



Bruno Bytes
First Quarter 2022
From Dr. [Richard L. Bruno, HD, PhD](#)
Bits and Tidbits from the Post-Polio Coffee House

1st Quarter 2022 Topics Include:

Anesthesia, Dopamine, EMG, Joint Damage, Ketamine Infusions, Scoliosis
and a study involving PPS and Gray Matter Atrophy

On the topic of Anesthesia and Shivering

Question: I had a procedure to replace a heart valve. I warned them ahead of time about polio survivors needing to be careful and showed my Anesthesia Warning Card. When in the operating room they started something intravenously. I began trembling violently, before they gave me something else to put me out. While recovering later that day, I was in a lot of pain and started trembling violently again.

Dr. Bruno's Response: "Trembling" (shivering) is one of the most commonly recognized problems associated with anesthesia. Shivering doesn't mean that any drug you were given is off limits for polio survivors. The drugs are standard for your surgery and for many procedures requiring anesthesia. If you are concerned about shivering before or after surgery, talk to the surgeon and anesthesiologist and ask for pre-op and post-op warming with a "Bair Hugger" to get warm and stay warm.

https://www.bairhugger.com/3M/en_US/bair-hugger-us/

On the topic of Dopamine and Polio

Question: I found the brain stem and hippocampus could have been affected by polio. This is where dopamine is produced. Research shows people with polio are 40% more likely to be schizophrenic because of lower levels of dopamine. Lack of dopamine is probably what causes schizophrenia.

Dr. Bruno's Response: The question misquotes Nielsen's 2007 Danish database study of polio survivors. The study does not say that, "Research shows people with polio are 40% more likely to be schizophrenic because of lower levels of dopamine." Nielsen didn't mention schizophrenia or dopamine, but stated, "Overall, history of poliomyelitis was associated with a 40% increased risk of being hospitalized for a psychiatric disorder. The overall increased risk of psychiatric hospitalizations *could not* be confined to specific groups of psychiatric disorders. Rather, there seemed to be slightly increased risks of several different disorders, especially *milder* psychiatric disorders. These included personality disorders, substance/alcohol abuse, and other *non-psychotic* mental disorders," not schizophrenia. (Note: the Italics are mine.)

Nielsen continued: "The reason for the higher odds of having mental problems isn't really known, but it might related to the very painful and fearful experience of contracting polio, the stringent isolation from family for several weeks, and the difficulties of then overcoming physical handicaps and social prejudice," not low levels of dopamine. (reuters.com/article/us-polio-psychiatric-ills/polio-victims-may-suffer-psychiatric-ills-later-idUSKIM67022820070206)

There is a 1997 paper by Eagles suggesting a potential relationship between polio and schizophrenia, which is a hypothesis based on coincidences, not research. Squires addresses the failings of Eagles' hypothesis. (link.springer.com/article/10.1023/A:1022486423238)

Actually, a decrease in dopamine should REDUCE, not increase, the incidence of schizophrenia. In fact, schizophrenia is treated with antipsychotic medications that block the action of dopamine in the brain.

www.netdoctor.co.uk/medicines/brain-nervous-system/a7483/risperdal-risperidone/

continued . . .

Both David Bodian's research from the 1940's and our studies found polio survivors showing evidence of a decrease in brain dopamine due to poliovirus damage to the basal ganglia that produce dopamine, not the brainstem and hippocampus, which do not.

Search "FATIGUE and DOPAMINE" in the ARTICLES, "BRUNO BYTES" and INDEX of the ENCYCLOPEDIA of POLIO & PPS at www.papolionetwork.org/brunoarticles

On the topic of EMG and PPS Diagnosis:

Original Post: I understand an EMG is a test used to eliminate other potential problems like ALS. However, according to two physiatrists here, I do not have PPS based on my EMG results. My left leg has shrunk and I've developed scoliosis. I was told my last EMG showed old polio damage. I had non-paralytic polio as a child. I have suffered with worsening PPS symptoms since the late 90s. No one has an answer for my leg weakness and atrophy while developing scoliosis. I know I need a brace on my left ankle but who do I go to now?

Dr. Bruno's Response: If everything else is ruled out and you have a history of non-paralytic polio, your EMG shows "old polio" (neuron damage), and you have PPS symptoms, you should be treated as having PPS. Since the late 1970s, an office EMG has never been shown to be able to diagnose PPS. You need to see a physiatrist who knows about PPS or is willing to learn.

On the topic of EMG and Previous Polio:

Question: I have a friend, in her 70's who is now developing weakness in her hips. She was around me when I got polio and her cousin was the carrier. The question is can she have a normal EMG and still have had polio? The doctor told her that she could not have had polio because she had a "normal" EMG.

Dr. Bruno's Response: Studies have shown that 10% to 25% of polio survivors have *normal* EMGs because their nerves were damaged but not killed. As a result, there are no neuron "sprouts" to show up on EMG. In one study, almost 10% of patients who had a history of polio muscle weakness, and who were reporting new pain, fatigue or weakness today, had normal EMGs, meaning that there was no EMG evidence that they ever had had polio. Another EMG study found that almost 25% of *paralytic* polio survivors' limbs had no evidence of motor neurons having been killed. Those limbs were classified as having "no clinical polio". However, neurologist Carlos Luciano, using a special "macro" EMG technique, found over-sprouted motor neurons in 85% of muscles that were thought to have had "no clinical polio." This is not surprising since research by David Bodian and Alan McComas showed that seemingly unaffected muscles had lost 40% of their motor neurons to polio.

As for being around you when you had polio and her cousin being the carrier, in 5% to 20% of households where poliovirus attacked one family member, another was also stricken. From 1909 to 1955 more than 2000 family members in more than 1000 households were surveyed in which at least one person had polio. On average if one child in a household became ill he "shared" polio with one other sibling of similar age. Just over half of those who became ill were paralyzed, while the others had flu-like symptoms ranging from a fever, sore throat and nausea to a stiff neck and muscle pain. This "minor illness" was caused by the poliovirus but may never have been diagnosed as polio at all, or may have been called "abortive" or "non-paralytic" polio. In three-quarters of the households the first case of polio was paralytic and the second was "non-paralytic."

Bottom line: There's about a 1-in-5 chance that if you had paralytic polio one of your brothers or sisters had non-paralytic polio and may not even have known it.

There is more information on EMG and "Non-Paralytic Polio" in the Encyclopedia of Polio and PPS. You will find numerous articles under the topic of "Poliovirus" in the [Articles section](#).

On the topic of Joint Damage

Question: I'm scheduled for a total replacement of my left shoulder. Previous I had my left knee replaced in 2007. I'm also having problems with my major joints on my right side. Can this be from Post-Polio Syndrome?

Dr. Bruno's Response: Joint damage and arthritis are "secondary" PPS, the result of the original "primary" poliovirus damage that caused long lasting muscle weakness.

On the topic of Ketamine Infusions for pain

Question: I'm trying to find information on Ketamine infusion to treat pain for polio survivors.

Dr. Bruno's Response: There's no data on treatment of pain or depression with ketamine in polio survivors yet. My concern is that ketamine is an anesthetic. Therefore, the "normal" dose would be too much for polio survivors and put them out for much longer than non-polio survivors. The usual dose lasts about 2 hours and there are risks: unconsciousness, high blood pressure, dangerously slowed breathing, stomach pain, depression and poor memory. I'd stick to treating the cause of the pain.

Resources:

1. www.webmd.com/depression/features/what-does-ketamine-do-your-brain
2. www.practicalpainmanagement.com/patient/treatments/medications/ketamine-chronic-pain-management-current-role-future-directions?fbclid=IwAR3yEKO9CoHr3slRAQ7k9VHeEEGOsUCAstOoy7sZkaZet-r-8ZPyNwQgmeE

On the topic of Pain Sensitivity

Question: I've NEVER understood this. You say polio survivors are more sensitive to pain than non-polio survivors but have a higher pain tolerance. How is it that I can have a high pain tolerance and be more sensitive? It feels contradictory to me.

Dr. Bruno's Response: It has been known since the 1970s that the body produces its own morphine-like, painkilling opiates called endorphins and enkephalins. The problem for polio survivors is that the poliovirus killed off brain and spinal cord neurons that produce the body's own opiates. So polio survivors can't "medicate" themselves against pain, which is why polio survivors need more pain medication than do non-polio survivors.

Our 1984 study showed that polio survivors are TWICE as sensitive to pain as non-polio survivors, likely due to the lack of endorphins and enkephalins (1) "Normal" levels of pain would be doubled in polio survivors and likely intolerable if polio survivors hadn't developed a higher pain tolerance.

Here's another example of sensitivity and developed tolerance. Think about many polio survivors' emotional hypersensitivity to childhood hospital smells (e.g., rubbing alcohol, the smell of wet wool from hot packs). As adults, polio survivors had to develop an increased tolerance to these emotional triggers or they never would have allowed themselves to enter a hospital again. Sadly, many polio survivors have indeed refused to get medical treatment because they didn't develop an increased tolerance for hospitals and medical facilities. (2)

References: (1) Bruno RL, et al. Motor and sensory functioning with changing ambient temperature in post-polio subjects. Late Effects of Poliomyelitis. Miami: Symposia Foundation, 1985.
(2) Bruno RL, Frick NM. The psychology of polio as prelude to Post-Polio Sequelae: Behavior Modification and Psychotherapy. Orthopedics, 1991;14 (11):1185-1193.

For more information, please read these two articles under the topic of "Psychology" in the Encyclopedia of Polio and PPS: [Trauma and Illness as Precipitants of Post-Polio Sequelae](#) and [Psychology of Polio as Prelude to Post-Polio Sequelae](#)

[On the topic of PPS and Seizures](#)

Question: I have been experiencing seizures, the kind that puts me in an ambulance. Is this polio related?

Dr. Bruno's Response: Seizures are not PPS symptoms. There is one very small Turkish study finding 11 of 91 polio survivors had epilepsy. But epilepsy onset was at 17 years old, not in mid-life as with PPS. Seizures should be treated in polio survivors as in non-polio survivors, with doctors being aware that anti-seizure drugs may cause increased fatigue in polio survivors.

www.webmd.com/epilepsy/medications-treat-seizures

[On the topic of PPS Spinal Cord Atrophy](#)

Question: A February 2022 study claims that patients diagnosed with PPS have spinal cord "gray matter atrophy" in their necks and also have muscle weakness in their arms, hands and feet. Is spinal cord atrophy the cause of PPS?

Dr. Bruno's Response: I read the study when it was published last month and didn't think it was worth mentioning. Only 20 polio survivors said to have PPS were studied and compared to non-polio survivors, not to polio survivors without PPS. It's no surprise that survivors were found to have spinal cord gray matter atrophy, that is damage to the "gray" spinal cord motor neurons ("polio" means gray in Greek).

This study of only 20 polio survivors links gray matter atrophy not only to post-polio muscle weakness, but also statistically performs multiple comparisons between gray matter atrophy and other factors, e.g., fatigue, pain, depression, age, sex, age at or time since polio.

Unfortunately, the statistics applied to draw these conclusions are incorrect, the authors themselves stating, "Given the exploratory nature of these...analyses in this rare disease, we report [statistics] explicitly not adjusted for multiple comparisons." More than 175 subjects would have been required for a valid statistical analysis and appropriate conclusions.

The editors of the journal who published the study of "this rare disease" (having 20 million survivors worldwide) should have required appropriate statistics or rejected the paper outright.

[On the topic of Scoliosis and PPS](#)

Question: I am 76 yrs old and had polio at 3. I never had scoliosis but over a period of a few years I now have some scoliosis. Is this common in those of us with PPS ?

Dr. Bruno's Response: Scoliosis results from polio-caused muscle weakness that allows back muscles that were less affected to pull the spine toward their side, causing a curve. One estimate from the epidemic years was that 1/3 of young polio survivors developed scoliosis, which resulted in many spinal fusions. Scoliosis can also result from polio survivors' back muscles becoming weaker over time. So, scoliosis is an "indirect" result of PPS.

[The Encyclopedia of Polio and Post-Polio Sequelae](#)

contains all of [Dr. Richard Bruno's](#) articles, monographs, commentaries, "Bruno Bytes" (Questions & Answer articles) and his Video Library.

The Encyclopedia of Polio and PPS is also available by a direct link from: www.postpolioinfo.com

Are you looking for a specific topic?

The [Encyclopedia Index](#) (By Subject) is available.