

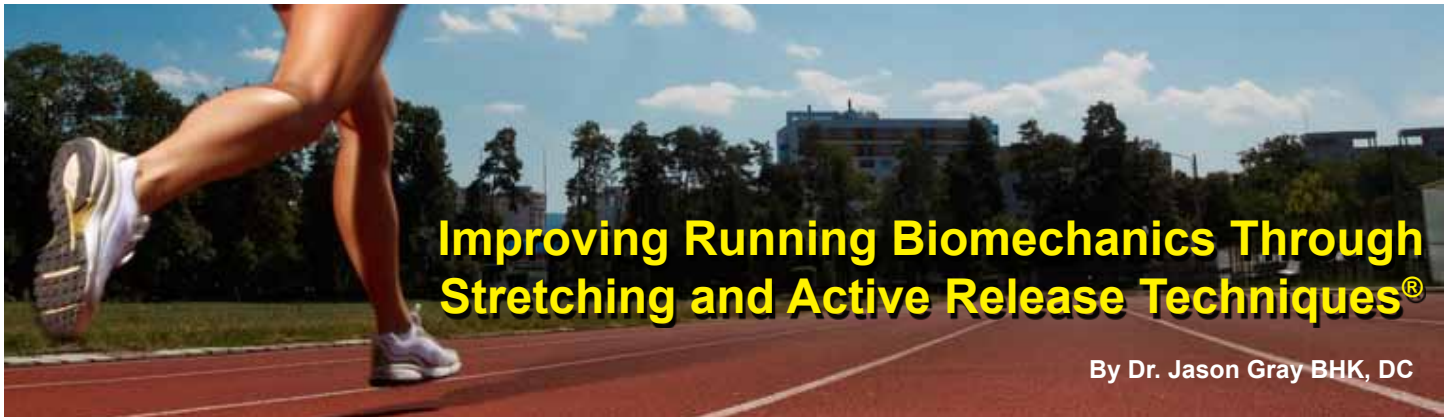
Running Flexibility Self-Assessment Test

Improving Running Biomechanics with Stretching
and Active Release Techniques®



*Building
Better Athletes*
KINETESIS
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CLINIC

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To run your best, it is not enough to just train hard and put in the miles, you also need to work at keeping your body healthy and moving efficiently. A huge part of this is making sure your muscles and joints are flexible and free of restrictions. You see, running is a highly repetitive motion, requiring your ankles, knees, and hips to move through the same movement patterns thousands of times with each run. When your muscles are tight and your body is unable to move through its full range of motion it can dramatically interfere with your normal running motion. In fact, tight muscles make a proper running stride impossible, forcing your body to compensate with faulty running mechanics. This is a big deal as 45% to 72% of runners will sustain an injury each year¹⁻⁴, and it is suggested that most of these injuries are associated with underlying anatomical or biomechanical problems⁵.

How do muscles become tight?

With running, muscles most often become tight from overuse. This is a product of the repetitive nature of running – as the same muscles stretch and contract thousands of times they are subjected to a process known as micro-trauma. With this damage new tissue forms to repair the damaged area. This new connective tissue - commonly referred to as scar tissue or adhesion tissue - is dense and sticky, and muscle less elastic. It can also cause the muscles to stick together and prevent them from sliding on one another, further limiting their flexibility. Making matters worse, these scar tissue adhesions will also begin to affect the muscles contractile ability, which makes the muscles weaker.

Unfortunately, traditional stretching is not effective in dealing with these scar tissue adhesions. In fact, when the muscles are bound-up and restricted by these adhesions a runner can often stretch and stretch without seeing any noticeable improvement in flexibility. This is not to say that stretching is not beneficial. In fact, stretching is an important part of maintaining flexibility and keeping the muscles healthy. But when the muscles are restricted because of scar tissue adhesions another approach is needed. Fortunately, there is a specialized soft tissue treatment technique known as Active release Techniques®, or ART® for short, that is extremely effective at identifying and treating scar tissue restrictions. In our office we have found ART® to be an invaluable tool in keeping runners healthy and moving freely, especially when combined with a proper stretching routine.



Active Release Techniques® - The Gold Standard in Soft Tissue Therapy



ART® is a new and highly successful hands-on treatment method to address problems in the soft tissues of the body. It is quickly becoming the treatment of choice for endurance athletes as it is so effective in keeping the muscle moving freely and efficiently despite high training mileage and intensity. ART® treatment is highly successful in dealing with running injuries because it is specifically designed to locate and treat scar tissue adhesions that accumulate in the muscles and surrounding soft tissues.

If you are unfamiliar with ART®, it is probably best described as a type of active massage. The practitioner will first shorten the muscle, tendon or ligament, then apply a very specific pressure with their hands as the tissue is then stretched. As the muscle lengthens the practitioner is able to assess the texture and tension of the tissue to determine if the tissue is healthy or contains scar tissue that needs further treatment. When scar tissue adhesions are felt the amount and direction of tension can be modified to treat the problematic area. In this sense, each treatment is also an assessment of the health of the area as we are able to feel specifically where the problem is occurring.

Running Flexibility Self-Assessment Test

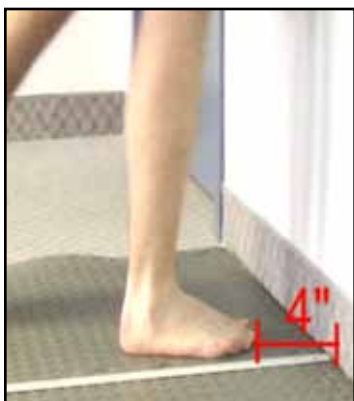
Are tight and restricted muscles compromising your running mechanics and increasing your chances of becoming injured? The following test is a quick screening procedure to help detect flexibility/range of motion (ROM) problems that may be keeping you from running your best. A brief summary of how each flexibility impairment may affect your stride, as well as common injuries associated with each problem and recommended stretches are also provided.

	Test	Motion Tested	Associated Muscles
1	Standing Calf ROM Test	Ankle Dorsiflexion (DF)	Gastrocnemius; Soleus
2	1st Toe Extension ROM Test	1st Toe Extension	Flexor Hallicus Longus; Flexor Hallicus Brevis; Plantar Fascia; 1st Toe Joint Capsule
3	Hip Abduction ROM Test	Hip Abduction	Hip Adductor Group
4	Modified Thomas Test	Hip Extension	Psoas; Iliacus; Rectus Femoris; TFL; Anterior Hip Joint Capsule
5	Active Knee Extension Test	Knee Extension	Hamstring Group
6	Prone Knee Bend Test	Knee Flexion	Quadriceps Group
7	Hip Rotation Test (Internal Rotation)	Hip Internal Rotation	Hip External Rotators (Piriformis; deep hip rotators; Psoas-Iliacus)
7	Hip Rotation Test (External Rotation)	Hip External Rotation	Hip Internal Rotators (TFL; Gluteus Minimus; Anterior fibers of Gluteus Medius)



Click [here](http://youtu.be/pjRmW837Th0) or paste this link into your browser for a You Tube Video of the Running Flexibility Self-Assessment test - <http://youtu.be/pjRmW837Th0>

Test #1 - Standing Calf ROM Test



Standing Calf ROM Test

Stand with your toes positioned 4 inches away from a wall. Keeping the heel firmly in contact with the ground, bring your knee towards the wall. Be sure to keep your knee directly over your toes. Repeat on the opposite side.

Your knees should be able to touch the wall from this position. If they cannot it is a sign that your ankle and/or calf muscles are restricted.

Effect on Your Running Stride

Full ankle mobility is important to ensure smooth forward progression during running. Restricted ankle ROM will either cause the heel to lift up prematurely, or will force the foot to compensate by over-pronating. Either of these situations can create excessive strain to the calf and foot, and can predispose the runner to injuries such as forefoot pain, plantar fasciitis, calf muscle strain, or Achilles tendiopathy.

How ART® Can Help

The calf consists of several muscles, all of which have different roles. When these muscles are overworked adhesions can develop in and between these muscles, creating weakness and stiffness that cannot be completely corrected through stretching or exercise. ART® can help treat these adhesions and restore normal movement to the area.

Recommended Stretch

Standing Dorsiflexion Stretch – this stretch can be helpful in improving ankle motion, especially when combined with ART® treatment.

1. Stand with one foot in front of the other, with the toes of the front foot facing the wall
2. Bend the front knee and ankle, allowing your lead knee to move towards the wall. Your knee should track straight over your second toe, and your lead heel should stay firmly on the ground.
3. Hold the stretch for 2 seconds, then return to the starting position.
4. Repeat this 10 times, on the last repetition hold for 15-30 seconds.



Test #2 - 1st Toe Extension ROM Test



1st Toe Extension ROM Test

From a kneeling position, keep both your heel and the ball of your foot flat on the floor. Gently pull up on your big toe. Repeat on the opposite side.

Under normal circumstances you should be able to lift your big toe 2 inches off the ground. If you cannot lift the toe this high it is an indication that your 1st toe is restricted.

Effect on Your Running Stride

Proper mobility of the 1st toe is important for an optimal running stride as the big toe needs to fully flex during the final moment of toe-off. This allows the trunk to roll forward over the forefoot, and directs the body weight through the 1st metatarsal. When the big toe is restricted it will compromise toe-off and place excessive strain on the metatarsals, and calf, predisposing the runner to forefoot problems such as metatarsal pain or stress fractures and inter digital nerve pain, as well as Achilles tendon problems.

How ART® can help

In many cases mobility of the 1st toe is restricted because of soft tissue adhesions in the muscles that run along the bottom the big toe, or in the joint capsule itself. When this is the case ART® can be very effective in treating these adhesions and improving motion of the toe.

Recommended Stretch

No stretch is provided due to the nature of this restriction (stretching in the presence of excessive tension of the joint capsule, or with existing joint irritation is not recommended as it can cause further problems). If you have a restriction with this test it is recommended that it be evaluated by an appropriate health care professional.

Test #3 - Hip Abduction ROM Test



Hip Abduction ROM Test

Lie on your back with both legs fully extended. Keeping your toes pointed towards the ceiling slide one leg away from your body as far as possible. Repeat on the opposite side.

Under normal circumstances your each leg should be able to slide out 40 degrees. Anything less than this, or differences in flexibility between legs, is an indication that you hip adductors may be tight and compromising your running.

Effect on Your Running Stride

Tight adductors are a big problem for runners as this will restrict motion of the hip and pelvis, and tight adductors are usually associated with muscle imbalances around the pelvis. Tight adductors will predispose runners to SI joint and low back problems, as well as conditions such as muscle strains/tendonitis around the hip.

How ART® can help

There are actually several muscles that are classified as adductors. It is common for adhesions to develop between these muscles in runners, especially between the adductor magus (the biggest muscle in the leg which is also very important in flexing and extending the thigh during running) and the medial hamstrings. ART® is very effective in locating and freeing up these muscles and restoring muscle balance to the area.

Recommended Stretch - Standing Adductor Stretch

This stretch can be help stretch the hip adductor muscles, especially when combined with ART® treatment.

1. Stand with your feet spread apart.
2. Bend one leg and shift your body towards that side. As you do this you should feel a stretch in your inner thigh. Be sure to keep your upper body tall and upright as you do this.
3. Hold this stretch for 2 seconds, the return to the starting position.
4. Repeat 10 times, holding the last stretch for 15-30 seconds.



Test #4 - Modified Thomas Test



Modified Thomas Test (Hip Flexor Test)

Sit on the edge of a table or bed - your hip bones should be as close to the edge as possible. Lie back and pull one knee up to your chest while contracting your stomach muscles so your lower back is flat against the table. Now let the opposite leg hang freely over the edge (keep this leg completely relaxed). Repeat on the opposite side.

Your thigh should be able to reach horizontal or slightly below, and your right and left sides should be the same. If this does not occur it is an indication that your hip flexors are too tight.

Effect on Your Running Stride

The hip must be able to freely extend during the push-off phase of running. If the hip flexors are too tight it will block this motion, leading to a shortened stride and increased vertical oscillation. This will not only make your stride less efficient, but will also place additional strain on the knee, hip, and lower back.

How ART® can help

The most commonly restricted hip flexor muscle is the iliopsoas muscle, which is located deep along the pelvis and front of the hip. ART® treatment is extremely effective in releasing the tension in this muscle. In many cases we have found a significant improvement in just a single treatment.

Recommended Stretch - Active Kneeling Lunge Stretch

This stretch will help stretch the hip flexor muscles and improve hip extension range of motion, especially when combined with ART® treatment.

1. From a kneeling position bring your trunk forward by bending your lead knee. This will cause the back thigh to extend. You should feel a stretch on the front side of the back hip or thigh as you do this.
2. Be sure to keep the trunk and pelvis tall and upright - it is best to perform a posterior pelvic tilt during this stretch.
3. Hold this stretch for 2 seconds, then return to the starting position.
4. Repeat 10 times, holding the last stretch for 15-30 seconds.



Test #5 - Active Knee Extension Test



Active Knee Extension Test

While lying on your back pull your thigh up with your hands so your knee points straight up towards the ceiling. Straighten your knee as far as possible without letting your thigh drop down towards the floor. Repeat on the opposite side.



You should be able to completely straighten the knee, or at least come very close to this (10-20 degrees shy of vertical would be considered normal), and your right and left sides should be symmetrical. If this does not occur it is an indication that your hamstrings are too tight.

Effect on Your Running Stride

The hamstrings are critical stabilizers of the knee, and perform the important function of pulling the foot in towards the body as the foot first comes into contact with the ground. When the hamstrings are weak it will often lead to over-striding and/or instability of the knee, both of which can lead to knee pain and a less efficient stride.

How ART® can help

It is common for the hamstrings to become bound up due to scar tissue adhesions. These adhesions can often entrap the sciatic nerve as well. When this occurs not only will the hamstrings become weak and restricted, but they are often resistant to stretching. ART® is effective in helping to release the adhesions that are binding up the hamstrings/sciatic nerve and restoring the normal strength and flexibility to the area.

Recommended Stretch - Hurdler's Stretch

This stretch will help stretch the hamstrings, especially when combined with ART® treatment.

1. Sit with one leg fully extended. The opposite leg should be bent and resting on the floor with the bottom of the foot against the other knee
2. Lean your trunk forward toward your extended foot until you feel a stretch on the back of your thigh. Try to keep the back straight as you do this.
3. Hold this stretch for 2 seconds, then return to the starting position.
4. Repeat 10 times, holding the last stretch for 15-30 seconds.



Test #6 - Prone Knee Bend Test (Quads)



Prone Knee Bend Test

Lie on your stomach with both knee extended. From this position flex one knee and use your arm to gently pull your foot towards your hip. You should not feel any pain in the lower back, and the front of your hip should not lift off the ground as you do this.



Under normal circumstances you should feel a light stretch on the front of your thigh, and you should be able to touch your heel to your hip. If you cannot reach your hip with your heel or if one side is more flexible than the other it is a sign that your Quadriceps may be restricted.

Effect on Your Running Stride

Restricted knee motion and tight quads are a problem as it will limit knee flexion during the swing phase, making your stride slower and less efficient. Furthermore, usually a tight Quad is also a weak Quad. When this is the case both shock absorption and propulsion will be greatly affected. Any of these situations can create excessive strain to the quad and anterior knee, and can predispose the runner to injuries such as Quadriceps tendonopathy, Patello-Femoral Pain Syndrome, or lower back pain.

How ART® Can Help

The Quadriceps consists of four separate muscles. It is common for adhesions to develop between one or more of these muscles which prevents the proper stretching and sliding of these muscles with each other, as well as with other surrounding tissues. It is also common for adhesions to develop between the quads and the femoral nerve, which will result in tightness and weakness of this muscle. ART® is extremely effective in resolving these restrictions and restoring the normal flexibility and motion to this area.

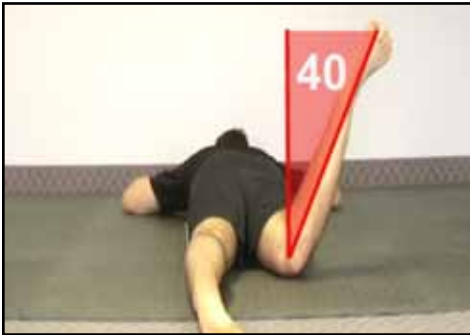
Recommended Stretch - Side-Lying Quad Stretch

This stretch will help stretch the Quads, especially when combined with ART® treatment.

1. While Lying on your side, bend your top knee and extend your thigh behind your body.
2. Increase the stretch by pulling your foot up and back with your arm. As you do this you should feel a stretch on the front of your thigh.
3. Be careful - do not allow the lower back to arch as you do this. Hold this stretch for 2 seconds, then return to the starting position.
4. Repeat 10 times, holding the last stretch for 15-30 seconds.



Test #7 - Hip Rotation Test



Hip Rotation Test

Lie on your stomach with one knee bent so your lower leg is pointing towards the ceiling. Let your foot rotate out away from your body as far as possible and note the angle formed between your shin and vertical. This tests the flexibility of your external rotators (piriformis, deep hip rotators, etc).

Now let your foot rotate in towards your opposite leg as far as possible, again, note the angle formed between your shin and vertical. This tests the flexibility of your internal rotators (TFL, anterior GMed, etc).



Your shin should be able to rotate approximately 40 degrees to either side, and your ROM should be even when rotating the hip in and out (it is normal to have up to 10 degrees more external rotation than internal rotation), and between right and left sides. Restricted ROM, or asymmetries between sides is a sign of tight hip rotators.

Effect on Your Running Stride

Tight hip rotators will restrict hip motion, and will interfere with the normal counter-rotation between the shoulders and upper back. This will not only interfere with your efficiency but will often force the lower back and knees to rotate more to compensate for the restricted hips, placing excessive strain on these areas.

How ART® can help

The hip rotators are notoriously difficult to isolate with traditional stretches, especially when scar tissue adhesions are present and binding-up the tissues. ART® can be used to locate the specific areas of restriction and the restore the normal flexibility and relative motion between the affected muscles.

Recommended Stretch - Prone Hip Rotation Stretch

This stretch will help stretch the hip rotator muscles and improve hip rotation range of motion, especially when combined with ART® treatment.

1. Lie on your stomach and bend one knee so your shin is pointing up to the ceiling
2. Rotate your thigh so your foot swings out away from your body (this stretches your external rotators & promotes internal rotation), or let your foot fall inward towards your opposite leg (this stretches your internal rotators & promotes external rotation)
3. For a deeper stretch use your arm to pull the leg further into rotation
4. Hold this stretch for 2 seconds, then return to the starting position.
5. Repeat 10 times, holding the last stretch for 15-30 seconds.



Improving Running Biomechanics and Preventing Injury Through Stretching

As previously stated, tight and restricted muscles are a common source of poor running mechanics. If after completing the flexibility self assessment screening tests you have identified any tight or restricted muscles it is important to resolve those restrictions. The first step in doing this is with a proper stretching routine. Where possible I have provided examples of stretches that would be recommended based on the specific muscle or movement that is restricted. You definitely need to do the stretches associated with any problematic areas uncovered by the self-assessment test, but those runners wanting to incorporate a regular running specific stretching routine into their training can simply do all the stretches as a complete routine. Start by performing the stretches 1-2 times per day, then as your range of motion improves and the self-testing procedures become normal, do the stretches 3-6 times per week for maintenance.

Please note that you should notice a steady and noticeable improvement in your range of motion with stretching. If you find that your muscles remain tight even after you stretch, or you find that your improvements in flexibility are only temporary, it is a sign that something is preventing your muscles from releasing. It is common for this to happen when scar tissue restrictions have developed in the muscles. When this is the case additional manual therapy (such as ART®) is needed as stretching is generally ineffective in addressing these adhesions.

Improving Running Biomechanics and Preventing Injury With ART®.

Although ART® treatment is an incredibly successful approach in treating injuries and quickly getting runners back training, it is also an invaluable tool in keeping runners healthy and running as smoothly as possible. In fact, it is common for both elite and recreational level runners to work regular ART® sessions into their training. This allows them to combat the stress and strain of running before it builds up to the point of injury and compromised performance, and keeps their muscles moving freely and efficiently.

To learn more about how ART® treatment can help you get back to running after an injury, resolve your stride faults, or simply help you to stay healthy and running your best, visit our website, www.KinetesisSports.com, or contact us directly by phone or e-mail.

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