What is Pandiculation, and Why Doesn't Stretching Work?

WHAT IS PANDICULATION?

The Pandicular Response

Pandiculation is generally defined as the act of stretching oneself and yawning, especially upon waking. However, our automatic pandicular response has far more significance than simply prompting us to stretch and yawn.

Pandiculation is the nervous system's natural way of waking up the sensory-motor system and preparing for movement. Humans, along with all vertebrate animals, tend to automatically pandiculate when we wake up or when we have been sedentary for a while. If you've ever seen a dog or cat arch their back when they get up from a nap, or watched a baby stretch their arms and legs as they wake up, you've witnessed the pandicular response.

Pandiculation also sends biofeedback to the brain regarding the level of contraction in our muscles, thereby helping to prevent the buildup of chronic muscular tension. This is an extremely important function of the pandicular response. Pandiculation contracts and releases muscles in such a way that the *alpha-gamma feedback loop* (a feedback loop in the nervous system that regulates resting muscle tension) is naturally reset. This resetting reduces muscular tension and restores conscious, voluntary control over the muscles. Preventing the buildup of tension in our muscles is critical to maintaining healthy posture and movement throughout our lives.

Fetuses have been observed pandiculating while in the womb, showing how deeply ingrained the pandicular response is in our nervous system and how critical it is to our musculoskeletal functioning. Unfortunately, as we age and develop habitual ways of standing and moving, our natural pandicular response typically can't counteract all the learning that occurs in our nervous system. And as we lose sensory-motor awareness and control, the pandicular response often becomes inhibited.

Pandiculation as a voluntary movement

Thomas Hanna studied neurophysiology and explored movement techniques that would directly address the habitual muscular tension that was the underlying cause of his clients' chronic pain and posture and movement issues. Hanna developed the techniques of *hands-on pandiculation* and *self-pandiculation,* both of which make use of the natural function of the pandicular response. I sometimes refer to these techniques as "voluntary pandiculations" in order to make the distinction between them and the reflexive movements that occur in the pandicular response.

Voluntary pandiculation proved to be a groundbreaking movement technique. It quickly reduced muscular tension, and since it relaxed muscles through active learning rather than passive manipulation (such as in stretching or massage), the effects were typically long-lasting.

Hanna would first teach his clients pandiculations that focused on a small group of muscles, releasing muscle tension by resetting the alpha-gamma loop. Once involuntary muscle tension had been reduced, he would then teach his clients larger movements which taught natural, efficient full-body movement patterns.

Hanna found that **active, voluntary movement** on the part of the client was the most efficient and effective way to retrain the nervous system and release chronic, involuntary muscular contraction. Pandiculation was the first active hands-on movement technique that a somatic educator had employed to any significant degree. Previous somatic educators had focused on passive hands-on movement techniques that improved function by increasing sensory-motor awareness and relaxing the nervous system. However, none had specifically addressed the resetting of the alpha-gamma loop by using active movement.

What is a voluntary pandiculation?

A voluntary pandiculation is a type of *eccentric contraction*. An eccentric contraction is defined as the action of a muscle that is engaged while it is lengthening under load. Here is an example: You hold a weight with your arm hanging straight by your side. Then you lift the weight, bending your elbow and contracting your biceps as you lift the weight up. As you lower the weight down, you are doing an eccentric contraction of your biceps. Your biceps are actively engaged because you are holding the weight, but they are slowly lengthening at the same time.

A pandiculation is a more specific type of eccentric contraction because:

- It must be performed very slowly and very consciously so that the nervous system is able to learn from it.

- The muscle group opposing the muscles that are being actively released should not engage during the pandiculation.

- The resistance, or load, must be applied in a direction such that the muscles being released are fully engaged throughout the range of motion of the movement.

In a hands-on pandiculation, the practitioner provides resistance to the muscles that are actively releasing. Hands-on pandiculations can be performed in any position relative to gravity because the practitioner is providing the resistance. The practitioner can adjust the direction of the resistance as the student moves through the range of motion.

Most of the Clinical Somatics self-care exercises are self-pandiculations. In a self-pandiculation, gravity provides the only resistance. So, the student must be in specific positions relative to gravity in order to pandiculate certain muscles correctly.

The exercises taught in this course are all true self-pandiculations, with the following exception:

> The Washcloth is a full-body integrative movement that incorporates the pandiculation of some muscles; however, when the full exercise is practiced, it is difficult to consciously focus on each muscle group. The exercise is meant to integrate muscular releases that have been learned in previous exercises, and to teach natural, full-body movement patterns.

WHY DOESN'T STRETCHING WORK?

What is the Stretch Reflex?

All of us, including all vertebrate animals, have a nervous system reflex called the *stretch reflex*, or *myotatic reflex*. When your doctor used that little hammer to hit just below your knee, making your foot kick up, he was testing your stretch reflex.

The stretch reflex is an automatic nervous system response to stretching within a muscle. The reflex provides automatic regulation of skeletal muscle length. When a muscle is lengthened beyond a point where it can comfortably stretch, muscle spindles (proprioceptors in the muscle) are stretched and their nerve activity increases. Neurons then immediately send a message to the muscle fibers to contract in order to protect the muscle from being torn.

In general, reflexes exist to help us stay alive and avoid injury. One critical function of the stretch reflex is that it prevents us from tearing our muscles, tendons, and ligaments. The knee-jerk reflex is a great example. The doctor hits your patellar tendon just below your knee, suddenly stretching the tendon and the quadriceps tendon, which attaches above the patella.

The muscle spindles in your quadriceps muscles sense the sudden increase in length, and the message is automatically sent to contract your quadriceps in order to prevent injury and over-stretching of the muscle and tendon. When your quadriceps contracts, your foot kicks up. If your foot doesn't kick up, it could be a potential sign of a neurological disorder, such as receptor damage or peripheral nerve disease.

The stretch reflex also helps us stand up straight in our gravitational field. For example, when a person standing upright begins to lean to the right side, the postural muscles on the left side of the vertebral column will be stretched. When the muscle spindles in those muscles sense that they are being lengthened, the message to contract them is automatically sent in order to correct the person's posture. We are rarely consciously aware of how the stretch reflex automatically maintains our balance and keeps us from falling over—but we sure would notice if it wasn't working properly.

Why doesn't static stretching work?

When you practice static stretching, the conscious and subconscious parts of your nervous system are fighting against each other, trying to achieve opposite results. The conscious part of your brain is sending the message to manually lengthen your muscles by pulling on them. But despite all your efforts, your stretch reflex is automatically kicking in, contracting your muscles to prevent you from overstretching and tearing your muscles, tendons, and ligaments.

But why does it feel like static stretching works?

So if our stretch reflex prevents us from manually lengthening our muscles, why does stretching sometimes make us more flexible? There are a few reasons.

One reason is that when you engage in prolonged static stretching, pulling your muscles and tendons past the point that they are able to voluntarily lengthen, you begin to stretch your ligaments. With prolonged stretching, ligaments can be stretched, resulting in more flexible and often less stable joints. Once stretched, ligaments may never regain their original length and strength.

Second, prolonged static stretching can cause the stretch reflex to become much less active, leaving the muscles lengthened for a period of time. This is why you may feel looser after you stretch. However, the effects wear off fairly quickly. Often you will feel your muscles begin to tighten up again within just a few hours as your stretch reflex regains normal function.

For this reason, prolonged static stretching decreases muscle performance by temporarily reducing the muscle's ability to contract. This is not beneficial if you're about to engage in athletic activities. A great deal of research has shown that static stretching before a workout decreases joint stability and reduces muscle performance and power. Many coaches and

trainers have come to realize that the best way to warm up is to do a slow, gentle version of the movement you'll be doing in your workout. By consciously practicing the movement sequences and increasing blood flow to your muscles and connective tissues, this type of warm up prepares both your brain and your body for optimal performance.

A third reason that stretching can make us feel more flexible is that when we stretch repeatedly, we are building up a tolerance to the sensation of pulling in our muscles. Even though it is by nature an uncomfortable sensation, with repetition it can become tolerable, enjoyable, and even addictive.

Stretching to relieve chronic pain: Why it doesn't work

First, stretching does not reeducate the nervous system. No amount of pulling on the muscles will change the resting level of muscle tension that is being set by the alpha-gamma feedback loop. The resting level of muscle tension must be reset through an active process of relearning involving slow, conscious, voluntary movement and the integration of sensory feedback from the muscle.

Second, when you pull on an already tight muscle the stretch reflex is activated, making the muscle contract even more. It is possible that you might get some temporary pain relief from gentle prolonged static stretching, but as we've already discussed, the increased muscle length is temporary and the muscle will rebound within a short period of time. Most likely, stretching will not only do little for your pain, but will increase and prolong your pain by making your muscles tighter.