

## **A Primer on Scientific Evidence and Treatment of Neurogenic Pain**

Neurogenic pain is simply “pain generated by a nerve.” The explanation concerning the difference between “nociceptive” pain and “neuropathic pain” will be deferred, but usually, neurogenic pain is **neuropathic**—that is, due to an injured or diseased nerve that spontaneously generates pain. This nerve can be a PERIPHERAL nerve, like the nerves in the feet that transmit pain associated with diabetic neuropathy...or perhaps like the median nerve which is compressed in carpal tunnel syndrome. Neurogenic pain may also emanate from a plexus, which is a structure that is comprised of a bundle of different nerves. An example of this is the brachial plexus (the bundle of nerves between the spine and the arm). Neurogenic pain can also emanate from the nerve roots, which are very important bundles of nerves that arise directly from the spinal cord and exist on both sides of the spinal cord at every spinal level. All of these aforementioned structures are PERIPHERAL in origin because they are found in the peripheral nervous system, which is distinguished from CENTRAL nerves, which are found in the central nervous system. Examples of central nerves are structures in the brain and spinal cord. Examples of pain from CENTRAL nerve structures include complex regional pain, at times referred to as Reflex Sympathetic Dystrophy. For the purpose of this instruction sheet, we will refer to neurogenic pain that arises from the PERIPHERAL nervous system only (nerve, plexus and nerve root).

Examples of NEUROGENIC pain include pain from nerve compression, muscle spasm affecting nerves, disc herniation affecting nerve roots, failed spinal surgery or from injuries sustained during sports and recreational activities. A scientific literature review confirms that sport and

recreational activities can lead to a range of peripheral nerve injuries<sup>1</sup>. Even mild, brief retraction of the nerve root during minor spinal surgery reduces nerve blood flow significantly and can result in postoperative pain<sup>2</sup>. This particular pain is associated with injury to very tiny ramifying nerves that are named “nervi nervorum,” a.k.a. nerves from a nerve that innervates that nerve. Just like the heart sends blood to coronary vessels, which come back to feed the heart muscle itself, the tiny nervi nervorum are special tiny nerves that arise from the nerve itself and travel a very short distance back to the nerve to innervate the nerve cover (sheath). Based on current scientific and clinical evidence, nervi nervorum are extremely sensitive to even the slightest injury or compression and are implicated in initiating events leading to chronic nerve pain<sup>3</sup>.

**Management of neuropathic pain** is a great challenge that is a specialty of Avicenna Spine & Joint Care. Currently, there is no consensus regarding the optimal management of neurogenic pain. As a result, treatment of neurogenic pain varies greatly worldwide<sup>4</sup>. The treatment of neuropathic pain is largely experiential, often relying heavily on data from small, generally poorly-designed, clinical trials or, in many cases, anecdotal evidence (anecdotal evidence is basically a collection of stories from reputable sources that is clinically useful, but not scientific...often used to guide treatment when more scientific data are not available. Treatment of neuropathic pain may include non-invasive therapies (such as pharmaceutical treatment or physical therapy), invasive therapies (nerve blocks, radiofrequency procedures), or alternative therapies (e.g., acupuncture). A scientific literature review by Abram demonstrated that

**peripheral nerve block procedures** can provide useful diagnostic information and play an important role in the management of peripheral neuropathy<sup>5</sup>. That is to say, nerve blocks simultaneously reduced pain and at the same time, help diagnose the cause or location of pain. A study by Amer confirmed that a local anesthetic block has a more complicated effect on nerve structures, not just the expected numbing effect for 2-3 hours. The study established that pain relief after a nerve block can last from 12 to 48 hours and in some patients even 2 to 6 days<sup>6</sup>. Of course, the functional improvement may last much longer, particularly when performed in the context of a well organized treatment plan.

### ***Neurogenic Pain and Osteoarthritis***

A review of scientific literature in *Arthritis Research & Therapy* has shown that the evidence presented in multiple studies clearly indicates that changes in the central nervous system caused by degenerative joint injuries are the origin of chronic arthritic pain<sup>7</sup>. It was also pointed out in the *Current Opinion in Rheumatology* that the nervous system has a variety of mechanisms whereby it can initiate or accelerate joint disease<sup>8</sup>. That is to say, joint disease causes the nervous system to worsen the problem and the nervous system causes the joint disease to worsen—perhaps causing a vicious circle of chronic pain—that can be mitigated by certain interventional pain therapies performed at Avicenna Spine & Joint Care.

### ***Nerve Blockade and Radiofrequency Lesioning for Treatment of Osteoarthritis***

Multiple studies have been performed which show the success of nerve blockade and radiofrequency lesioning for the treatment of osteoarthritis. “Lesioning” refers to the precision destruction (in some cases) or pulse stunning (in

other cases) of a very discrete portion of the nerve or nerve root branch that actually HELPS get rid of pain and improve function. One study demonstrated that a suprascapular nerve block effectively relieves shoulder pain and reduces disability due to rotator cuff tendinitis<sup>9</sup>. This is commonly performed in this clinic and the results have been excellent. In this clinic, ultrasound guidance is often utilized for this type of block, which further increases the safety as well as the effectiveness of this block. A different double-blind study showed that in patients with shoulder arthritis, a suprascapular nerve block resulted in considerable pain relief as well as considerable improvement in range of motion when compared to conventional intra-articular steroid injections (the usual injections into the shoulder joint)<sup>10</sup>. Another study exhibited the positive effect of pulsed radiofrequency when performed on suprascapular nerves, noting the relief of shoulder pain for up to 12 months<sup>11</sup>. Gurbet reported that radiofrequency lesioning of the suprascapular nerve provided pain control for at least 12 weeks and improved shoulder joint movements<sup>12</sup>. Now moving down to the knee—it has been demonstrated that radiofrequency lesioning of the saphenous nerve (a purely sensory nerve that innervates the knee joint) had induced an adequate relief of knee joint pain and improved knee range of motion for more than 5 months<sup>13</sup>.

While the world of pain medicine does rely some on “anecdotal evidence,” these selected few studies represent the burgeoning scientific literature that has helped us better understand pain as well as having guided improvements in pain medicine techniques that are seen in this office. Avicenna Spine & Joint Care strives to incorporate techniques as to represent an optimal combination of precision, effectiveness and safety in its treatment.

## REFERENCES

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