory muscle weakness or from residual muscle weakness from the initial polio. Medically this is called “restrictive lung disease.” Problems include “remembering” to take a breath or to take enough breaths per minute. This is broadly called sleep apnea (central apnea). Paralysis of some muscles of the throat can also cause intermittent blockage of the air passages in the throat, which may also be termed sleep apnea (obstructive).

■ **Certain problems with swallowing.** These can cause choking while swallowing, especially thin liquids such as water, and sometimes some of the swallowed material will go into the lungs instead of

down into the stomach causing a pneumonia known as aspiration pneumonia. Some people lose weight and have difficulty maintaining adequate nutrition because eating is so time consuming or difficult.

Note: Many people over age 50 have other problems unrelated to polio that can cause problems swallowing. Various tests can determine the exact cause of the dysphagia.

■ **Osteoporosis/osteopenia.** Weight bearing exercise is necessary for bone to become and remain strong. In persons who had paralytic polio the affected limb(s) may have bone that has less than the normal mineral (calcium) content. The terms osteoporosis and osteopenia refer to decreased amount of normal bone tissue; osteoporosis is more severe than osteopenia. These conditions can mean the bone is more “brittle” and may break more easily than normal bone. (Generalized osteoporosis/osteopenia can also occur in certain medical conditions and with increasing age and is usually not related to polio.)

What symptoms/signs may be related to polio (secondary effects)?

■ **Increased wear and tear on joints including osteoarthritis, tendonitis, tendon tears, bursitis.** When a person has a weak limb, the unaffected or lesser affected leg or arm does more work to compensate, and weakness from polio can lead to arthritis problems in the good limb as well. People who use their arms in place of their legs (crutch walkers, users of canes,

manual wheelchair users) put more stress on the joints of the upper extremities than someone who has normal use of their legs, and this can result in damage to cartilage, tendons and ligaments in the wrists, elbows and shoulders.

■ **Nerve compression.** Carpal tunnel syndrome can be caused/ aggravated by pressure on the heel of the hand and palm from crutches and canes or from propelling a manual wheelchair. Other nerves may also be compressed by abnormal positions of joints and of the vertebrae in the spine. Symptoms of nerve compression are usually a numbness or tingling, an “electric shock” sensation and sometimes progressive weakness in the area of the body supplied by the particular nerve that is being pinched.

■ **Increased respiratory problems** from increasing curvature of the spine resulting in less room for the lungs and internal organs.

■ **Fatigue from increased energy expenditure.** Walking with an abnormal gait, use of crutches and propelling a manual wheelchair all require more energy than unimpeded walking. For example, walking with a locked knee can use up 20 percent more energy than walking with an unlocked knee, and walking with two crutches can burn up to twice as much energy as a nondisabled person would use walking the same distance.

■ **Headaches.** These can be “muscle contraction” headaches that may be caused by chronic overuse of neck muscles, unusual use of



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▷ neck muscles when doing daily tasks or related to abnormal positions of the neck from muscle imbalance or scoliosis. Headaches, especially upon awakening, can be from inadequate ventilation (breathing) overnight that may be due to respiratory muscle weakness and/or sleep apnea that may or may not be connected to prior polio.

■ **Emotional issues.** These can include post traumatic stress disorder associated with hospitalizations and medical procedures and/or teasing by childhood peers or dysfunctional family interactions with the person who contracted polio.

What symptoms may be compounded by having had polio (tertiary effects)?

■ **High blood pressure and/or coronary heart disease** aggravated by weight gain and decreased exercise that were related to limitations imposed by polio.

■ **Weight gain** (including overweight and obesity) linked to decreased exercise/activity. Significant obesity, can, of itself, lead to obstructive sleep apnea and restrictive lung disease plus other problems including diabetes, osteoarthritis of hips and knees, etc.

■ **Diabetes**, in susceptible individuals, related to decreased activity and/or weight gain.

■ **Skin breakdown, or pressure sores**, from prolonged sitting without shifting position, from sleeping in one position due to

difficulty turning in bed or from poorly fitting supportive devices (corsets, braces).

■ **Situational depression** associated with decreased functioning and independence.

More important than establishing the relationship between a condition and prior polio is finding a treatment or solution for the medical problem. Post-polio experts agree that in most instances the management or treatment plan for the secondary and/or tertiary problems are the same as for people who did not have polio.

What symptoms/signs are NOT related to polio?

■ **Tremor of arm, leg or head** especially when that body part is at rest.

■ **Problems with “sense organs” – vision, hearing, taste, smell.**

■ **Seizures.**

■ **Allergies to medicines or to things in the environment.**

■ **Dizziness or vertigo (“the room spinning”).**

■ **Sharp, shooting pains or severe burning pain with numbness.**

Generally, polio does not cause numbness, but nerve compression can result from abnormal positions around a joint or from crutch/cane walking or propelling a manual wheelchair and cause these symptoms.

■ **Inability to know the position of a part of the body** or where it is in space (decreased proprioception).

■ **Food getting stuck in the lower esophagus** (in the midchest or lower).

■ **Abdominal pain or diarrhea.**

■ **Cancer of any kind.**

■ **Liver disease.**

■ **Kidney disease.**

■ **Most infectious diseases**, except perhaps pneumonia in a person with a weak cough or who has swallowing problems and is “aspirating” food into their lungs.

■ **Skin rashes**, but unrelieved pressure on areas of the skin can skin breakdown and redness.

■ **Diabetes**, but weight gain and decreased activity often worsen blood sugar control in persons with other risk factors for diabetes.

■ **Hardening of the arteries** (atherosclerosis) in the heart, legs, neck, brain, although lifestyle changes induced by polio may increase the likelihood of developing this when added to other risk factors. ▲