

# Decreasing Edema with Active Isolated Stretching

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One main key to understanding how to reduce edema lies in stimulating the lymphatic and venous systems. Circulation needs to be restored to deeper tissues, adhesions released, and scarring reduced and realigned. One of the best ways to accomplish this is by utilizing muscle contractions and stretching to create a pushing and pulling force within the vessels. The repeated muscle contractions and stretching that occur using the Active Isolated Stretching (AIS) method create exactly that - a gentle pumping action that promotes lymphatic and venous circulation. This action in turn reduces inflammation and edema. A healthy lymphatic system is an essential component in restoring balance in the body so that it can heal.

The lymphatic system is comprised of vessels, nodes and organs. It plays an important role in maintaining stasis in the circulatory system, supplying white blood cells to fight infection and disease and removing metabolic waste products. At the cellular level in the interstitial space between arteriole and venous ends, tiny lymphatic capillaries collect, filter and absorb the remains of plasma and by-products of cellular activity and store them as lymph fluid. Most of the interstitial fluid is reabsorbed into the venous blood stream; the remainder is taken up by lymph. When there is a lymphatic blockage or dysfunction, excess fluid cannot drain effectively. The result is edema or swelling due to fluid retention or build-up. Localized swelling is common with soft tissue injuries.

The lymphatic system begins with tiny capillaries that increase in size to deeper vessels or collectors (nodes). The largest lymph vessels are called ducts and they drain into the venous system by means of the subclavian veins at the base of the neck. Lymph nodes distributed along lymphatic vessels filter lymphatic fluid and contain lymphocytes, which are an important component of the body's immune system. This drainage system follows a specific pattern of superficial areas near the skin before entering deeper ducts such as the thoracic, cisterna chili and iliac nodes. The lymphatic drainage territories are separated by overlapping regions called watersheds. The right arm, right shoulder and right neck drain into the right lymphatic duct. The rest of the body drains into the thoracic duct.

***Lymphatic flow is unidirectional and is mostly passive requiring active muscle contraction of skeletal muscles*** as well as the act of diaphragmatic breathing and peristalsis (*Ratray/Ludwig, p. 218*).

Nonetheless, the lymphatic vessels themselves have been found to have a minor contractile ability. "This minor contraction is stimulated by stretching the vessels either internally, by the vessels filling, or externally by light massage" (*Ratray/Ludwig, p. 217*).

Active Isolated Stretching (AIS) is a dynamic flexibility system developed by Aaron Mattes. It is grounded in physiological laws and clinical observations. Utilizing the physiological mechanism of reciprocal inhibition and a 2-second contraction of the synergistic muscles creates a brief window that allows the antagonist muscles to be stretched gently without traumatizing tissue. To illustrate one example of how this works, when you extend your knee using your quadriceps, neurological signals are sent to your hamstrings to relax in order for your knee to straighten. Physiologically, the contraction of agonistic and synergistic myofascial structures allows antagonistic muscles and fascia to relax and lengthen naturally. This creates an optimal environment to safely open up tissues. The act of contracting and stretching is repeated many times to create a pumping action that stimulates lymphatic

and venous flow. This flushes the tissues with restorative blood and nutrients and returns blood and lymph to organs for processing and elimination. As the process continues, scar tissue softens and realigns while myofascial adhesions restricting circulation are loosened.

When edema is caused by acute trauma, such as a rolled ankle or twisted knee, the resulting swelling is part of the injury healing process. Tissues become inflamed immediately due to tissue damage and the burden placed on the lymphatic and venous systems. Usually our body is able to cope with most of these disruptions well enough without intervention; however, sometimes the injury is much more than our body can handle on its own and it requires outside help before healing can occur.

Scar tissue in the form of extra fibrin is laid down to knit together torn tissue. The scarring that takes place does so indiscriminately, attaching to anything close at hand to lend to stability. This process can include other tissues, even bone. Scarring must be addressed to fully restore circulation to the affected joint and surrounding tissues. The repeated muscle contractions associated with AIS realign scar tissue in the direction of movement initially and have the potential to permanently remodel the tissues by aiding and stimulating the body's natural ability to reabsorb the collagen that has been laid down. Homeostasis is restored to the body allowing the body to heal.

There are three main principles behind how AIS works and why it is effective. The first is Sherrington's Law of Reciprocal Inhibition, which illustrates why active muscle contractions are an important component to any stretch. What occurs physiologically is the initiation of a neurological signal that innervates one muscle to contract and inhibits the opposite one to relax. This is what allows movement to occur. Without this mechanism, you could not bend or straighten your elbow smoothly, throw or catch a ball with force, or push off from one leg to the other gracefully when walking. Adhering to active versus passive movement enables the body to take advantage of this law.

The second principle follows Wolff's Law. Dr. Wolff observed that the body adapts to the stresses placed upon it. If the stress is abnormal, the result will be an abnormal adaptation. By taking into consideration every possible joint angle and the fundamentals of joint movement, the AIS system ensures that stretches are done with the joint in proper alignment to avoid compensations and to stay within the joint's own ability to move. These specific movements, repeated numerous times, create the optimal cellular environment to allow for tissue remodeling that can go as deep as the bone. For example, when you are running and consistently pounding the pavement, your bones become denser in most cases. This is the same principle we are dealing with when we perform stretches repeatedly.

The cornerstone of the AIS technique, the third principle, lies in the mechanism behind the stretch reflex. Spindle cells located in muscle bellies (and more recently discovered in fascia) (*Hammer, 2014*) act as monitors for every stretch. When the spindles are stimulated by a stretch that could injure muscle and fascial tissue, they act to protect the endangered soft tissue by sending a signal to it to contract. The purpose of the contraction is to protect the muscles from being torn by being over-stretched. The stretch reflex is triggered by three different stimuli. The first is when you try to stretch a muscle beyond its tensile ability. The second is when a muscle is stretched too quickly and the body cannot keep up with the speed at which the muscle lengthens. The third trigger is holding a stretch too long. The approximate time it takes for the spindle cells to trigger a protective muscle contraction is 2 seconds. The AIS system avoids this contraction by holding a stretch for no more than 2 seconds. Each stretch is done gently to avoid triggering the myotactic reflex and to sedate the nervous system with its rhythmic movement and deep breathing. The stretches are then repeated numerous times for greater effectiveness.

### **Shoulder Abduction, “Thumb Up and Down”, Seated**

*(The “Shoulder Abduction” stretch is just one of many possible movements in the AIS system to help pump the lymph ducts, nodes and vessels in the shoulder and thorax.)*

**Client:** Sitting with their arms at their side, have your client lift their shoulder to a 90 degree angle in a “thumb up” position. Then have your client rest their opposite arm behind the chair or stool to help stabilize their torso.

**Practitioner:** Stand behind your client off to their **R**. Place your **L** hand on your client’s **R** scapula. Grasp your client’s wrist with your **R** hand as they abduct and extend their humerus.

**Client:** Retracts their scapula and reaches backward with their **R** arm.

**Practitioner:** As your client extends their shoulder, gently grasp their wrist. Give gentle assistance at the end of the movement.

**Repetitions:** Two Sets of 8-10 on each side.

**Client and Practitioner-** Repeat the above process with the client’s thumb pointing down, toward the floor.

**Key Points for Success:** Be sure your client starts their movement with scapular retraction and keep your client’s thumb in a downward position with your assisting hand.

**Technique Tips:** The Pec. Mj. is a flexor of the shoulder; be sure your client allows you to hold up the weight of their arm to avoid eccentric loading of the tissue you are stretching. Have your client turn their head to the **L** to help keep their torso from rotating into the stretch.

**Point of Information:** This stretch is part of the treatment for anterior shoulder impingement.

**Precaution:** Keep your client’s shoulder at less than a 90 degree angle. Due to the movement of the humerus and the scapula irritation of the joint capsule can occur due to the humerus butting into the acromion.

(Repeat the same sequence for the L side.)

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More detailed information and specific protocols are found in the manual [Balance is Possible: F.R.O.M Head to Toe](#) (Morton, 2009).

AIS utilizes the same concepts taught in manual lymphatic drainage (MLD) by starting proximally and working distally from there. First we start by freeing-up the subclavian terminus and opening up the thoracic duct in order to drain the lymphatics. A typical approach begins by releasing myofascial restrictions in the cervical and pectoral area moving from proximal to distal. Opening up the lymphatic ducts on the side of the neck between the trapezius and SCM (sternocleidomastoid) and the subclavian ducts located medially inferior to the clavicle should be the first step. “While there are no nerves shown to become entrapped from a tight pectoralis major, lymph vessels from the breast pass in front of and around the muscle.” (*Morton, 2009, Shoulder chapter, p. 15*). From there move on to free the axillary ducts by stretching the shoulder girdle down to the hands if you are working with upper extremity swelling. If the swelling you are addressing is in the lower extremity or extremities, continue on from the chest into the lumbar, pelvic, inguinal and lower leg lymphatic ducts in the popliteal space and then finish by draining the foot. Specific attention should be focused on the cisterna chyli, the inguinal and popliteal lymph nodes. Adding manual resistance to all of these stretches produces a more powerful pumping action to stimulate lymphatic and venous flow. Once these areas have been worked in this order, continue to follow MLD protocol and direct your work back up towards the thoracic duct, doing the stretches and resistance work in the opposite order. This stimulates lymphatic circulation back towards the primary ducts for filtration.

There are generally no contraindications to doing this type of work, but there are always precautions that are relevant for any manual therapy modality. A sudden increase in swelling, pain that doesn’t go away, nausea, dizziness are just a few symptoms that might warrant immediate medical attention or referral to the patient’s physician. Since active muscle contractions affect the lymphatic and venous systems indirectly (there is no direct manual pressure placed on the tissue), the usual contraindications for MLD are not applicable for AIS with the exception of increasing circulation when it is undesirable, such as in cases of acute infections,

especially systemic infections and thrombosis. Restoring a healthier environment for the body to heal presents the best possibility for a positive outcome. The advantages of the AIS approach go beyond simply reducing edema via increased circulation. Improved mobility, greater uptake of oxygen and nutrients into the tissue, soothing the nervous system with breathing and gentle movements, and establishing a baseline of strength are some additional benefits of this work.

**References:**

***Clinical Massage Therapy: Understanding, Assessing and Treating over 70 Conditions*** by Fiona Rattray and Linda Ludwig, Talus Inc., Toronto, Canada, March 2000.

***Balance is Possible F.R.O.M. Head to Toe*** by Joshua Morton, 2009 (Unpublished)

The Fascial System is a Sensory Organ, by Warren I. Hammer, D.C., April 2014:  
[http://www.acatoday.org/content\\_css.cfm?CID=5438](http://www.acatoday.org/content_css.cfm?CID=5438)