

## **Lower Extremities**

Multiple nerve-related problems can affect the lower extremities. Peripheral neuropathy, Morton's neuromas and nerve injuries/neuromas (due to trauma or surgery) are some of the conditions that respond to surgical treatments, decreasing, and in many cases eliminating, pain.

## **Neuropathy**

### **What Causes Neuropathy?**

Many types of neuropathy are caused by chronic diseases, the most common of which is diabetes. Patients who are "Pre-diabetic", those who are overweight with high cholesterol and high blood pressure exhibit neuropathy symptoms similar to that of diabetic patients. Other causes of neuropathy can include chemotherapy (Vincristine, Thalidomide, Taxol and Cisplatin are common chemotherapy medications that have been proven to cause neuropathy), Lyme's disease, certain forms of arthritis, thyroid disorders, leprosy, alcoholism, drug use, heavy metal toxicity, and vitamin deficiencies. Still there are many types of neuropathy in which the cause is not known. This is referred to as idiopathic neuropathy.

Compressive neuropathy is caused by pressure on the nerve similar to Carpal Tunnel Syndrome. This type of neuropathy can be corrected by surgically relieving the areas of compression on the nerves caused by the surrounding tissues. Diabetics and "pre-diabetics" most commonly have compression neuropathies. This is because in diabetics the nerves are swollen. When sugar (glucose) from the blood goes into the nerve it changes to sorbitol (another sugar). This chemical reaction causes a greater number of water molecules to enter the nerve causing swelling. The swollen nerves run through tight anatomical tunnels in the body. When swollen nerves are in tight tunnels they get compressed causing pain and numbness. By releasing the areas of compression (the tight tunnels) sensation can be restored and pain decreased. This is the same operation has been done for carpal tunnel syndrome for many years. The success rate of nerve decompression surgery for diabetic and "pre-diabetic" patients is in the eighty-percent range. Decompression of the nerves can reduce or eliminate pain, improve sensation and balance and prevent ulcerations and amputations.

### **Are There Non-Surgical Treatment Options for Neuropathy?**

Patients should first consult their primary care doctor to determine if their type neuropathy is caused by an underlying disease that can be treated, such as a thyroid disorder, vitamin deficiency or diabetes. Treatment of the disease can frequently provide relief for the symptoms. Some anesthesia pain management doctors have medical treatment options for those patients who are not healthy enough to undergo surgery or for those who are not good surgical candidates.

### **Who Is A Candidate For Neuropathy Surgery?**

Surgery is an option once it is determined that your neuropathy is a "Compression Neuropathy" and that you are a good candidate for surgery. Dr. Rosenberg and his staff will use the PSSD (Pressure Specified Sensory Device) to measure the function of your nerves. This is a non-painful and non-invasive test that quantifies the sensory loss of the nerve. Dr. Rosenberg will also examine you for a "Tinel's Sign" to determine whether there are signs of compression over the nerves. Patients who are under the age of 75 that are in good health with abnormal PSSD test results and a positive Tinel's sign are typically good surgical candidates.

### **What Can I Expect During and After Neuropathy Surgery?**

Nerve decompression surgery is an outpatient procedure that takes about two hours. A general anesthetic is administered by an Anesthesiologist. Using microsurgical techniques Dr. Rosenberg makes 3-4 incisions, one on the top of the foot, one up by the knee on the outside of the leg, one by the calf, and one on the inside of the ankle. Once Dr. Rosenberg finds the nerve, he follows it to the area of compression and releases the tight band (the top of the tunnel) that is compressing the nerve, similar to what is done during carpal tunnel surgery. After Dr. Rosenberg completes the operation, a simple compressive dressing is placed on the leg and the patient is transferred to the recovery room. There are some patients that notice an immediate difference in their pain as they wake up in the recovery room, others it can take up to several months depending on the amount of compression and the degree of nerve damage from the compression. The patient is sent home and asked to use a walker or crutches for the first week to minimize the amount of pressure placed on the operative leg. After the first week the dressing is removed and the patient may get back into a normal shoe and sock. The final sutures are removed 2-3 weeks after surgery and at this time the patient is released to normal activity. Patients are allowed to immediately walk on the operated leg but we try and limit activity and bending at the ankle to allow proper wound healing.

As the nerves regenerate and grow some patients may experience neuro-regenerative sensations such as shooting, stabbing or electrical types of pain. This is a good sign showing the nerve is growing. As the nerve continues to grow, the numbness the patient had before surgery will improve and the neuro-regenerative pain will improve.

### **Are There Any Risks Involved With Neuropathy Surgery?**

The biggest risk with this operation is that patients may still be left with areas of pain or numbness or there might be no change at all in the amount of numbness and/or pain. The most common risks associated with any type of surgical procedure include minor infections and scarring. Certain medical conditions, such as diabetes, may slow the healing process increasing the risk of infection. Other risks include an increase in pain (which is usually the progression of the neuropathy and not an operative complication) or DVT which are very uncommon.

## **Morton's Neuromas**

### **What Causes Morton's Neuromas?**

Morton's Neuroma is another type of peripheral nerve problem in the foot caused by the repetitive compression of the common plantar digital nerve. This nerve lies between the heads of the metatarsal bones. Consequently, the neuroma that develops is not a true neuroma, but rather chronic nerve compression. Tight shoes and high heels can intensify this type of pain. If the Morton's Neuroma has already been operated on by another physician and he/she cut the nerve, then the Morton's Neuroma is a true neuroma and the nerve needs to be resected. For this type of Morton's Neuroma see the next section on nerve injuries.

### **Are There Non-Surgical Treatment Options for Morton's Neuromas?**

Morton's Neuroma symptoms can often be alleviated by wearing flat, wide-toe shoes or Orthotic devices made by a podiatrist. Other treatments include the use of arch supports or custom-fitted shoes to redistribute weight away from the area.

### **Who Is A Candidate For Morton's Neuroma Surgery?**

To determine whether or not you are a good candidate for surgery Dr. Rosenberg and his

staff will use the PSSD (Pressure Specified Sensory Device) to measure the function of your nerves. This is a non-painful and non-invasive test that quantifies the sensory loss of the nerve. This test will also verify the patient does not have problems with other nerves and the Morton's Neuroma is an isolated problem. Patients who are under the age of 75 that are in good health with abnormal PSSD test in the distribution of their other nerves are typically good surgical candidates. The PSSD can also help identify those individuals who have been misdiagnosed as having a Morton's Neuroma and actually have a mild early peripheral Neuropathy.

### **What Can I Expect During and After Morton's Neuroma Surgery?**

Morton's Neuroma surgery is an outpatient procedure taking about an hour. A general anesthetic is used in most cases though in rare instances a spinal block may be used. Once Dr. Rosenberg finds the nerve, he releases the area of compression and cuts the tight band that is compressing the nerve. After Dr. Rosenberg is done with the operation a dressing is placed and the patient is transferred to the recovery room. There are some patients that notice an immediate difference in their pain as they wake up in the recovery room, others it can take up to several months depending on the amount of compression and the amount of time since the compression presented. The patient is sent home and asked to use a walker or crutches for the first week to minimize the amount of pressure placed on the operative foot. After the first week the dressing is removed and the patient may put on a shoe and sock. The final sutures are removed three weeks after surgery and at this time the patient is released to normal activity.

### **Are There Any Risks Involved With Morton's Neuroma Surgery?**

The biggest risk with this operation is that patients may still be left with areas of pain or there is no change in the amount of pain. The most common risks associated with any type of surgical procedure include bleeding, infection and scarring. Other risks include an increase in pain (which is usually the progression of the neuropathy not an operative complication) or DVT which are very uncommon.

## **Nerve Injury**

### **What Causes Nerve Pain Due To An Injury?**

When a nerve gets injured due to a traumatic injury or surgery the damaged portion of the nerve, the neuroma, causes shooting, stabbing and/ or throbbing pain. There are operations for some of these nerve injuries that can decrease and in most cases eliminate the pain.

### **Are There Non-Surgical Treatment Options for Nerve Injury Pain?**

Patients should first consult their primary care doctor to determine if the cause of the pain is nerve related. Also there are pain management specialists that may be able to help to diagnose and sometimes manage the pain especially for patients that are not good surgical candidates.

### **Who Is A Candidate For Nerve Surgery?**

Surgery is an option once it is determined that the pain is from a neuroma and that you are a good candidate for surgery. Dr. Rosenberg uses nerve blocks to determine which nerve is causing the pain. This is done by injecting the area surrounding the nerve with a local anesthesia similar to what a dentist would use on a patient undergoing dental work. The nerve block should last several hours and will allow the patient to see how the involved area will feel after surgery. After several hours the pain that existed before the block will return.

Patients that are in good health and have appropriate responses to the local anesthesia block may be good candidates for surgery.

### **What Can I Expect During and After Nerve Surgery?**

Neuroma surgery is an outpatient procedure taking about an hour. A general anesthetic is administered by an Anesthesiologist. Using microsurgical techniques Dr. Rosenberg finds the damaged area of the nerve (neuroma), he cuts it out and buries the healthy end of the nerve into a muscle. After Dr. Rosenberg is done with the operation a dressing is placed and the patient is transferred to the recovery room. There are some patients that notice an immediate difference in their pain as they wake up in the recovery room, others it can take up to several months. The patient is sent home and asked to use a walker or crutches for the first week to minimize the amount of pressure placed on the operative foot. After the first week the dressing is removed and the patient may put on a shoe and sock. The final sutures are removed three weeks after surgery and at this time the patient is released to normal activity.

### **Are There Any Risks Involved With Nerve Surgery?**

The biggest risk with this operation is that patients may still be left with areas of pain or there is no change in the amount of pain. The most common risks associated with any type of surgical procedure include bleeding, infection and scarring. Other risks include an increase in pain or DVT which are very uncommon. Unfortunately some patients may continue to have pain and their body never responds to removing the nerve. These patients are often thought to have “centralized pain” which means their pain will not respond to procedures done on the nerve itself and instead need these patients need the expertise of a pain management specialist.

### **Who Is Qualified to Perform These Operations?**

David S. Rosenberg, MD, is a plastic surgeon who has been specially trained in peripheral nerve surgery. He trained with Dr. Christopher Maloney and Dr. A. Lee Dellon MD (the founder of this procedure) at the Dellon Institutes of Peripheral Nerves Surgery. Dr. Rosenberg uses his extensive experience, education and training to ensure the best care and highest success rate for his patients' surgical outcomes.