

## **Dry Needling for the Chiropractic Tool Box**

*By Carol Marleigh Kline, JACA Online editor*

**D**ry needling enables practitioners not only to defuse pain, but to help heal many neuromuscular skeletal conditions. In the 70s, Karel Lewit,<sup>1</sup> a Czech physician, began the first experiments with hollow-bore needles and trigger points that led eventually to the development of dry needling as a technique. Some confusion exists because at this time, dry needling uses monofilament needles, which are also used in (but not exclusive to) acupuncture. Any similarity between acupuncture and dry needling is on the surface, says David Fishkin, DC, MPH, founder of the Dry Needling Institute in Rockville, MD.

### **How different are acupuncture and dry needling?**

Dr. David Fishkin says dry needling (DN) is “a physiologic therapeutic technique and procedure. Its purpose is to neutralize soft tissue and to restore and improve muscle and fascial function. This treatment mechanically disrupts physiologically locked tissue. It consists of insertion of a monofilament, sterile, thin-gauge needle, a needle that also happens to be used by acupuncturists.” He adds, “The soft-tissue entities in the periphery are influenced by and influence the central and peripheral nervous systems.

“Dry needling is not to be confused with acupuncture. Acupuncture is an Asian complete system of healing. Its theories focus on the use of specific points, meridians, and the concept of *chi*, or life-force.”

“The dry needling procedure, however, works with myofascial trigger points and tender points. It is based on Western concepts of anatomy, physiology, neurology, and biomechanics. The only common element is the choice of tool.”

### **What is the pathophysiology of myofascial pain?**

“Pain,” says Dr. Fishkin, “can be generated centrally, at the spinal cord, by a combination of articular, ligamentous, muscular and vascular forces upon the nerve, which travel along the osteoligamentous canal, irritating the root and resulting in peripheral neuropathies. Or pain can be generated peripherally from local acute trauma or low-amplitude repetitive forces upon the muscle-fascial system. As peripheral nerves travel through the soft tissue, they can become affected by compressive or tensile and torquing forces. If either mechanism is left firing too long, the supraspinal region, the central brain, will undergo changes that will perpetuate the pain cycle and be a further source of pain generation.”

### **What is the pathophysiology of trigger points?**

Trigger points (TrPs) can also result from external irritation. “They are classically defined as hyper-irritable places in the skeletal muscle associated with a hyper-sensitive palpable nodule in a taut band—with credit to Travell and Simons.<sup>2,3</sup> “The clinical manifestation of myofascial trigger points (MTrPs) is referred to as myofascial pain syndrome (MPS), and is defined, again, by Travell and Simons as “the sensorimotor and autonomic symptoms caused by myofascial trigger points.” This theory proposes that abnormal concentric and eccentric contraction demand on a muscle by macrotrauma, or recurrent microtrauma, leads to increased calcium release from the sarcolemma and a prolonged shortening of the sarcomeres.” Prolonged shortening, he says, disrupts circulation. The reduced oxygen supply leaves cells unable to produce enough adenosine triphosphate (ATP) to begin the process of relaxation. “In addition, ischemic by-products of metabolism accumulate and are partly responsible for some of the pain produced by

## Focus

sensitization and direct stimulation of sensory nerves.”

**Would you talk more about trigger points?** “I break down TrPs into several types: active, passive, and latent. My TrP definitions have been developed as a result of the work I have done with dry needling over many years—they are not necessarily in line with Travell. The classic TrP is defined in the Travell/Simons theory as having a characteristic “ping” or jump sign when you palpate it. The confirmation occurs when the needle is inserted, followed by the characteristic involuntary contraction of the muscle, which is known as the local twitch response (LTR). But this is the extreme manifestation of altered function. There is a continuum of change along the way that also has diagnostic value and is worthy of treatment. The active points are the ones that the patient knows and can show you—along with the sequellae of dermatomal and/or myotomal patterns and other autonomic phenomena.

“The patient is not aware of the passive points until you elicit a response. This can cause quite a surprise to patients if you don’t warn them that this could happen.

“The third type of trigger point is latent. A latent point hasn’t manifested, but it can occur in a similar location on the contralateral side. You may not see latent points or feel them, but you want to look out for them. Active and passive points are all-important for diagnosis and treatment. But we should keep a lookout for those latent ones.”

### **What are the physiological and neurological mechanisms behind dry needling?**

“Tissue becomes locked, fixated. We also use this term in chiropractic—when joints become fixated.” But that, says Dr. Fishkin, refers to bones. “With soft tissue, the muscle-fascial system is also in a locked or fixated state. The needle has to mechanically disrupt the area in a way similar to chiropractic manipulation to restore motion.”

Dr. Fishkin says that with trigger points, too, the provider wants to allow fixation to dissipate. “I believe what’s happening is that dry needling improves lymphatic and blood circulation. pH levels improve. Interstitial swelling, which is associated with this process, recedes, and neurotoxic chemicals are flushed out. Whether it’s osseous manipulation or mobilization or massage, they all cause a response in the central system, meaning in the brain, as well. Needling will send signals to the spinal cord and up pathways to the brain, which appear to elicit a strong response from the hypothalamus, which then influences the pituitary and subsequent endocrine functions. Paraspinal TrPs will more directly influence autonomic symptoms. There’s also a central brain response, an anti-inflammatory response from the hypothalamus/pituitary/adrenal axis.”

### **Is there always a spinal cord component to dry needling?**

“In treatment, yes. But you can have a purely peripheral presentation. You can treat peripherally and it can result in complete resolution of the problem. So it’s not necessary to treat both. You can treat just peripherally.” But, Dr. Fishkin says, it’s often important to needle both a particular trigger point and the related paraspinals. “We may not be sure where the irritation started—centrally or peripherally. As we know, the communication goes both ways. Therefore, when there is a question, absolutely treat both. But there are times when someone will have a very localized area and you can just treat the spot and be done with it.”

### **What is the biomechanical explanation for trigger points?**

“Needling,” he says, “works directly on the soft tissues of the body—specifically the muscles, ligaments, tendons, and fascial tissues. These tissues are not just slaves of the nervous system, but are themselves an integral part of the communication with the nervous system and its own network of tissues on the cellular level. So this comprises a vast tissue signaling system that has a network effect throughout the structural system from a single point of stimulation.

## Focus

“We use the term ‘biotensegrity,’ which is originally an architectural term that refers to the interface of architectural systems. Postural changes, which relate to our biotensegrity, directly influence the communication network. Imagine a continuous, overlapping, flowing, sliding sheeting or Saran wrapping. When there’s a glitch in this system, it has impact on adjacent and non-adjacent tissues.” Dr. Fishkin credits researcher Helene Langevin<sup>4,5</sup> with her work to help explain a body-wide signaling system. He says chiropractors have focused for too long on the joints and the articular structures as primary. “Our bones are in this matrix of connective tissues. But I’m coming to find that secondary to the complexity of the fascia, there may be an intelligence to the soft-tissue system.”

In the early years, he says, x-ray images allowed practitioners to see the skeletal system. “In many ways, the skeletal system is easier to fix, compared to the matrix of the soft-tissue system. Imagine tearing Jell-O—and trying to fix *that*. Tensegrity is a scientific principle that describes the natural geometry of the body in terms of compression and tension vectors. The musculoskeletal system is a synergy of muscle and bone. Muscle provides continuous pull, and bones provide continuous push—so there is this ongoing interaction between them. But the bones are not as “smart” as the soft-tissue system when it comes to overall function.

“When I first started working in this area, what I learned challenged many of my underlying assumptions. I had to get over that. Once I did, it became much easier.

“For example, a patient would come in very antalgic.” Classic training, he says, would lead DCs to do what they learned in school. “But by applying the dry needling technique to such a patient, by the end of the session, pain would be much reduced and the patient could stand up straighter. That has to really rock your belief system,” he says, when you’ve helped a patient to that degree “without having done a traditional manipulation. We have to be open to growing and expanding our ideas.”

### **Would you go more deeply into the chemical effects of dry needling?**

“Shah<sup>6</sup> works at NIH and his paper is quite good on these effects, but there are other researchers that brought this up much earlier. Patients will often report to a doctor that they feel swollen, but they don’t look swollen. They have this feeling of pressure. Brendstrup<sup>7</sup> in 1957 showed evidence of acid polymucopolysaccharides and interstitial edema by histologic staining techniques. What happens is that in this process, the chemicals—the pH—changes. That causes an increased concentration of hyaluronic acid. We know that hyaluronic acid is one of the components of the disk. And one of the qualities of the disk, as Dr. James Cox has taught us repeatedly, is its increased water-binding capacity. When you have an increase of hyaluronic acid in the interstitial fluids, it also causes a water-binding capacity. This edema might also distort the nerve endings. One of the positive effects of needling is to allow all that to get washed out.

“In summary, we know that trigger points are hypoxic—that there’s not enough oxygen there. Hypoxia leads to an acidic environment. pH changes allow all these negative things to happen. An acidic environment leads to a decrease in acetylcholine esterase, and there’s an increase in noxious biochemicals. This leads to an increase in pain and motor end plate activity. So the contracted muscle now is in energy crisis because the ATP supply has been exhausted and it cannot replenish itself due to hypoxia. So then the tissue is in this locked, fixated state. And then the needle comes along and unlocks it.”

### **Why is there more than one kind of dry needling?**

“There are two major ones that I talk about a lot. There’s superficial dry needling, which comes from Peter Baldry,<sup>8,9</sup> and deep dry needling, which has been proposed for many years by Dr. C. Chan Gunn<sup>10,11,12</sup> of Vancouver.

“Baldry used to do the deeper form, but he apparently hurt someone, so now he uses superficial dry needling (SDN). SDN has effects,

## Focus

but not as profound as the deep dry needling (DDN) that Gunn uses. Gunn is an MD, not a DC, but his theory is completely consistent with the chiropractic theory of nerve impingement, which is an important component of the subluxation complex. Gunn puts forth the simplified image of stepping on the garden hose and cutting off flow—and I'm relatively sure he never read chiropractic theory. His idea is that the deep paraspinal muscles are not just in spasm, but they're shortened over time. A spasm is usually an acute event but that muscle eventually goes from being in spasm to just being short. The shortness leads to compression of the space where that nerve exits. With his technique, it's important in the paraspinal region to deeply release those muscles.

“The technique that I teach is a combination of both approaches. It depends on the need. We want to have as many tools in our toolbox as possible to help the patient. Even within the technique, there's variability in how you do it to achieve certain goals.

“The biggest issue is pneumothorax, but it's very technique- and operator-dependent. Therefore, it can be minimized almost to zero. Theoretically, it could happen, but the likelihood is probably even smaller than the cervical manipulation problems faced by chiropractors. Even if it happens, pneumothorax is not a devastating event. It's completely recoverable—not that you ever want it to happen. It's very unpleasant. As in cervical manipulation, if you screen the patient properly and use the correct technique, it probably should never happen. I train people to minimize the likelihood to the lowest possible level.

### **Can dry needling accomplish the same pain relief as having an MD inject a TrP with local anesthetic?**

“Absolutely. We know, historically speaking, that Karel Lewit used a hollow-bore needle, not a thin solid filament needle, and it worked. I came independently to the same conclusion. I was working with an anesthesiologist in 1998 who

was doing pain management for me with patients. He would come to my office and inject patients—and I would treat them immediately.

We got fantastic results. We talked about the fact that the drug could not act that fast and be that effective, so maybe there was something else going on. I picked up that idea and ran with it. There were some other studies that compared dry needling with injection therapy.<sup>13,14</sup> Dry needling was found to be equally as effective as injection, if not more. We know that drug injection has limited value because of drug toxicity. In that sense, DN is a better choice.

“At other times, patients may be in such a bad state that you decide to refer them for trigger point injections.” Dr. Fishkin says he used to do that in the past fairly often, but not much today.

### **Comparing SDN and DDN**

“Superficial dry needling may have more global effects in terms of pain or activation of the central nervous system and what's called opioid-mediated pain suppression. Deep dry needling has a much more immediate local effect. We might use SDN initially to desensitize patients to the pain they are feeling and to the experience of needling—and follow that with deeper needling. I think it's a good way to build patients' tolerance.

### **Patient and Practitioner Comfort**

“The important thing to me is that the patient has a minimally painful experience. Some other techniques are very uncomfortable for the patient. I've adapted and changed the approach to make it both as comfortable and as effective as possible. This also avoids stressing the practitioner. If the patient is squirming and screaming, it's not comfortable to do the work.” On the other hand, he says, if a patient is comfortable and relaxed and tolerates the treatment, the stress is off everyone.” ■

**Next Month:** Dry Needling, Part II: twitching, shouting, rotating, pistoning, and more.

## Focus

### References

1. Lewit, K. The needle effect in the relief of myofascial pain. *Pain* 1979;6(1):83-90.
2. Simons DG, Travell JG. *Travell & Simons' Myofascial Pain and Dysfunction: The Trigger Point Manual*. Baltimore, MD: Lippincott, Williams & Wilkins. 1999.
3. Simons DG, Mense S. Diagnosis and therapy of myofascial trigger points. *Schmerz*. December 2003; 17(6):419-24.
4. Langevin HM. Connective tissue: a body-wide signaling network? *Med Hypotheses*. 2006; 66(6):1074-7.
5. Langevin HM. *Connective Tissue Mechanotransduction Responses to Stretch and Acupuncture: From Ex Vivo Fibroblast Cytoskeletal Morphology to In Vivo Ultrasound Elasticity Imaging*. National Center for Complementary and Alternative Medicine. Lecture.
6. Shah JP. An in vivo microanalytical technique for measuring the local biochemical milieu of human skeletal muscle. *Journal Appl Physiol* 2005;99:1977-1984.
7. Brendstrup P. Morphological and chemical connective tissue changes in fibrotic muscles. *Annals of Rheumatic Diseases* 1957;16:438-40.
8. Baldry P. *Myofascial Pain and Fibromyalgia Syndromes*. Edinburgh, UK: Churchill Livingstone. 2001
9. Baldry P. Superficial Versus Deep Dry Needling. *Acupuncture in Medicine* 2002; 20(2-3):78-81.
10. Gunn CC. Electrical twitch-obtaining intramuscular stimulation in lower-back pain: a pilot study. *Am J Phys Medicine & Rehab* 2006;85(12):1015-1016.
11. Gunn CC. Tenderness at motor points. a diagnostic and prognostic aid for low-back injury. *J of Bone & Joint Surgery* 1976;58(6):815-25.
12. Gunn CC, *The Gunn Approach to the Treatment of Chronic Pain*. Churchill Livingstone. 1996.
13. Garcia-Franco M. A comparative study of two myofascial infiltration techniques in trigger points: dry needling and local anaesthetic injections. *Rehabilitacion* 2006;40(4):188-92.
14. Ay, S. Comparison of injection methods in myofascial pain syndrome: a randomized controlled trial. *Clin Rheumatol*. 2010 Jan;29(1):19-23.

### Other Sources

Brendstrup P. Morphological and chemical connective tissue changes in fibrotic muscles. *Annals of Rheumatic Diseases* 1957;16:438-40.

Gerwin RD. An expansion of Simons' integrated hypothesis of trigger point formation. *Current Pain and Headache Reports* 2004 8: 468-75.

Kimura Y. Evaluation of sympathetic vasoconstrictor response following nociceptive stimulation of latent myofascial trigger points in humans. *Acta Physiol (Oxf)*. 2009; Feb 4. [Epub ahead of print]

Shah JP. An in vivo microanalytical technique for measuring the local biochemical milieu of human skeletal muscle. *Journal Appl Physiol* 2005;99:1977-1984.

Takaguchi S. Relationship between a chronically painful trapezius muscle and its metabolic state analyzed with PET/CT. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2010 Jul;110(1):54-61.

Shah JP, Gilliams EA. Uncovering the biochemical milieu of myofascial trigger points using in vivo microdialysis: An application of muscle pain concepts to myofascial pain syndrome. *J Bodywork Movement Ther*. 2008;12:371-84.

Lund N. Muscle tissue oxygen pressure in primary fibromyalgia. *Scandinavian Journal of Rheumatology* 1986;15(2):165-173.