Dynamic Chiropractic
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June, 2013

Reducing Muscle Hypertonicity with a Deep Muscle Simulator

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Editor's note: This article is the first in a series on technologies in practice.

The Functional Movement Screen (FMS) has popularized our awareness of checking for asymmetries in the body during movement. Muscle strains and joint dysfunctions caused by asymmetrical movements over time can generally be reduced by treatment using the Deep Muscle Stimulator (DMS).

The DMS is a hand held device that delivers strong vibration, oscillation and percussion. Use of the DMS appears to reduce stiffness by signaling inhibition of the sympathetic nervous system. Palpate tight or stiff fascial tissue or a taut and tender muscle fiber, and then apply the Deep Muscle Stimulator (DMS) device for approximately two to three minutes, the post treatment/application will leave the skin red, warm and it will palpate as "softer." This probably has to do with local changes in the arterioles and capilliaries and the mixing up of tissue viscosity.

To really appreciate the DMS, we need to review some neurology. Golgi receptors are located in dense connective tissues such as ligaments, joint capsules (Golgi end organs) and around myotendinous junctions (Golgi tendon organs).[1] Golgi receptors are stimulated by slow active stretching or strong local pressure resulting in a lowered firing rate of associated alpha motor neurons via the spinal cord, this leads to decreased active muscle tone in related muscle fibers.

Pacinian and Ruffini bodies are found in dense connective tissue – muscle fascia, tendons, ligaments, aponeuroses and joint capsules. Pacinian corpuscles are more concentrated in the tendinous portion, deep joint capsules; deep spinal ligaments; plantar and palmer tissues; periosteum and fascia of the antebrachial, crural, abdominal fascia and fascia of the masseter and lateral thigh.[2] The Pacinian receptors are stimulated by high-velocity thrust manipulations and vibratory or oscillatory techniques like the DMS (especially if

held with constant pressure). Hanna[4] suggests this stimulation may improve local neuromuscular coordination.

Ruffini endings are found in joint capsules, the dura mater, the ligaments of peripheral joints, the hand and the knee. The thoracolumbar region has significant amounts of both Pacinian and Ruffini receptors.[3] Stimulation of the Ruffini receptors has a local relaxing effect and a whole body relaxing effect, especially if performed with slow and deep tissue techniques and/or faster strokes with the DMS. The DMS device becomes an extension of your hand and you control the speed of movement, depth (superficial or deep) and amount of pressure applied to the tissues.

The Golgi, Pacinian and Ruffini receptors are type I and II receptors and only a small portion of the sensory information comes from these. The majority of the sensory input comes from the type III and IV receptors called interstitial receptors. The majority of these fibers function as mechanoceptors and help in fine tuning the nervous system's regulation of heart rate, blood pressure, and respiration.[5]

Application of the Deep Muscle Stimulator prepares the paraspinal muscles and soft tissues to receive higher force manipulation that will allow gross structural spinal and postural changes. The DMS cycles seem to mix and re-mix the soft tissue aggregate. Motion palpation allows us to feel parts of tendons, joint capsules, aponeuroses, fascia, ligaments, retinaculae, septa, membranes, etc that become too tight. The DMS can be used to loosen these structures. Then the patient can be taught how to stretch (static or dynamic) the same muscles that were treated with the DMS. If you palpate structures that have become too loose, the patient is taught stabilization or motor control exercises.

One particular technique I like to use with the DMS is covering the posterior myofascial chain or superficial back line as called by Tom Myers. I start this technique by using the DMS on the bottom of the foot and travel cephalad with the DMS going over the posterior calves, thighs, sacrotuberous ligament, gluteals and paraspinals up to the cervicothoracic junction. This procedure takes about two to five minutes per side. This seems to lower the resistance of spinal disks and ligaments, thereby making changes in spinal position easier and pain free.

One of the most practical applications using the DMS includes treating patients with Janda's Lower Crossed Syndrome and the Layer Syndrome. Muscles that tend to tightness and are key to treat using the DMS are the gastroc-soleus, thigh adductors, tensor fascia latae, piriformis, psoas, hamstrings, thoracolumbar erector spinae and levator scapulae. The posterior layer of the lumbodorsal fascia (PLF) connects the spinous

processes of the lumbar vertebrae with the iliac crest and the gluteus maximus muscle. Based on the fiber orientation of the PLF and gluteus maximus, the PLF connects all four limbs and acts as a tendon of the gluteus maximus.

As practitioners we deal with client's pain, tension, stiffness, limitations and injuries. The DMS is a useful tool to help you recognize and release faulty habitual patterns of movement and posture.

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