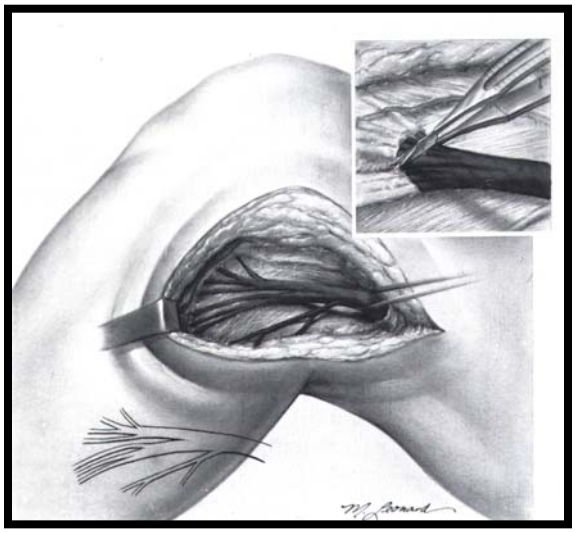
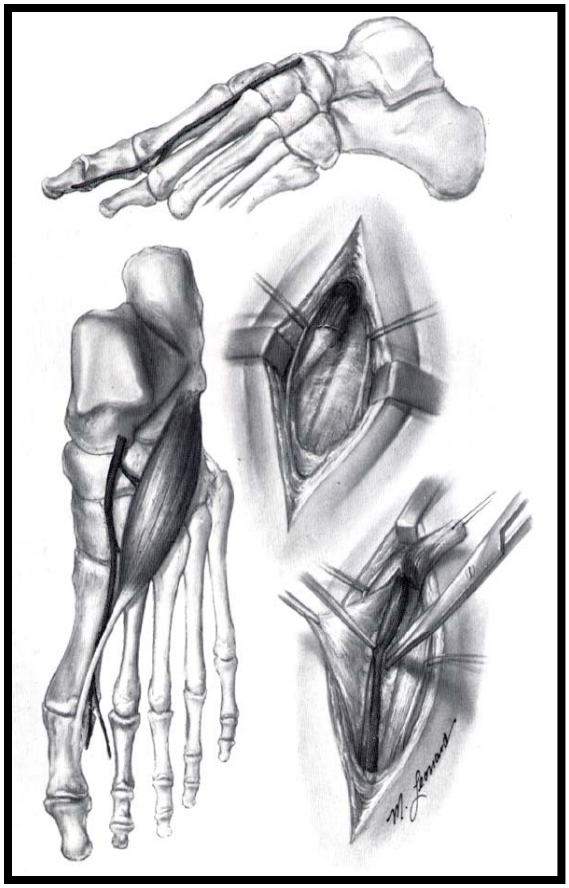
# *DECOMPRESSION OF MULTIPLE PERIPHERAL NERVES*

Dr. Adam D. Perler, American Health Network *Foot & Ankle* has studied on several occasions with A. Lee Dellon, MD, a professor of neurological and plastic surgery at Johns Hopkins University in Baltimore and founder of the Institute for Peripheral Nerve Surgery. Dr. Dellon discovered that by decompressing nerves first in the upper extremity for carpal tunnel syndrome he could restore strength and sensation to the hands. He then conducted research on peripheral nerves in mice which confirmed these originally incidental findings, and later applied these techniques to the feet and legs(2). The theory confirmed in Dr. Dellon's studies is that the underlying metabolic changes which occur in certain types of Peripheral Neuropathy lead to an increased susceptibility of the peripheral nerve to compression. This is based on research conducted in 1973 by Upton and McComas which confirmed that once a peripheral nerve is insulted, the remaining distal portion of the nerve becomes more vulnerable to compression (3). They termed this phenomenon the "Double Crush Syndrome". The original insult may either consist of a direct compression at a proximal level, or some metabolic abnormality manifesting a systemic problem such as diabetes or drug toxicity.





In the case of Diabetic Peripheral Neuropathy, sorbitol, a breakdown product of glucose accumulates in the peripheral nerve. Water then enters the nerve in order to maintain an isotonic environment, resulting in actual swelling of the nerve. Therefore, in tight anatomical tunnels which do not expand in the healthy patient, and much less in patients whose tissues are glycosylated, the nerves are compressed. The result of this compression is a decrease in the rate of axoplasmic flow, the inability of the nerve to heal itself distally, demyelination of the axons, and therefore the symptoms of neuropathy. It was proven first in mice, and later in humans, that when these nerves are decompressed in time they will regenerate, thereby relieving the painful manifestations of nerve compression and restoring sensation. (2,4,5,6,7)

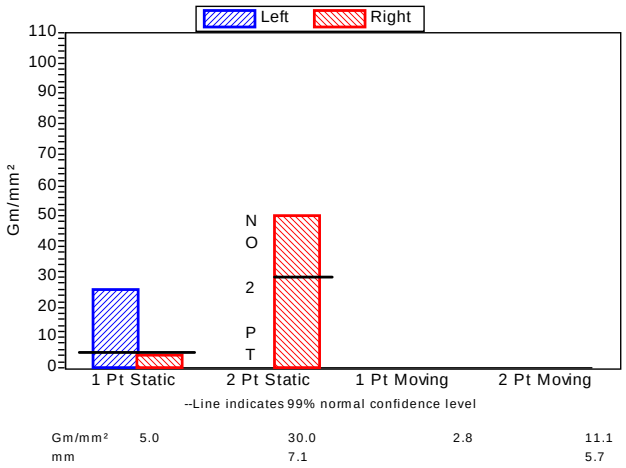
Additional underlying causes of neuropathy also result in swelling of nerves and compression in these tight anatomical tunnels. An example of a common clinical presentation of this is Chemotherapy Induced Peripheral Neuropathy, often associated with drugs such as Taxol, Cisplatin and Vincristine. Many former cancer patients

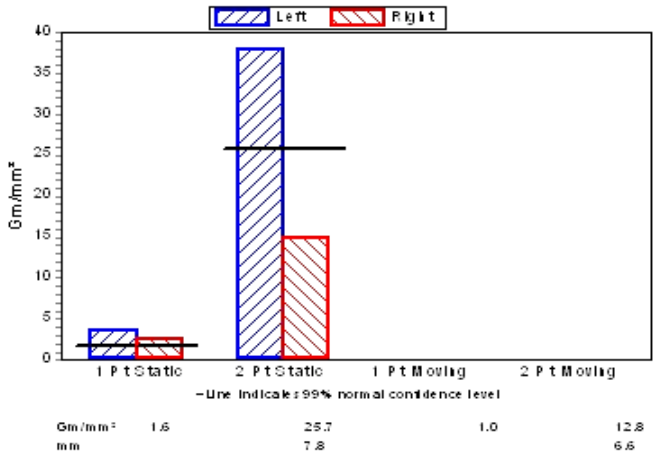
who have been successfully treated with these drugs suffer from severe pain in the extremities. These drugs cause peripheral neuropathy also through causing the nerve to swell. Again, axoplasmic flow is affected distally and peripheral neuropathy is the result. As of today, the results of nerve decompression in post chemotherapy patients have yet to be published. However, personal correspondence with Dr. Dellon and others boasts a 100% success rate with these patients for relieving pain so far.

The operative procedures which were developed by Dr. Dellon, and personally instructed to Dr. Perler, include decompression of peripheral nerves at three sites in the lower extremity. The sites were identified in studies conducted on cadavers by tracing the courses of nerves which innervate the foot. The common peroneal nerve is released at the fibular tunnel, just below the outside of the knee. The deep peroneal nerve is decompressed on the top of the foot where it is trapped between the tendon of the extensor digitorum brevis and the lateral aspect of the first metatarsal. The posterior tibial, medial plantar, lateral plantar, and medial calcaneal nerves are decompressed about the inside of the ankle in the region of the tarsal tunnel and distally through a single incision.

Intra-operatively, the nerves commonly demonstrate a visible indention at the sites of compression and the distal portions are noted to be thinner and unhealthy in appearance relative to the proximal portions. Immediately post operatively in the recovery room, many patients are able to feel light touch in areas of their feet that were previously numb. Also many patients report an immediate decrease in burning, tingling, and pain. However, there are a number of patients who will experience an increase in pain as the nerves regenerate distally. If present, this pain will occur for a period of time relative to the amount of preoperative nerve damage, predictable based on the fact that nerves regenerate at a rate of 1 millimeter per day or roughly 1 inch per month. Published studies indicate that of the patients who underwent this surgery, 90% report a significant decrease in pain and 80% a restoration of sensation. Also, at 4 year follow up of 44 neuropathic patients who underwent unilateral nerve decompression of the lower extremity, 0% of the operated extremities had reulcerated, while 9 of the non-operated limbs had. (submitted for publication)

***Before*** ***After***

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