



## Bruno Bytes 2nd Quarter, 2023

From [Richard L. Bruno, HD, PhD](#)  
Director, International Centre for Polio Education

### Abnormal Feelings or Numbness in Arms and Hands

**Question:** I have many symptoms of PPS and use a wheelchair part time now. I am experiencing severe pins and needles in my left hand. Sometimes in my thumb and next 2 fingers. Sometimes only in my ring and pinkie fingers. Sometimes all 5 fingers. It is there all the time now, just slightly. But sometimes my entire hand is completely dead. It can last up to 4 hours. When this happens, “waking “ my hand up is extremely painful. My left elbow is really sore as well. Could this have anything to do with having had polio, part of PPS. I have an appointment with a neurologist soon, thought knowing one way or the other if PPS could be involved would help.

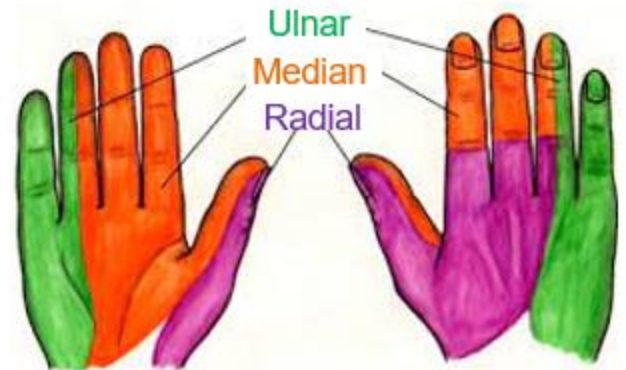
**Dr. Bruno’s Response:** Many, if not most, polio survivors who have had leg muscle weakness have compensated for years by stressing their arms and hands using canes or crutches, pushing a wheelchair or just compensating for leg weakness by using their arms to push themselves up and out of a chair. This kind of arm and hand overuse can cause damage to sensory (feeling) nerves in the neck, arms or wrists, producing numbness, a cold sensation and pins and needles. The best known type of damage causing hand symptoms is carpal tunnel syndrome, where tendons forming the tunnel pinch the nerves as they travel across the wrist.

Abnormal feelings in your thumb and next two fingers are common with pinching the median nerve (in pink above).

Abnormal feelings in your ring and pinkie fingers can result from

pinching the ulnar nerve (in green above) as it crosses the elbow through the tendons forming the cubital tunnel, called cubital tunnel syndrome. If your entire hand feels “completely dead” and your left elbow is sore, there also could be pinching of the median nerve across your elbow.

It may be time to talk to your rehabilitative physician or neurologist about having a nerve conduction velocity study, which uses electrical pulses to see if the nerves are being pinched.



### Muscles “Shaking”

**Question:** My left hand and forearm shake at random times. Yesterday, I walked on a rocky area and I admit I over did it. I fully understand that the pain I had was a result. What was new was a wobbly hip. I was so unstable, I barely made it back to the car. It was very scary.

I’m used to “spaghetti legs”, but I have never experienced shaking or wobbly hips. My physician did a brain scan that didn’t show any signs of other causes.

Can this be due to PPS? Can my forearm crutches be causing this? What can we do when this happens?

**Answer:** The forearm crutches are likely causing you to overuse your arm and hand muscles. What you’re describing is called a “physiological tremor” and can be seen in anyone who stresses a muscle, for example weight lifters. The poliovirus damage and PPS makes it easier for your muscle fibers to become stressed and cause shaking. What’s more, if you are experiencing new weakness in your hips you are likely putting more stress on your arms to walk with the crutches.

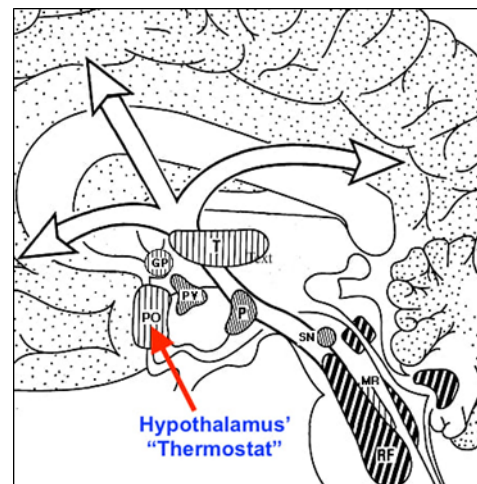
What can you do when your muscles shake? Rest the muscles and, while you’re resting, log activities that caused the arm and hand shaking and “wobbly hips” then stop those activities, pace them or do much less of them.

## The Inability to Manage the Heat

**Question:** I'm always reading about polio survivors being miserable in the cold weather. I seem to be the opposite. I feel hot, even indoors in the winter. When the temperature goes up, I sweat and soak my clothes. I feel like I'm cooking inside. Is my problem with temperature a post-polio thing?

**Dr. Bruno's Response:** You aren't alone. This question is coming up more and more. Here's what's going on:

The poliovirus damaged the neurons in the brain and spinal cord that control body temperature by controlling the sympathetic nervous system. Your brain's thermostat (in the hypothalamus) should turn on sympathetic nerves to cause skin veins and arteries to constrict when it's cold, preventing loss of body heat. The reason polio survivors have cold and purple "polio feet" is that there isn't a signal from the brain thermostat that reaches blood vessels to tell them to constrict. So hot blood flows to the vessels near the surface of the skin, heat in the blood radiates away from your body and your skin gets cold, which passively makes the veins clamp down, trapping cold, purple blood in the little veins and, voilà, "polio feet."



But if the poliovirus damaged neurons that control body temperature, shouldn't polio survivors have trouble with heat as well as cold? Over the course of decades I had not heard one polio survivor report being overcome by heat the way they were being frozen stiff by the cold. So while I studied blood flow and the effects of cold on polio survivors, I never studied the effects of heat. But I should have. Back in 1985, in our own first Post-Polio Survey, about 1/3 of polio survivors said that they were adversely affected by the heat.

Why didn't I study heat intolerance? Truth be told, I think I was frightened off by the first polio survivor I studied. She said that his polio-affected foot was always much colder than the other foot, even when he was in a room where others were comfortably cool. I was shocked and worried when he removed his sock to reveal a reddish-purple calf and a deep purple foot. I was afraid he had a blood clot, maybe even a clogged artery. But her veins were clear and there were bounding pulses in both feet. The real shock came when I placed an electronic thermometer on his skin. The room temperature was 75°F (24°C). I watched as the numbers on the thermometer dropped and dropped, until they stopped at 72°F (22°C). His foot was actually *colder* than the room temperature! I had to put his foot up on a stool and cover it with a hot pack for half an hour before it began to warm just slightly. And when it finally did heat up, the skin became as red as a lobster. It didn't take a rocket scientist to see that there was something radically wrong with blood flow in this polio survivor's leg. So that's where our research focused, on the effects of cold.

Too Darn Hot.

It's not that I wasn't interested in the effects of heat. The mechanism for sweating was one that I had studied fairly extensively when I was the autonomic nervous system fellow at Columbia-Presbyterian, before even seeing a polio survivor. The first research I presented at a national conference was on the mechanism of decreased sweating in Parkinson's patients. We knew that the brain's thermostat and sympathetic nerves not only control blood vessels but also control sweating, which cools your body by evaporation of sweat on your skin when opening blood vessels doesn't "dump" enough body heat via radiation. Given our finding of polio survivors' arteries not getting a signal to constrict, I would have expected poliovirus damage to the brain's thermostat and sympathetic nerves would cause polio survivors always to sweat too little. And I would have been wrong.

In a 2021 survey on the Post-Polio Coffee House, six-dozen polio survivors reported difficulties with temperature, specifically heat intolerance. When asked about sweating, a minority reported "little to no sweating" associated with heat intolerance, while three times as many reported "hot flash-like" sweating, continued . . .

especially about the neck and face. “Comfortable” indoor or outside temperatures were reported to range from 61°F (16°C) to 72°F (22°C), while heat intolerance symptoms began from 72°F (22°C) to 85°F (29°C). The most common symptoms of heat intolerance were “nausea,” “feeling faint or dizzy,” being “itchy,” fatigued and even anxious. Surprisingly, only three polio survivors reported that their skin became red when they felt overheated, suggesting an inability of blood vessels to open and dump enough body heat so that sweating wasn’t necessary. Also surprising were polio survivors who reported having “hot flash-like” sweating from the neck up at the same time as they were experiencing painfully cold legs and feet.

With these findings, we may have come full circle. We know that polio survivors have cold legs and feet ultimately because arteries clamp down and prevent hot blood from the body's core heating the skin’s surface. Perhaps the inability to get rid of excess body heat results from the same problem - surface arteries not opening - that leads to symptoms of heat intolerance and triggers sweating above the waist to try to cool the body.

So, at least for some polio survivors, cold feet cause hot heads. It seems clear that if you can't stand the heat you *may* be a polio survivor.

### Weakened Calf Muscles

Question: I had non-paralytic polio when I was 3. My left calf muscle is underdeveloped and has very little working muscle. I have had right knee replacement and left ankle fusion. Muscle fatigue and atrophy are setting in now, my foot rolls off to the right and I have a lot of balance problems. The operation helped, but my foot had other ideas! My Doctor thinks it is related to post-polio syndrome.

Dr. Bruno’s Response: Did anyone suggest a short leg brace before surgery...or now?

Answer: Nobody has suggested a short leg brace. I have used custom made AFO’s for both legs. They helped, but my left foot keeps trying to turn out.

Dr. Bruno’s Response: It might be worth another visit to the brace maker to see if a different AFO would help.



The newly updated Encyclopedia of Polio and PPS by [Richard L. Bruno, HD, PhD](#) makes searching for topics in both: Bruno Bytes AND the Encyclopedia of Polio and PPS much easier.

Go to: [www.polionetwork.org](http://www.polionetwork.org)

Under Articles/Resources you will see: Bruno Bytes and Encyclopedia of Polio and PPS listed (along with many other areas of interest.

When you click on either, you will see a box with the words: **INDEX/CATEGORIES**

From there you will see hundreds of topics, clearly listed alphabetically – along with the number of articles that are indexed by that topic.

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