

Peroneal Nerve Entrapment – A Case Study

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Not long ago, I was visited by a man (L.) who presented with neural symptoms down the lateral aspect of the lower leg, happening only unilaterally and on an intermittent basis. The numbness and tingling was not severe, but was certainly annoying. He had no clue as to the source of the problem, nor could he identify any traumas that preceded it. It was very unpredictable, sometimes activity made it worse and sometimes a walk would make it better, at other times he would wake up with the pain and numbness. He did state that he thought he had an anatomically short leg and he has very pronated feet.

OK, what are we dealing with here? The fibular (peroneal) nerve is entrapped and producing tingling, burning, and numbness down the lateral compartment of the leg. Let's examine this closely and solve the puzzle together.

What to make of this scenario? First, it is important to assess the role of the obvious factors. First, has he seen anyone else about this? There are several medical problems that could present with these symptoms; a doctor should rule them out first. This had been done. Second, what is to be made of the anatomically short leg issue? I had L. visit a local doctor who is taking x-rays for PNMT to be used in a study we are doing. With the cathode at trochanteric height, the xray revealed that his femur is short by 6mm. Well and good, but that does not explain why he wakes up in the AM with this pain. Pain due to structural issues generally gets worse the longer the person is upright. Since the pain is not tied to long periods of upright stance, this is probably not a main cause. It is certainly possible that is structural issue causes more stress on the lower leg, which in turn makes the nerve more susceptible.

Speaking of structural, what about his severely pronated feet? Does pronation affect the nerve? Just like the leg length issue, the answer is a qualified yes and no. Yes, it certainly affects the nerve as pronation changes the length – tension relationship of the tibialis muscles and the fibularis muscles. On the other hand, if this were the direct cause, he would be much worse after walking or at the end of the day. Instead, L. is telling us that sometimes it hurts in the AM and can feel better after a walk. That does not make sense.

What is left? Here is what we know. We know what nerve (peroneal / fibular) and we know where (under the head of the fibula). We know that this is neural in nature and is not directly tied to activity or to being on his feet for several hours. We also know that there are no clear indicators that this came from any sort of identifiable trauma. Our only conclusion is that there is some entrapment on the nerve, which is of very low intensity causing microtrauma to the nerve. This would take the form of compression, tractions, or friction. To explore this farther, let's explore the peroneal nerve entrapment in depth.

There are two branches of the peroneal nerve, a superficial and a deep branch. The superficial branch is the most likely to be affected with L. The superficial branch serves the peroneus longus and brevis. Eventually, weakness of eversion is the likely result. The most likely symptoms will follow the sensory path of the nerve, in this case an extensive pathway that covers the whole lateral aspect of the lower leg. It can cover the lateral malleolus and the dorsal area of the foot. The deep division of the peroneal nerve has less of a sensory distribution; the cutaneous branch of



the deep division covers the top of the great toe and the top of the second toe as well. While it has a small sensory area, it innervates the anterior tibial muscles and the extensors of the toes. (Sekul, E., 2001) With all peroneal entrapments, the person can have only sensory symptoms, motor symptoms (weakness) or both. (Fabre, T., et al, 1998)

How do entrapments of this area happen? Common macrotrauma causes are a fracture of the fibula that stretches the nerve laterally. Other causes are a blow to the side of the leg at the head of the fibula. This happens in car accidents and falls where the side of the leg hits a sharp edge. Interestingly, and sadly, it is often seen in people who drink to excess and then pass out with their leg in a very uncomfortable position however they cannot receive proper feedback telling them to move. Other microtraumatic reasons might be very tight garments, stockings, or bandages at that level and prolonged sitting with the legs crossed and pressure applied to the inferior head of the fibula. As mentioned earlier, nerves are entrapped by three forces; compression, traction, or friction. These forces can be of a microtraumatic nature (low intensity, long duration) or macrotrauma (high intensity, short duration).

The structure of the fibular tunnel is also part of the inherent problem. Certain areas of the body are dangerous for nerves just because of their architecture. The fibular tunnel is such a place. The fibular/peroneal nerve passes between the two heads of the fibularis (peroneus) longus muscle. Just underneath the nerve is the fibula itself. It is at this site that the nerve can be compressed; where the nerve bifurcates into the deep and superficial branches.

As in any condition, the PNMT practitioner must assess if there are any other reasons for these symptoms. The most common other cause for such symptoms is L5 radiculopathy. What symptoms help the therapist define that the problem is a radicular pain from the back rather than local nerve entrapment? Here are some symptoms that should help with that decision:

Is there any history of back pain or are there accompanying back pains presently? If so, this must be assessed by a physician.

If you run a fingernail or paperclip over the skin in an area of nerve entrapment, that area will be less sensitive (or at least have altered sensations) to touch. In entrapment of the peroneal nerve, the area with loss of sensation is the lower two thirds of the calf. If the entrapment is above this area and extends above the knee, a physician should check out the possibility of lumbar radiculopathy.

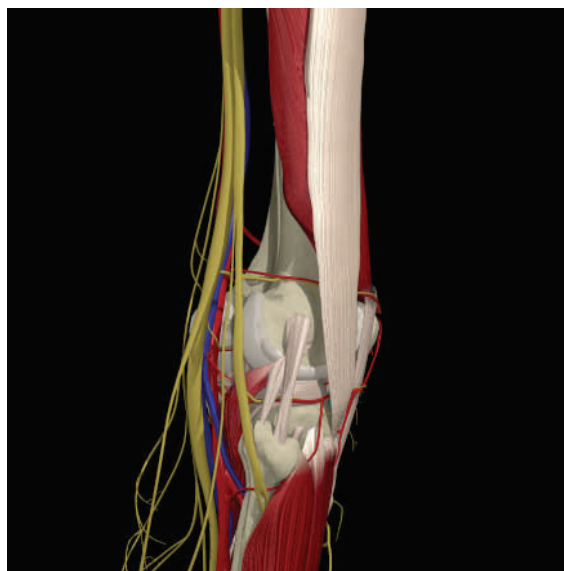
Another possibility is to check the strength of the tibialis posterior. The posterior tibialis is not innervated by the peroneal nerve, therefore, if it is weak, the problem is from higher up. (Dawson, D., Hallet, M., Millender, L., 1983)

As to treatment protocols, here are some important guidelines:

First and foremost, do not go right after the area just inferior to the head of the fibula. This may be the epicenter, but it is unwise to deal with this directly. It is very difficult to address the area without negatively impacting the nerve. Any work in this area must be very superficial fascial release with minimal pressure. Very light work with thumbs in opposition is probably the most direct treatment possible for the early stages.

Make sure to treat the higher areas of the nerve very thoroughly, especially the area immediately above the head of the fibula. Treating the path of the nerve all the way to the piriformis is a wise idea. The treatment is lateral distraction with the thumbs or fingers to create space for the nerve. Do not press on the nerve, open space so the nerve may glide freely.

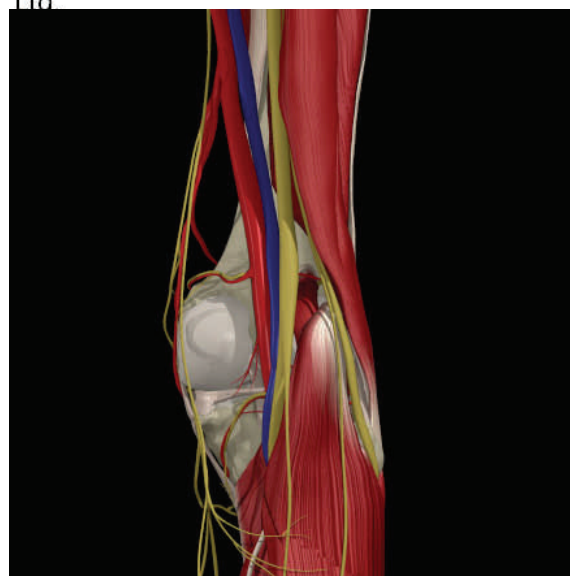
This view of the nerve is from the perspective of looking at the leg from the side view. Notice how the nerve dives under the peroneus (fibularis) longus. As it travels upward, it runs along side the tibial nerve.



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In the second picture, notice the path of the peroneal nerve as it courses superiorly. We are looking at the nerve from the back of the knee. The nerve lies under the biceps femoris on its way to join the tibial nerve. This area under the biceps femoris may be an important area to address for entrapment issues below. Minor entrapments at higher areas make the nerve hypersensitive to any pressure below.

I have only seen L. for three sessions presently, but the numbness is less often and with less intensity. Nerve entrapments by nature go away slowly, do not expect the immediate change we see when treating muscles.



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Dawson, D., Hallett, M., Millender, L. (1983) Entrapment Neuropathies Boston: Little, Brown and Company

Fabre, T., Piton, C., Andre, D., Lasseur, E., Durandea, A. Peroneal Nerve Entrapment, *The Journal of Bone and Joint Surgery* 80:47-53 (1998)

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