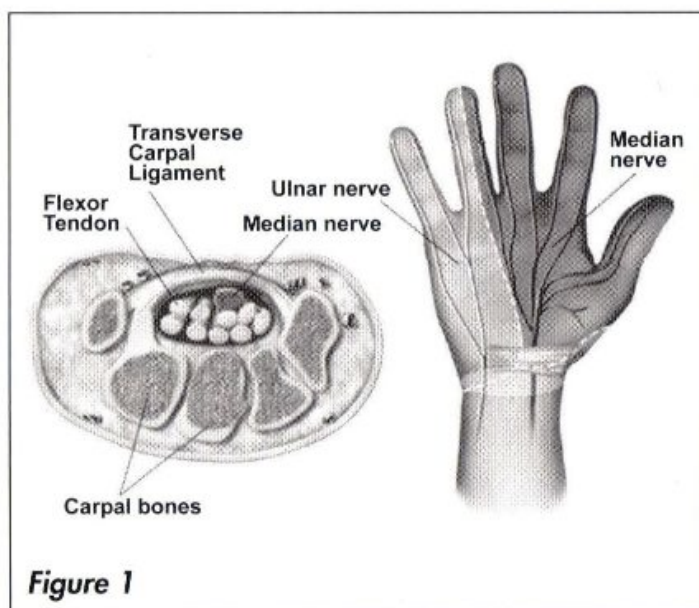




## **Understanding Carpal Tunnel Syndrome**

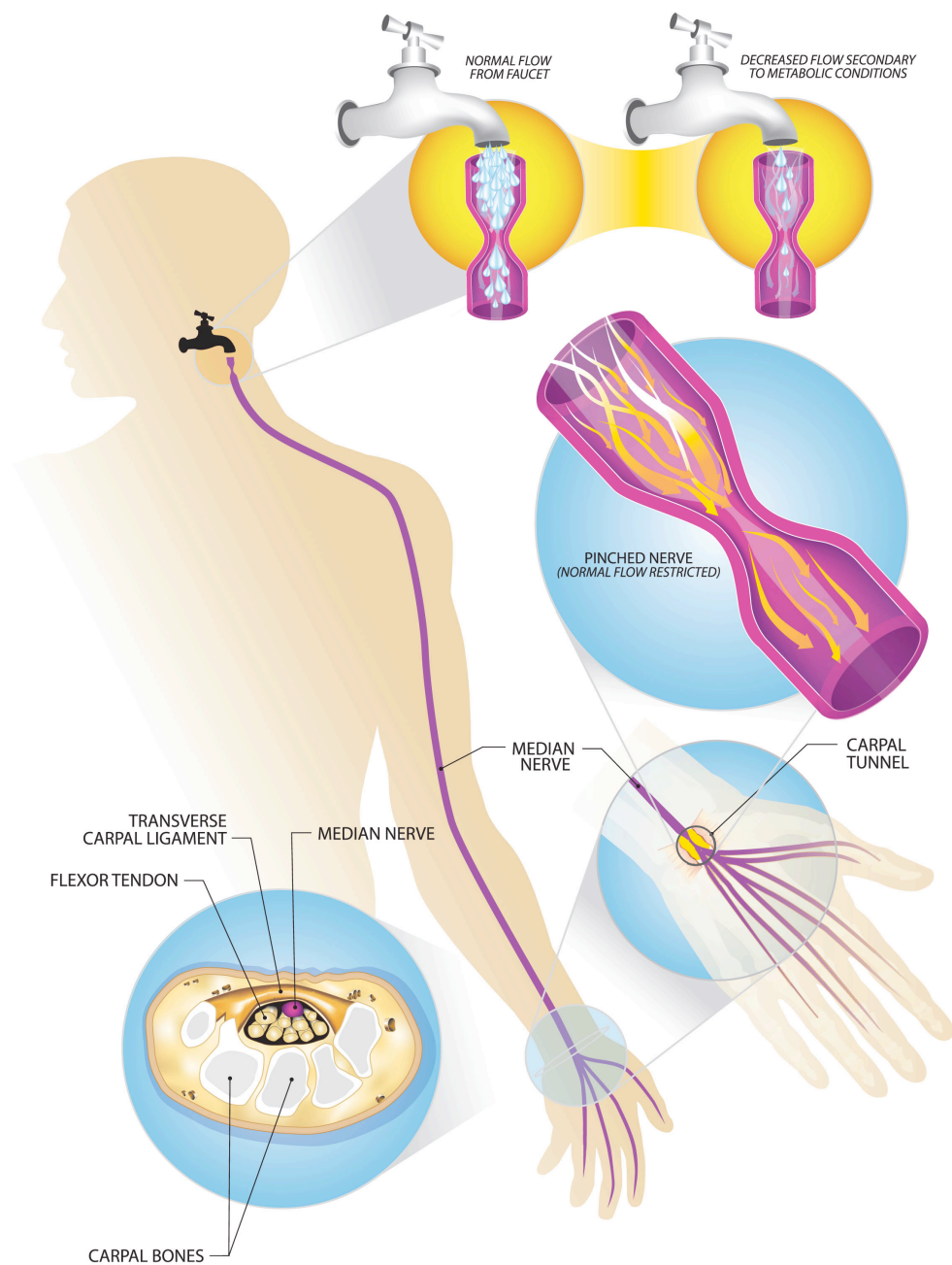
*by Bruce Steinberg, M.D.*

The most common cause of numbness and tingling of the upper extremity is carpal tunnel syndrome. Symptoms may also include sharp, piercing pain that radiates from the wrist to the fingertips, and/or from the wrist to the shoulder. When these symptoms occur, individuals will often stop what they are doing, and may shake their hands in order to obtain relief. This pain may occur while performing simple activities such as driving and typing. The symptoms of carpal tunnel syndrome are very similar to those experienced when sitting for a long period of time, such as in a movie theatre. When one stands up, the foot feels as if it is “asleep.” A sensation of “pins and needles” occurs within the foot, but by walking and shaking the foot, these symptoms go away. This condition occurs from compression or squeezing of the sciatic nerve along the back of the thigh. In the upper extremity, carpal tunnel syndrome occurs from compression or squeezing of the median nerve at the level of the wrist. The carpal tunnel is a narrow, rigid canal formed by a thick ligament (transverse carpal ligament) on one side, and the bones of the wrist on the other (Fig. 1).



**Figure 1**  
**Cross section of carpal tunnel**

The carpal tunnel houses the median nerve and the tendons of the fingers. Swelling within this canal leads to the squeezing of the nerve as it goes through this confined space. Electrochemical impulses travel from the neck to the fingertips, much like a garden hose transporting water. When the nerve is squeezed like the hose being kinked, the symptoms of pain, numbness, tingling, and weakness occur due to the decreased flow of the electrochemical impulses. In addition to having compression of the nerve at the level of the wrist, an individual may also have compression of the nerve at the neck from arthritis or a herniated cervical disk. The nerve, in this situation, is like a hose with kinks in two places, both decreasing flow. Metabolic conditions such as diabetes, thyroid disease, kidney disease, and vascular disease, may affect the amount of electrochemical impulses that travel down the nerve similar to a faucet on low flow (Diag. 1).



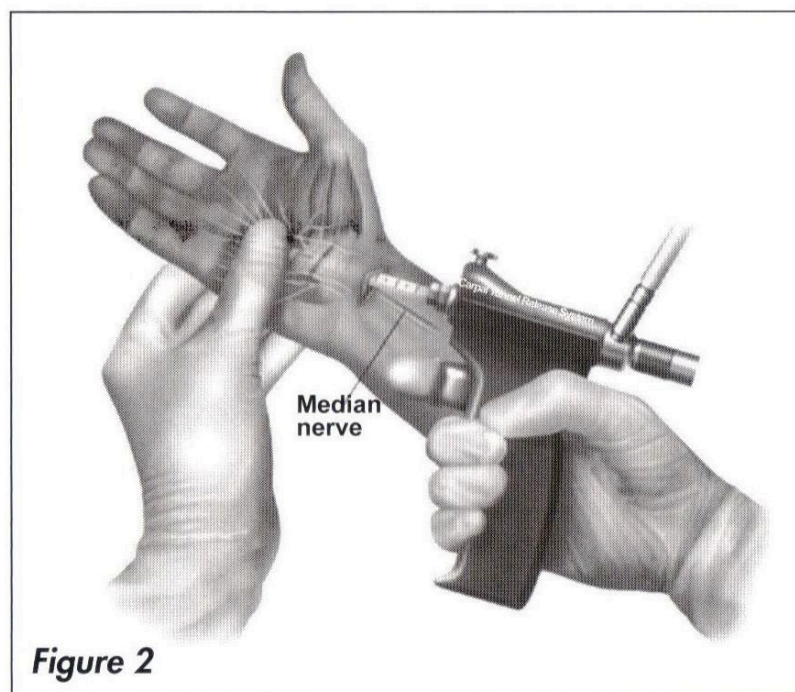
**DIAGRAM 1**

The combination of a low faucet flow and kinking of the hose/nerve in more than one area can compound the symptoms. When evaluating for carpal tunnel syndrome, other conditions such as cervical spine disease and metabolic causes such as diabetes, etc., must be ruled out. A thorough history and careful clinical examination from the neck to the fingertips and sometimes an electrophysiological test (EMG/NCV) will help confirm the diagnosis. Once the diagnosis of carpal tunnel syndrome has been established, the treatment is aimed at taking away the compression of the nerve at the level of the wrist. A simple over-the-counter wrist splint positioned to extend the wrist decreases the kinking of the median nerve. Anti-inflammatory medications such as Motrin and Aleve may also be helpful by decreasing the swelling of the tendons within the carpal canal. When these remedies fail, an injection of cortisone into the carpal tunnel combined with a splint, can significantly diminish the swelling leading to decreased compression of the nerve and thus resolve symptoms. If these conservative treatments fail to decompress the nerve, the canal space can be made larger. Unfortunately, there are no manipulations or devices that will expand the rigid carpal tunnel canal structure.

Surgery is aimed at opening the thick transverse carpal ligament that forms the roof of the canal, giving more room for the median nerve. By opening the transverse carpal ligament, the kink of the nerve is removed and the electrochemical impulses can now flow more normally. The pain, numbness, tingling, and weakness can resolve if the nerve has not been significantly damaged by long-standing compression.

Surgical intervention for carpal tunnel syndrome has significantly progressed. The old technique of an open carpal tunnel release creates an incision within the sensitive palm of the hand. While this approach takes away the kink of the nerve by opening the transverse carpal ligament, the downside is a tender, painful palm. This drawback has been overcome by using an endoscopic device which allows the operation to be done through a ¼ inch incision site away from the palm at the wrist crease.

The median nerve is directly visualized and therefore the contents of the carpal tunnel can be safely decompressed by releasing the transverse carpal ligament (Fig. 2). While this operation is more technically demanding than the open carpal tunnel procedure, with training and experience, this surgery is safer and leads to excellent relief of the symptoms while allowing faster return to full activity.



***Endoscopic carpal tunnel release***