

essential skills

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ACTIVE ISOLATED STRETCHING AND STRENGTHENING

Injury Rehabilitation, Part 1

Active Isolated Stretching and Strengthening (AIS) is a uniquely effective exercise system developed by Aaron Mattes. In recent articles [“Active Isolated Stretching” Parts 1 and 2, November/December 2009 and January/February 2010, pages 100 and 88], we gave a general introduction to the stretching component of AIS, explaining the physiological principles underlying the techniques and the various ways in which this modality can benefit our clients.

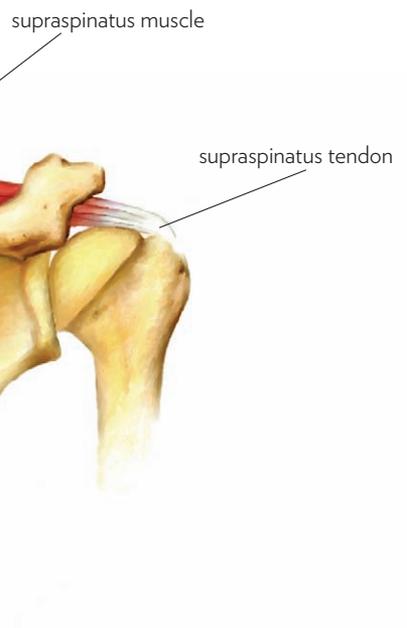
In this two-part article, we’re going to discuss the ways in which AIS (including both stretching and strengthening) can play a role in injury rehabilitation—therapy aimed at restoring function that has been

lost through physical trauma or other types of soft-tissue damage. A large proportion of our clients require some degree of rehabilitative work, and since we began using AIS, our effectiveness in helping them has increased greatly. In speaking with various AIS practitioners and their clients, we have also collected many other reports of restored neuromuscular functioning. We’ll incorporate some of their stories throughout the article as well.

Specialists in the field recognize five key components in the rehabilitation process:

1. Addressing the pain.
2. Restoring the full range of motion.
3. Neuromuscular reeducation.
4. Rebuilding strength.
5. Restoring full function.

We’ll address each of these, one at a time.



1. ADDRESSING THE PAIN

The first step in rehabilitation is to relieve whatever pain the client feels. This makes intuitive sense—you can’t effectively stretch or strengthen an injured structure until it stops hurting. Among other problems, pain usually causes a protective contracture, which ultimately increases the problem rather than solves it. To help resolve the pain, you need to determine what the cause is. We separate three kinds of causes: precipitating event, direct cause, and indirect cause.

Suppose a person begins experiencing shoulder pain when lifting a suitcase after returning from vacation. Lifting a suitcase uses a small, fairly weak muscle called the supraspinatus, which sits on top of the shoulder beneath the trapezius muscle (Image 1).

Using AIS to Address Pain and Resolve Injury

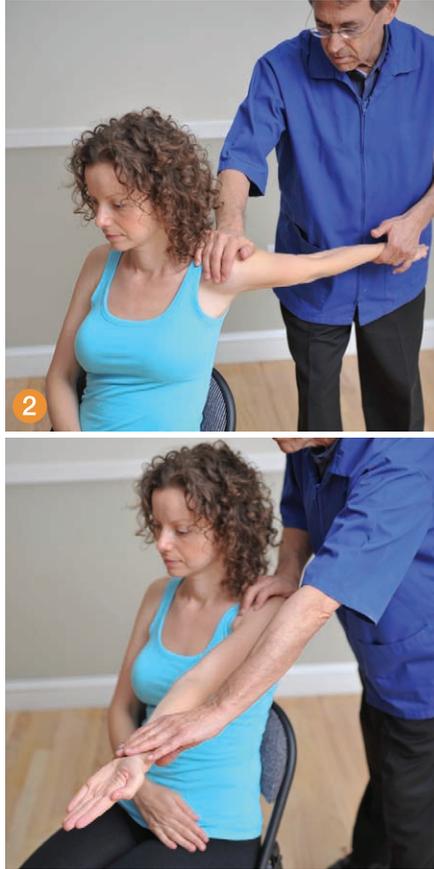
AIS practitioner Roger McNear tells the story of one client, a sophomore in college, who had such severe shoulder pain he couldn't concentrate or sleep through the night. The student rated his level of pain as 10 out of 10. This young man had previously been highly active. In addition to competing as a distance swimmer, he also did triathlons, played tennis, and played the mandolin.

McNear realized that all of these activities developed the muscles on the front of the client's body (referred to as the anterior chain), specifically the muscles on the front of the chest and shoulder. None of them helped to strengthen the opposing muscles at the back of the shoulder area (part of the posterior chain). Moreover, earlier treatment may have made the situation worse; the client's first therapist had worked almost exclusively with the anterior shoulder muscles.

Through an assessment process, including AIS range-of-motion tests, it became clear that this individual was suffering from chronic injuries to two important muscle-tendon regions: the supraspinatus and the biceps. Damage to these structures was the direct cause of his pain.

After performing the AIS exercise protocols on his neck, shoulder, and upper back area (attending to both the anterior and the posterior chains), the pain decreased significantly (from a 10 to a 6 or 7). After several more hours of work the next day, his pain level was down to a 2 or a 3. McNear taught him AIS stretching and strengthening techniques to do on his own, and then saw him again 10 days later. The pain had remained at a level 2, and by the end of the session the shoulder was no longer painful.

In summary, this treatment not only resolved the direct cause of pain, but also helped begin the process of establishing muscular balance that would prevent similar damage from occurring in the future.



The first AIS hyperextension stretch and three additional starting positions.

An average person can lift about 10–15 pounds using this muscle. When we go on vacation, our suitcases usually weigh a good deal more (often 30–40 pounds). It is likely that dealing with the suitcase—lifting it, carrying it around, putting it into the trunk of a car, lifting it up to place it in the plane's overhead bin, etc.—was the precipitating event that led directly to the injury. What is causing the pain now (the direct cause) is the result of that event: tears in the supraspinatus muscle and/or tendon and the resulting adhesive scarring. There may also be additional factors that predisposed this person to injury, such as a lack of strength or flexibility, muscle tension, or poor body alignment. These are indirect causes.

Whether or not you can identify a specific precipitating event, it is important to resolve the direct cause of the pain. The necessary treatment

may range from hands-on work to exercise therapy to injections to surgery, depending on the nature and severity of the injury. While AIS does not work in every case, it is a good place to start. AIS is noninvasive, and for some mild to moderate cases, it may be the only form of therapy required. Gentle, progressive stretching and strengthening exercises in the AIS protocols can help modify adhesive scar tissue and restore pain-free movement.

In treating the supraspinatus muscle-tendon unit, the process includes a series of stretches referred to as hyperextension of the shoulder. In these stretches, the AIS practitioner assists the client to extend the arm straight back with the arm rotated in four different positions (Image 2). The strengthening component starts with a standing abduction exercise (moving the arm away from the body sideways, using a light weight), and then progresses to the same



movement done side-lying, which is much more challenging (Image 3).

By starting to improve flexibility and strength, such AIS techniques may begin to resolve the indirect causes of injury and help prevent future damage from occurring. Ongoing stretching and strengthening work, in stages 2 through 5 of rehabilitation, will also be beneficial in this regard.

2. RESTORING THE FULL RANGE OF MOTION

After you have addressed the client's pain, the next challenge is to restore the full range of motion in the muscles, fascia, and joint structures. This includes not just the immediate site of injury, but also other structures that may have been affected. When people are injured, they tend to compensate with other parts of the body, which can decrease the range of motion in these areas. For instance, a person who has an injury in her foot may compensate by walking in an unbalanced way, leading to pain and loss of mobility in her hip. The structures most likely to be affected are those in the same kinetic chain as the injured tissues. For example, if someone has a shoulder injury, both the neck and the elbow will likely be affected as well.

Often, it's necessary to work on other parts of the kinetic chain before we can improve the range of motion in the injured area. This relates back to the idea of indirect causes. A client with a knee injury may have an underlying problem with one of his arches collapsing and placing strain on both the hip and the knee on that side. In that case, before you can truly correct the knee dysfunction, you'll need to first strengthen and restore functional integrity to the foot. It's also possible to have a kinetic chain dysfunction in the hip that causes an uneven distribution

Using AIS to Restore Range of Motion and Resolve Long-Standing Problems

One individual came to AIS with an extremely limited range of motion in his left shoulder. He couldn't rotate his arm to put on his coat, had trouble reaching his head to brush his hair, and could not put his hand in his back pocket without a lot of pain. After his first 90-minute session, he was amazed that he could put his blazer on by himself. Some discomfort still remained, but after two more sessions his mobility was fully restored.

That wasn't the end of the treatment. As is often the case, there were long-standing problems in other, adjacent areas of this person's body. His AIS practitioner, Paul John Elliot, had noticed dysfunctional patterns in the way he moved his head and neck, and asked if he had any neck pain or if he ever got headaches. The client replied that he suffered from debilitating migraines, particularly when traveling. Elliot taught him a series of AIS neck stretches that he could do on his own. Now, whenever he travels or feels a headache coming on in another situation, he does these stretches and the headache resolves quickly.



of weight through the knee, leading to knee injury and pain. Whenever you don't get results from working directly on an injured area, try looking elsewhere to see what other factors may be preventing a full recovery.

In order to test for any limitations in mobility, you need to know the normal range of motion for the joint you're testing (see Normal Range of Motion in the Hip, page 94, for examples). It's also important to consider the client's performance goals. For instance, an elite swimmer or

baseball player may require a greater capacity for internal rotation of the shoulder than the average individual.

Once you've identified the area(s) where range of motion needs to be restored, there are various methods of stretching you can use. As discussed in previous articles, AIS is a highly efficient approach; it develops maximum flexibility in the shortest amount

of time by taking into account key principles of human physiology.

One advantage of AIS is its specificity, isolating individual muscles and ensuring that each one is stretched in the correct functional position and plane of movement. For example, to stretch the hamstring muscles by lifting the leg straight up, you need to stay on the mid-sagittal plane (keep the legs parallel). If the leg rotates out to the side, you lose much of the hamstring stretch and start affecting other muscles instead. The same is true with stretching the rectus femoris in the anterior thigh; once you move off the mid-sagittal plane, you may lose the stretch in that muscle and begin to stretch the lateral quadriceps (vastus lateralis) instead. AIS techniques clearly specify these positions and also differentiate between different fibers of specific muscle groups. You can pinpoint restrictions very precisely, in the proximal or distal portion of a given muscle, and then focus your stretching on whichever area is most limited. For instance, one stretch of the hamstring works the distal half (from mid-thigh to the knee) and another works the proximal half (between the back of the hip to the middle of the thigh) (Image 4 and 5, page 95).

3. NEUROMUSCULAR REEDUCATION

The next step is to reestablish normal communication between the muscles and the brain. After a prolonged period of disuse following an injury, you may see various signs of decreased neuromuscular control. For instance, the client may exhibit co-contraction (when one muscle contracts, the opposing muscle also contracts at the same time) or a muscle may shake or tremble on eccentric contraction (muscle contraction that occurs while the muscle is lengthening). Restoring normal functioning may require

Normal Range of Motion in the Hip

- a. Single-leg pelvic tilt, bringing the knee to the chest: 75–80 degrees.
- b. Medial rotation of the hip: 50–60 degrees.
- c. Lateral rotation of the hip: 75–90 degrees.
- d. Abduction of the hip: 50–60 degrees.
- e. Extension of the hip: 25–30 degrees.



activating tissues and neural pathways that have remained latent for some time, establishing new pathways, and/or stimulating neurogenesis (the creation of brand new nerve tissues). There are three basic guidelines for facilitating neuromuscular reeducation, based on constructivist learning theory. Each is supported by AIS practices.

USING ACTIVE, RATHER THAN PASSIVE, MOTION

Throughout an AIS session, the client actively initiates each movement and maintains continuous focus on performing the movement.

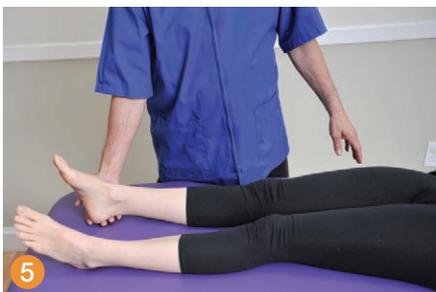
GOING SLIGHTLY BEYOND THE COMFORT RANGE

The practitioner increases the range of motion at the end of each stretch with a gentle assist, so the muscles are continually moving into novel territory.





When stretching the hamstrings, starting from the bent-knee position stretches the distal half of these muscles.



Starting from the straight-leg position stretches the proximal half.

AIS for Neuromuscular Reeducation

Often the clients in greatest need of neuromuscular reeducation are those struggling with chronic degenerative diseases. AIS therapist Al Meo told us about one woman he's worked with who has multiple sclerosis (MS). About 15 years ago, she was diagnosed with relapsing/remitting MS, a form of the disease in which relapses (periods in which new symptoms appear and old ones resurface or get worse) alternate with periods of full or partial recovery. Her neurologists told her that her condition would slowly worsen after every relapse; they estimated that she'd lose 1–3 percent of her neuromuscular functionality each time.

Determined to stay as high-functioning as she could for as long as possible, the woman committed to a regular schedule of AIS work, receiving AIS sessions twice a week and doing it on her own for 30 minutes the other five days. So far, she has exceeded all expectations, losing no functionality at all since her diagnosis. Meo remembers one relapse in which her legs were greatly debilitated. She began doing AIS two days later and surprised her doctors with a full and remarkably quick recovery (five or six days).

With ongoing AIS work, this person continues to maintain an active, busy life. Not only can she carry on basic daily activities, but she is also able to work a full schedule as a clinical massage therapist, seeing seven patients a day, five days a week.

REPEATING THE PROCESS

By repeating every movement six to eight times, we reinforce the neural pathways and solidify the learning in the nervous system.

CONCLUSION

Stay tuned for Part 2 of this article, where we'll explain the final two steps in the rehabilitation process—rebuilding strength and restoring full function—and discuss how you can personalize this process for your clients to help optimize their healing. **m&b**

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Editor's note: *Massage & Bodywork* is dedicated to educating readers within the scope of practice for massage therapy. Essential Skills is based on author Ben E. Benjamin's years of experience and education. The column is meant to add to readers' knowledge, not to dictate their treatment protocols.