

Acupuncture in the Treatment of Sports Injuries: A Western Perspective

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A problem that often confronts many sports medicine professionals in clinical practice is the treatment of obscure muscular pain found in association with either traumatic or chronic/overuse injuries. The athlete frequently reports weakness at the injury site and describes the pain as deep and dull aching in nature. There may also be sensations of “pins and needles”, tingling and numbness (paresthesia) that accompanies the injury or referred sensations that travel away from the injury site. The athlete may have difficulty in locating the pain but can often reproduce the pain with particular movements. In traditional Chinese medicine (TCM), acupuncture points are utilized to address the injury and can often help to alleviate the pain.

Regardless of the therapy employed, the pain may return due to a muscle imbalance problem that offsets the biomechanical alignment of the body. The musculoskeletal system is like a pulley and lever system. Structural balance requires an equal pull by the opposing muscle groups located on each side of the joint. In an imbalanced state, there is conflict between the opposing agonist and antagonist muscle groups, which creates undue stress on the joints, muscles, tendons and ligaments. In most instances, one muscle or group of muscles is found to be hypotonic and lengthened while the opposing antagonist muscle or muscle group is hypertonic and short. The shortening of a muscle or group of muscles in conjunction with the weakening of the opposing muscle or muscle group (antagonist) is the primary factor that creates and predisposes the body to many somatic injuries. Some common muscle imbalance injuries can be seen in: low back strain, shoulder impingement syndrome, whiplash and tendonitis.

Trigger Points

Tight and painful muscular bands have been observed for thousands of years. (1) It is commonly known that acute, chronic or sustained overloading of a muscle creates tight palpable bands and may therefore activate a trigger point. Factors that contribute to the development of a trigger point include overuse activities, poor posture, and lack of exercise and stretching. (2) A trigger point is defined as a “hyperirritable spot in the skeletal muscle that triggers a characteristic referred pain or tenderness phenomenon.” (3) Some of the indicators of a trigger point include pain referral, muscle twitch response and tight palpable bands. These tight and pain palpable bands are treated effectively with the acupuncture needle.

Motor Points

A motor point is defined as “the most electrically excitable area of the muscle, and represents the greatest concentration of nerve endings” (1). Motor points are not exact

anatomical points, but follow a reasonable fixed pattern of locations. These points can be identified clinically as the site where a twitch may be evoked in response to minimal electrical stimulation without producing contraction elsewhere in the muscle (1). Motor points are located on the skin over the muscle and correspond approximately to the level at which the nerve enters the muscle belly. This area is known as the neuromuscular junction or zone of innervation. (4, 5)

Generally speaking, when muscle contraction takes place, the agonist (primary muscle doing the movement) shortens in length in order to pull the muscle and create a subsequent movement. On the other hand, the antagonist (opposing muscle) lengthens in order for the agonist muscle to create the movement. This is likened to a pulley and lever system. When structural balance has been altered, whether by lack of exercise or repetitive use, there is an imbalance created between the forces of the two muscles. This imbalance usually results in a difference in the range of motion. This predisposes the musculoskeletal system to injury and soreness.

The Muscle Spindle

Dr. Irwin Korr, who has conducted extensive research on muscle imbalance, explains: “the muscle spindle is the primary reason for decreased joint range of motion based on the unilateral active contraction of the muscle pulling the joint in one direction from a repeated activity.” (6) He proposes that over-activity of the muscle spindle creates a reflexive spasm, or “ropiness”, in the muscle, that then inhibits the joint in which it functions from returning to its original resting position.

Muscle spindles are a group of sensory receptors located in muscle that monitor changes in length of the muscle. They are highly specialized and are scattered throughout skeletal muscle. Muscle spindles detect, evaluate, report and re-set the length of the muscle in which it lies, setting its tone continuously. (7-9)

The Stretch Reflex

When a rapid stretching movement stimulates a muscle spindle, a sensory neuron from the muscle spindle innervates a motor neuron in the spinal column to activate. The motor neuron will then cause a contraction of the muscle that was previously stretched. (11)

The knee jerk reflex is an example of a simple reflex. When the patellar tendon is tapped, the quadriceps femoris muscle group (agonist) is slightly stretched. The muscle spindles are stimulated and send impulses to the spinal cord. Impulses are sent back to the quadriceps muscle group. The muscle group responds by contracting and extending the lower leg. Accessory information is also sent to the antagonist muscle group (i.e. hamstring muscles) to relax so that a smooth coordinated movement may occur. This phenomenon is referred to as reciprocal inhibition. (1)

Most injuries involve muscle fiber overstretching on one side of the joint while there is shortening on the other side. This strains the soft tissue and affects the muscle spindle response.

What happens when an acupuncture needle enters a motor point?

When the acupuncture needle enters a motor point or zone of innervation, the needle usually elicits a change in length of the muscle (i.e. a rapid stretching movement). Twirling the needle can further increase the change in length (by the stretching of the muscle fibers around the needle). (1) In other words, the needle elicits the stretch reflex. In fact, many mini stretch reflexes occur to relax the muscle. Acupuncture to the motor points seems to “reset” the dysfunctioning muscle spindle and to correct the abnormal muscle function and reflexive spasm. (1) The motor point serves as a way of balancing the agonist and antagonist muscle groups.

Assessment and Treatment

The following outlines a typical assessment plan for a musculoskeletal injury. This is how one could assess and treat a particular injury. Different acupuncturists may use their own methods. The specific example will address the shoulder.

Before beginning it is important to be aware of the movements that take place at the shoulder joint.

The movements include: flexion, extension, adduction, abduction, internal rotation, external rotation, horizontal adduction and horizontal abduction. Each movement has a group of muscles associated with it.

(A) Evaluation of Musculoskeletal Injuries

The comprehensive evaluation of a musculoskeletal injury includes the following elements:

(1) Subjective

This component includes past and present history from both a western and TCM perspective.

(2) Objective

Objective findings result from the observation of systemic and regional changes in the athlete’s vitality, colour and appearance. In TCM, tongue diagnosis is also used.

A systematic evaluation of all bony landmarks and surface anatomy as well as soft tissue is also examined. In TCM, pulse diagnosis is also used.

All relevant functional orthopedic tests to the joint or area are conducted when making an injury evaluation. The injured side should always be compared to the uninjured side when conducting the examination. Both passive and active range of motion tests are utilized as well as any further area specific functional tests.

(3) Assessment

Utilizing the above steps, including palpation, range of motion and manual muscle testing, the practitioner has an educated idea as to the location and reasonable possibilities for the pain. Specific tests and evaluations would be used to diagnosis a shoulder injury.

(4) Plan

Once the diagnosis has been made, the next step is to determine the treatment plan. Appropriate motor points and trigger points are selected as are other acupuncture points. Some of these points will be found local to the injury area. In the case of the shoulder injury, some of the points will be located in the shoulder. Other points will be located somewhere else on the body. For example, some points could be located on the hands or legs or feet. These points are chosen based upon the results of the TCM diagnosis.

(B) Needling of the Appropriate Acupuncture Points

Using the 'clean needle technique' (10) and single use sterile needles, the needles are inserted and retained for approximately 10 – 15 minutes.

(C) Massage and Stretching

Following the acupuncture treatment, I use massage, proprioceptive neuromuscular facilitation (PNF) stretching and soft tissue release (STR) techniques. The massage techniques are an integration of western massage and Chinese massage. PNF stretching is used to help stretch and lengthen the tight muscles. STR is often used to aid in the release of the tight tissue helping to lengthen the muscle.

Muscle imbalance problems are often seen when treating musculoskeletal injuries. Orthopedic physical examination is useful when assessing these athletes. Combining this assessment with acupuncture allows for a treatment plan that not only addresses the injury itself but also the complete health and wellness of the athlete.
