



Discovering the Power of Aaron Mattes' Active Isolated Stretching

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The field of massage therapy and bodywork encompasses a wide range of different styles and approaches. Each of us brings a unique combination of skills that we've found to be effective over years of study and practice — in areas ranging from sports medicine and orthopedic massage to relaxation massage, craniosacral therapy, and a variety of ancient healing arts. There are few experiences more exciting than finding a new modality or technique to add to your repertoire that dramatically improves your ability to help clients. Over the

past couple of years, I've been exploring one such modality that has exceeded all my expectations: Active Isolated Stretching (AIS), a system developed over the course of the past 37 years by kinesiologist Aaron Mattes.

A Surprising Discovery

Discovering AIS has been the second major turning point in my professional career. The first came in the late 1970s. At the time I was working quite successfully (running a small somatic therapy school, as well as a large private practice), using techniques focused almost entirely on muscles. I was operating on the assumption that most pain and injury problems could be traced back to muscular tension and imbalances. It came as a great shock to learn that the majority of chronic pain is actually caused by injuries to fibrous connective tissues (ligaments, joints, tendons, and fascia). When I first heard this, I was highly skeptical. I wasn't convinced of the idea until I'd had it confirmed by direct experience, seeing Dr. James Cyriax's therapies give lasting pain relief to people who hadn't responded to any other therapies. Those people included me — receiving treatment for my own injuries eliminated the back and neck pain I'd felt for the previous 22 years (for which massage of the muscles had provided only partial relief).

Learning how to assess and treat connective tissue injuries caused a radical shift in my thinking. I eagerly shared what I'd learned with my clients and students, and saw many pain conditions that I had previously assumed to be permanent or beyond my expertise respond readily to the new types of treatment. Over the past 30 years, I've devoted much of my life to refining, practicing, teaching, and writing about these techniques.

Recently I've again had cause to question my assumptions about which musculoskeletal problems are likely to be permanent, and which can be resolved. From my earlier study with Dr. Cyriax and my own work with clients, I came to believe that in the majority of cases, a combination of friction treatment, myofascial therapy, massage techniques, and/or exercise therapy could effectively relieve chronic pain, build strength, and improve range of motion. When these were not sufficient, I could usually trust that either injection therapy or surgery would be successful. However, there were still various conditions that I thought of as untreatable, including declines in flexibility due to aging, degenerative arthritis, or serious injury and muscular dysfunction due to progressive degenerative diseases such as multiple sclerosis (MS) or Parkinson's disease. I'm happy to say that AIS has proven me wrong.

As in the previous instance, I initially came to AIS with a great deal of skepticism, and was convinced only by direct experience. I've seen results in myself that I never thought possible: after receiving the work for just a few months, I achieved greater range of motion than I could ever remember having. Limitations that I'd attributed to the inevitable effects of aging simply disappeared. Moreover, once I received AIS training and began incorporating it into my work with clients, I started seeing remarkable changes — healing times for most soft-tissue injuries were cut in half, and some conditions that had been gradually worsening over time (including one individual's MS symptoms) began to reverse course.

In this article, I'm going to outline the mechanisms of AIS, explain how and why it works, and discuss the specific ways in which it complements massage therapy and supports healing. In the process, I will highlight a variety of specific examples — including some surprising results I've seen in my clients, in myself, and in other individuals I've encountered — that demonstrate the usefulness, versatility, and power of this approach.

How AIS Works

The AIS method differs from most other types of stretching and strengthening programs in several important respects. Listed below are seven defining characteristics of AIS techniques. Each is supported by established principles of human physiology. Note that although this method is called Active Isolated *Stretching*, it actually incorporates both stretching and strengthening in almost every maneuver. (Aaron Mattes has also developed a complementary program focused more heavily on strengthening, which is outside the scope of this article.)

Characteristics of AIS Stretches

1. Specificity
2. Active initiation
3. Incremental assists
4. Gentle motion
5. Brief duration
6. Multiple repetitions
7. Deep breathing

1. Specificity

AIS movements are precisely targeted to stretch individual muscles and parts of muscles, rather than larger muscle groups. (For instance, in contrast to a simple forward bend that provides a general stretch for all aspects of the hamstring muscles, AIS uses six different stretches to focus on different combinations of the medial, lateral, oblique, proximal, and distal fibers.) This enables the practitioner to independently evaluate — and then work to maximize — the flexibility of each section of the muscle. There are AIS protocols for every primary muscle in the body, amounting to more than 170 separate stretches. Using different combinations of these stretches, we can develop customized regimens tailored to the specific needs of any client.

2. Active Initiation

Although AIS stretches are supported and assisted by the practitioner, each movement is initiated by the client. This enhances the stretch, since contracting a muscle on one side of a joint causes the muscle on the opposite side to relax (a principle known as Sherrington's Law of Reciprocal Inhibition), and that relaxation helps the muscle to stretch more efficiently. Moreover, having the muscles actively working helps to increase the temperature of the muscles and the fascia, which enhances flexibility even further.

3. Incremental Assists

At the end of the client's active range of motion, the practitioner provides just enough assistance to push slightly beyond what the person could do on his or her own. In this way it's possible to increase flexibility incrementally, typically adding two or three degrees with each repetition.

4. Gentle Motion

The movements involved in AIS are quite gentle, never approaching a muscle's maximum sustainable force (i.e., the level of force that will cause that muscle to give out). Laboratory studies confirm that to avoid injury, it's important to use 50% or less of the maximum force for the muscles being stretched.² Gradual, gentle motion also helps to delay activation of the myotatic reflex (commonly referred to as the stretch reflex) — a defensive mechanism that is designed to prevent muscles from stretching too far or too fast. A movement that's overly sudden or severe will cause the muscle being stretched to reflexively contract.

Two of the six AIS hamstring stretches



5. Brief Duration

The key to avoiding the stretch reflex altogether is to hold a stretch for only a short time — no more than two seconds. Traditionally, exercise specialists have recommended holding stretches for much longer periods of time, up to 60 seconds. (This is referred to as *static stretching*.) However, research has shown that such prolonged stretching initiates the stretch reflex, decreases blood flow within the tissue, and leads to a buildup of waste products, such as lactic acid, that contribute to muscle fatigue and soreness.³ When people stretch in this way, they're working against themselves, causing a contraction of the very muscles they're trying to lengthen (sort of like trying to drive a car with the parking brake on). As a result, the tendons and ligaments get stretched more than the muscles, which can lead to tendon irritation and even laxity, and thus predispose these structures to future injury.⁴

6. Multiple Repetitions

Static stretching relies on a principle known as *stress relaxation*: when muscles and connective tissues are held at a constant length, they eventually fatigue, release, and lengthen. In addition to promoting muscle fatigue, this type of action is also relatively slow. AIS achieves results much more quickly by using 6 to 10 repetitions of shorter stretches. This method can help increase the range of motion in a particular area by as much as 60 degrees in a relatively short period of time.

7. Deep Breathing

Throughout an AIS session, the client coordinates his or her movements with regular, relaxed breathing. Deep breathing helps to increase the flow of oxygen to the muscles, decrease muscle fatigue, and encourage the release of muscle tension and fascial restrictions. It is important to avoid holding the breath. With oxygen available as fuel, muscles burn fatty acids and glucose (aerobic metabolism). Without sufficient oxygen, glucose gets converted to lactic acid (anaerobic metabolism), again leading to muscle fatigue and soreness.



What's In It for Clients

To consider combining a new skill with the work we already do, we need to know what specific, additional benefits it will bring for the clients we see. I've found that AIS adds to the efficiency and effectiveness of bodywork in four different areas: general health enhancement; injury prevention; pain and injury treatment; and improvement of degenerative conditions.

General health enhancement

While many clients seek out massage therapy to help with particular pain or injury problems, these conditions are often tied in with deeper health issues. For most clients I see, regaining full healthy functioning requires not just healing a few isolated tissues, but helping to restore balance and resilience to the entire body. AIS can play a central role in that process by enhancing flexibility, strength, and the overall health of both joints and soft tissues.

It should come as no surprise that AIS improves flexibility; that's the least we can expect from any stretching program. What's remarkable is the amount of improvement it can bring, particularly for those who have experienced severe limitations due to aging, arthritis, or chronic injuries. I have always believed that as we age, our flexibility diminishes permanently. When I saw the range of motion in my own joints gradually decline

(despite regular exercise and stretching), I attributed this to mild age-related arthritis that would probably continue to worsen over time. I was surprised and delighted to find that AIS could not only stop that decline, but even reverse it — I've seen flexibility return to my shoulders, neck, back, hips, thighs, and feet, and I have greater freedom and range of motion than I can ever remember having. For instance, I can now reach my lower scapula with my fingers from above and below, something I assumed I would never be able to do. At the same time I've grown progressively stronger, even building strength at the end of my range of motion, where we are all generally weakest. Overall, I feel about 20 years younger than I did when I began. Clients with whom I've done AIS work have shown similar striking changes.

In addition to working on muscles, AIS also helps to develop healthy joints. When the practitioner places repeated, gentle tension on the fibers contained in a joint structure at multiple angles, the fibers of the joint itself are exercised and strengthened. Joint sensitivity and irritation diminish and often disappear with this type of stretching, especially in the hands and feet. Another benefit is that by simultaneously stretching the muscle on one side of a joint and strengthening its counterpart on the other side, AIS creates a balance of muscular tone that leaves the joint stronger and more resilient. Furthermore, the gentle, repetitive motion improves the circulation of blood and nutrients, supporting the healthy growth and repair of all the surrounding soft tissues. It also improves the circulation and drainage of lymph, helping to eliminate waste products.⁵



Injury prevention

As muscles become stronger and more flexible, they also become less vulnerable to injury. Increased strength allows them to absorb a greater amount of force, and increased flexibility allows them to lengthen further before becoming strained. Increased range of motion without muscle strength to control that new range of motion can be risky. AIS strengthens the muscles within an expanded range of motion, helping to ensure that the person will be able to function safely within that larger range.

Equally important is the support that AIS provides for tendons, ligaments, and fascia. By placing repeated gentle stress on these structures, it helps to build their strength and integrity. And, when minor strains or tears do occur, continued AIS work helps to prevent the buildup of scar tissue — a major contributor to stiffness, inflexibility, chronic injury, and pain conditions.

Pain and injury treatment

Readers of my past articles will be familiar with the types of treatment plans I generally recommend for tendon and ligament injuries — involving some combination of rest, friction therapy, deep massage, and a few specific exercises for the client to do at home. For more than 30 years, I understood this to be the most effective and efficient path to recovery. I still believe this is true, with one caveat: adding AIS to the mix makes the healing progress much more rapidly. For instance, I recently treated a woman who had fairly severe tears in her sacroiliac ligaments, injuries that would generally take 6–8 weeks to heal. This time, in addition to my usual methods, I applied the AIS protocols for the hips, legs, and low back (a total of 58 separate movements). After three sessions over the course of a week and a half, this person was out of pain and functioning completely normally.

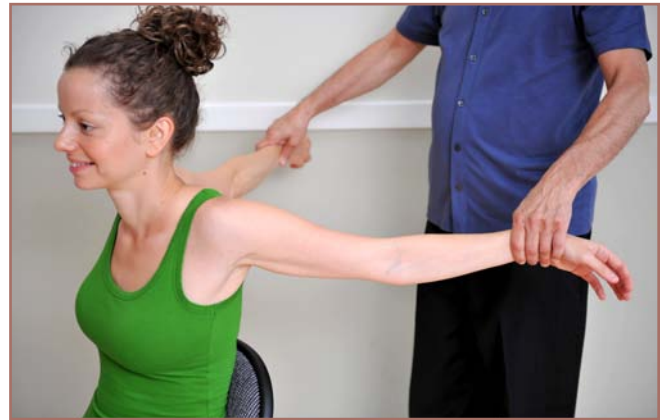
In some cases, I've even found AIS alone to be sufficient for healing. Not only do these stretches seem to prevent adhesive scar tissue from forming, but they may also help break down adhesions that have already formed. One client with an injured infraspinatus tendon (one of the rotator cuff tendons) recovered fully with just two sessions of AIS. Typically I would expect it to take at least 10 sessions of friction therapy and massage for this type of injury to heal.

One great advantage of AIS is that it enables therapists to treat structures that simply cannot be reached with the hands (such as the piriformis attachment to the sacrum). For years I had a nagging pain from one of the tiny ligaments deep in my foot that would come and go from time to time. No practitioner had been able to treat it successfully. Ever since I began having AIS work done on my feet, it has completely disappeared.

Improvement of degenerative conditions

In addition to enhancing my work with injuries, AIS has given me the skills to help an entirely new population of clients — people with serious neuromuscular conditions who don't respond to the other forms of treatment I offer. When I first heard reports that AIS could reduce the symptoms associated with Parkinson's, multiple sclerosis, muscular dystrophy, polio, and other debilitating diseases, I didn't believe it. It still seems almost too good to be true, but I've seen it happen and the results are unmistakable.

After I'd been using AIS for some time, I offered a free session to an acquaintance of mine with multiple sclerosis whose symptoms had been worsening for 12 years. Her mobility was quite limited: she was extremely unstable and shaky on her feet, and even had trouble moving around in bed. She had been in a wheelchair for three years. That initial session left her feeling energized, and she decided to try coming regularly as a client. Following her third treatment, she called me up to tell me that her ability to walk had significantly improved — she was able



to use her feet normally (with a heel-to-toe walking action) for the first time in three years. After five treatments, she regained her ability to move her legs in bed. By the eighth treatment, her coordination had improved to the point where she could make crawling movements. She continues to be amazed at the progress she's made with both stability and coordinated motion.

Talk to any experienced AIS practitioner, and you'll hear many similar stories. I spoke with one woman who has Parkinson's disease and uses AIS to stop her tremors. When she's under stress the tremors tend to return, but after a few sessions they go away again, for months at a time.

AIS achieves these impressive results partly by stimulating neurogenesis (the development of nerve tissues) and helping to create new neural pathways. Because the stretches are active, rather than passive, they reinforce the connections between the brain and the muscles.⁷ Furthermore, because the range of motion is gently increased at the end of each stretch, the muscles are continually moving into novel territory. Essentially, the brain-muscle connection keeps learning to do something new and different, which means new neural pathways are always being created.⁸ Repetition of the stretches also promotes nerve development.

Another relevant factor is the reduction of muscle spasticity. Spasticity, excessive tone in a muscle that leads it to involuntarily contract when it is stretched or lengthened, is a symptom common to both multiple sclerosis and Parkinson's disease. It can vary in severity from mild muscle stiffness to severe, painful spasms. In many cases, AIS can effectively resolve spasms and lessen spasticity.

References

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Mattes, A.L. "Flexible Fascia: How Active Isolated Stretching Combats Restricted Range of Motion." *Massage Magazine* Issue 137, October 2007.

Stretching USA (official AIS web site):
www.stretchingusa.com

In addition, some of the other effects that I mentioned earlier — promoting blood flow, nutrition delivery, waste elimination, and the general health of the muscles — are particularly helpful with degenerative neuromuscular diseases. AIS helps restore the supply of oxygen and nutrients to chronically contracted, blood-starved tissue. As a further benefit, the promotion of active, healthy muscle simultaneously promotes the health and growth of the surrounding nerves.

Some of the most affected tissues in MS and Parkinson's patients are the "two joint" muscles — muscles that act across more than one joint.⁹ These include the hamstrings and rectus femoris (hip and knee joints); gastrocnemius (knee and ankle joints); and the psoas (hip joint and multiple joints in the low back). With AIS, we can isolate and perform focused stretching on each of these muscles, working toward restoring normal posture and gait.

Integrating AIS into a Massage Therapy Practice

AIS is probably best known in the context of professional sports (Aaron Mattes has worked with hundreds of Olympic and professional athletes), but it's equally valuable for combating the more commonplace physical limitations that we all develop as we go about our daily lives. As we grow older, most of us accept declines in our body's functioning — such as a reduced range of motion, decreased strength and flexibility, and impaired coordination or fine motor skills — as an inevitable result of injuries and aging. It was a revelation for me to discover that through AIS, many of those declines can be successfully prevented or reversed. I am convinced that the majority of people who come for massage therapy could benefit from this work in one way or another, and I've started using it with most of my clients.

Typically I combine AIS with other hands-on work, splitting the session in half — after 30–45 minutes of AIS, I'll do 30 minutes of friction therapy and/or massage. The stretching leaves the body looser and more pliable, making the later work easier and more effective. I focus on the areas that need the most attention, working on both sides of the body to prevent any imbalances from developing. (AIS is almost always done on limited sections of the body, since performing the protocols for the entire body, from the neck down to the feet and toes, can take up to 4 or 5 hours.) In between sessions, I teach clients certain AIS stretching and exercise protocols that they can do on their own. That's another benefit of this method: most of the techniques can be done on your own with the use of a 7- to 9-foot rope and a few weights. In this way, people can participate actively in their own healing, both in and out of the treatment room. The only thing better than a remarkably efficient and effective new treatment is one that also leaves a client with a sense of empowerment and accomplishment for a job well done — and even a little bit of sweat to show for it.

For AIS training courses offered by Ben Benjamin, visit <http://benbenjamin.com/sched.html> or call 617.576.0555.

Ben E. Benjamin holds a Ph.D. in Sports Medicine and Education and is the founder of the Muscular Therapy Institute in Cambridge, Massachusetts. He is the author of many articles on working with injuries and chronic pain as well as the widely used books in the field, Are You Tense?, Exercise Without Injury and Listen To Your Pain: Understanding, Identifying and Treating Pain and Injury Problems, and is co-author of The Ethics of Touch. He has studied with the British physician, James Cyriax, M.D., widely known for his pioneering work in orthopedic medicine. Dr. Benjamin has been in private practice for over 40 years and has been publishing articles and teaching since 1986.

Jeffrey P. Haggquist, DO, is an osteopath who specializes in physiatry, a branch of medicine focused on restoring optimal functioning and quality of life to people with physical impairments or disabilities. Dr. Haggquist completed his residency training in physical medicine and rehabilitation at Temple University Hospital in Philadelphia, his osteopathic internship at the University of Medicine and Dentistry of New Jersey, and his medical education at Kansas City University of Medicine and Biosciences. Dr. Haggquist teaches widely on flexibility and neuromuscular reeducation, and is a national specialist on Active Isolated Stretching. He has trained elite athletes in professional baseball, football, soccer, and tennis, and collegiate track and field. He is the Medical Director of the Flexibility, Sports and Rehabilitation Clinic located in Washington, DC. Prior to his medical training, he practiced as a neuromuscular massage therapist for more than two decades.

Notes

- ¹ Dr. Cyriax, author of a major text on orthopedic assessment and treatment, and now commonly known as the father of orthopedic medicine, was a teacher of mine in the late 1970s.
- ² DeLee, J.C., D. Drez, and M.D. Miller, Eds. *Orthopaedic Sports Medicine*, 2nd ed. Philadelphia, PA: Saunders, 2003.
- ³ Mattes, A.L. *Active Isolated Stretching: The Mattes Method*. Sarasota, FL: Aaron L. Mattes, 2000, p. 1.
- ⁴ For more information on the effects of stretching tendons and ligaments, see Benjamin, B. *Exercise Without Injury*. Cambridge, MA: MTI, 1992.
- ⁵ Mattes, A.L. *Active Isolated Stretching: The Mattes Method*. Sarasota, FL: Aaron Mattes Therapy, 2000, p. 5.
- ⁶ Cyriax, James. 1982. *Textbook of Orthopedic Medicine*, Vol. 1, 8th Edition. London: Bailliere Tindall, pp. 16–19.
- ⁷ Mattes, A.L. *Active Isolated Strengthening: The Mattes Method*. Sarasota, FL: Aaron L. Mattes, 2006, pp. 5–6.
- ⁸ Extrapolated from van Praag, H., Shubert, T., Zhao, C., & Gage, F.H. (September 2005). "Exercise enhances learning and hippocampal neurogenesis in aged mice." *J. Neurosci.* 25 (38): 8680–5.
- ⁹ Observations drawn from Dr. Haggquist's clinical data.