Reducing the Autogenic Inhibition Reflex: Making Weak Muscles Strong

By Todd Turnbull, DC, CCSP

The autogenic inhibition (AI) reflex is a sudden relaxation of a muscle in response to excess tension.¹ This automatic lengthening reflex is controlled by the central nervous system and regulated by the proprioceptors in the muscles and tendons, mostly by the Golgi tendon organs (GTOs).

A Golgi tendon organ is a stretch receptor that signals the amount of force developed by a muscle.

The AI reflex may be extensively involved in motor control under both normal and abnormal conditions. "One possibility is that this reflex helps to spread the amount of work evenly across the entire muscle, so that all motor units are working efficiently. That is, if some muscle fibers are bearing more of the load than others, their Golgi tendon organs will be more active, which will tend to inhibit the contraction of those fibers. As a result, other muscle fibers that are less active will have to contract more to pick up the slack, thereby sharing the work load more efficiently."²

In a dysfunctional muscle, a certain number of muscle fibers will not be able to perform the normal amount of work output. If the load is shifted from healthy fibers to dysfunctional fibers, the entire muscle may lose power.

This reflex can be altered by stimulation of the GTO in both a negative and a positive manner. Positive stimulation results in a decrease in the reflex, leading to greater muscle power output; negative stimulation leads to an increase in the reflex being active and a reduction of muscle-loading capacity.

Muscle power output can be evaluated via muscle-testing dynamometers and manual muscle testing. Changes in the AI reflex as a result of direct stimulation can be observed by performing muscle strength testing.

Eccentric break testing protocols are the preferred method of manually testing muscle power output; the goal of testing is to break the patient’s resistance.³ A normal, healthy muscle has the ability to isometrically lock against a reasonably applied force, whereas a dysfunctional muscle will break down against the same force or less. Grading the muscle "break" can be determined based on the amount of force applied from
slight (one-finger pressure), moderate and strong resistance.

Positive stimulation of the GTO is accomplished by pressing the tendon into the bony insertion and holding for 3-5 seconds with a force that is comfortably tolerable to the patient, while negative stimulation involves pulling the tendon away from the insertion. Comparing pre- and post-adjustment testing will note whether the stimulation was positive, neutral or negative.

The goal when treating a dysfunctional muscle is to restore normal muscle power output. Positive stimulation of the GTO should always result in a reduction of the AI reflex and a noticeable increase in muscle resistance during eccentric break testing, usually leading to the muscle being able to perform an isometric lock. What the patient experiences is a dramatic change in muscle function with a treatment time of only seconds. Patients are surprised changes can happen so quickly and may refer to the changes as being like "magic."

References


Dr. Todd Turnbull, has authored online courses and articles about concussions, sports performance, soft-tissue diagnosis, rehabilitation and disc herniations. He is a 1991 graduate of Life University, a board-certified chiropractic sports physician, and maintains a private practice in Portland, Ore. He can be contacted with questions or comments via his Web site: www.drtoddt Turnbull.com/DCJournal.