

Season's Greetings

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From Kinetic Health

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Resolving Iliotibial Band Syndrome (Lateral Knee Pain)

By: Dr. Brian Abelson DC.



Iliotibial Band Syndrome (ITBS) is an overuse injury seen in runners, cyclists, soccer players, skiers, and weightlifters. ITBS is one of the most common causes of lateral knee pain. This condition often never completely resolves with conventional treatments, since most practitioners do not typically address all of the key structures involved in this injury.

Traditional Perspectives

Traditionally ITBS is seen as a *friction syndrome* in which the iliotibial band rubs against the lower portion of the leg (*lateral femoral epicondyle* of the *femur*). It has been postulated that this occurs when the *iliotibial band* moves anterior and posterior during knee flexion and extension. This repetitive motion causes friction, micro-tears, and inflammation of the area. (including a bursa located between the *lateral epicondyle* and the IT band). Numerous researchers have demonstrated that the most intense pain is experience at about 30 degrees of knee flexion (a zone of impingement). This is certainly the perspective I was taught during my orthopedic classes 25 years ago. It is also the logic that most practitioners use to formulate a treatment strategy. The only problem is that this perspective is **WRONG**....

Article continued on page 2

It's Not Just the Piriformis Muscle (The Deep Six)

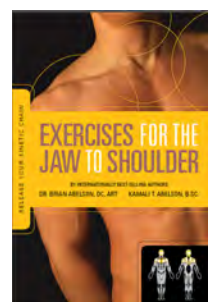
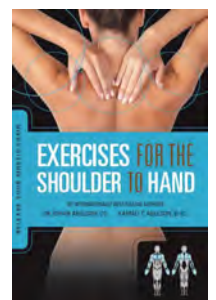
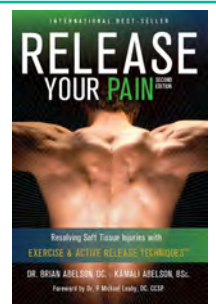
By: Dr. Evangelos Mylonas DC.



Many of our patients at Kinetic Health have heard of the *piriformis* muscle, especially if they have suffered from **Piriformis Syndrome** (i.e. sciatica caused from compression of the *sciatic nerve* by the *piriformis* muscle). However, what many of our patients may not know, is that the *piriformis* is just one of a group of six muscles that are collectively known in the anatomy world as the "**Deep Six**". We refer to these muscles as "deep" because they are located underneath, or deep, to the *gluteus maximus*. The Deep Six muscles are the: *piriformis*, *superior gemellus*, *obturator internus*, *inferior gemellus*, *obturator externus*, and *quadratus femoris*.

All of the Deep Six muscles share a common attachment site on the outer part of the hip (*greater trochanter* of the *femur*) and connect the top of the thigh bone (*femur*) to your pelvis. The hip is a ball-and-socket joint in which the Deep Six muscles control outward hip rotation (external rotation) and help to stabilize the hip during movement.

For the purpose of this article it is important to understand that we are describing the Deep Six muscles as a single group. This lets us illustrate where they are anatomically located and how they function together as one unit.... Article continued on page - 3



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Resolving - Iliotibial Band Syndrome (continued)

What the Research is Telling Us

With recent research, this traditional perspective has definitely come into question. This is primarily due to the discovery of anatomical factors that actually **prevent** the *iliotibial band* from moving in an anterior-posterior direction. Research has demonstrated that the iliotibial band is actually firmly anchored to the leg (*linea aspera* of the *femur*) by a sheet of strong connective tissue (*intermuscular septum*). In addition it is also attached by strong fibrous strands just above the knee (*lateral epicondyle*) and deep into the bone. These strong attachments prevent the iliotibial band from sliding anterior and posteriorly over the lower leg (*lateral epicondyle*) as was previously assumed.

Anatomy and Function of the ITB

Anatomically, the *iliotibial band* (ITB) is a thickening of a structure known as the *fascia lata*. The *fascia lata* is a web of connective tissue (fascia) that completely covers your entire leg. Think of the *fascia lata* as a sock encasing your entire thigh. The *iliotibial band* (the fascial thickening) is located on the lateral aspect of your thigh and is **not** an independent structure; it is a fully integrated part of the *fascia lata*. Which makes the postulated anterior-posterior motion pretty much impossible since it cannot glide independently.

The *Iliotibial band* is also part of a structure called the "Pelvic Deltoid Complex". In this complex, the superficial layers of the *gluteus maximus* muscle from the posterior hip and the fibers from *tensor fascia lata* muscle at the front of the hip fuse into the *Iliotibial band*. These muscles collaborate with each other to raise the hip to the side (abduct the hip). They also assist the *gluteus medius* muscle (an abductor) in maintaining the pelvis in a neutral position when standing on one leg (Stance Phase of Gait).

In addition the IT band acts as a brace that decreases bending stresses on the leg (femur). It does this by converting tensile loading to compressive loading on the lateral aspect of the leg.

Look at Hip Strength! Not IT Band Length

When the muscles of the hip become weak, there is an increase in the inward motion (adduction) of the leg. This becomes evident during the Stance Phase of Gait. This inward motion increases the amount of force directed through the *iliotibial band*, which in turn causes compression of the tissue of the lateral knee. This is exactly what researchers have found in individuals who suffer from ITBS. ITBS sufferers have weak gluteal muscles (abductors) and an increase in inward motion (adduction) of the hip during the Stance Phase of Gait.

The Problem Lies in the Fat Pad, Not in the Bursa

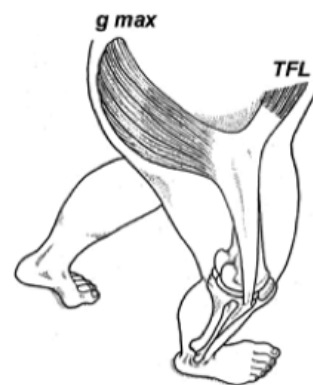
Earlier, we mentioned that the conventional perspective believed compression of the bursa is the cause of the pain. (A bursa is a fluid filled sac found between anatomical structures). Unfortunately MRI studies have shown that there is **no bursa** between the IT band and the lateral knee. From a biomechanical perspective, there are no bursa in this area because there is no need for one. Without the presumed anterior-posterior motion, there is no need for reduced friction.

However is in the area between the IT band and lateral knee (the site of pain), there is a layer of highly innervated fat, a layer of fat *full of neurological receptors*. Compression of this area is the most likely cause of the lateral knee pain in Iliotibial Band Syndrome.

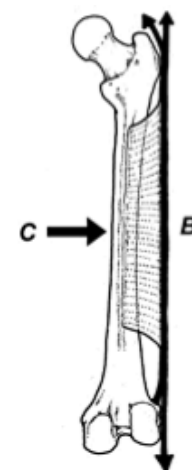
Treatment of ITBS

This new information has completely changed our approach for treating ITBS. Using this new approach we have obtained excellent results in even the most stubborn cases. If you would more information, or to book an appointment to have this condition (or another musculoskeletal condition) treated, just give us a call. 403-241-3772.

Evolution of the Koch model of the biomechanics of the hip: clinical perspective. *Fetto J, Leali*



Fibers from the *gluteus maximus* and the *tensor fascia lata* fuse into the IT band. The IT band runs down the lateral aspect of your leg, crosses the knee, and inserts into the tibia.



The IT band connects directly into your leg (the femur). When the *gluteus maximus* and the *tensor fascia lata* muscles contract, they create a compressive force that stabilizes the leg during the Midstance Phase of the Gait Cycle. Having strong gluteal muscles not only reduces the incidence of lateral knee pain, but it also reduces the risk of stress fractures that we often see in runners.



Resolving Iliotibial Band Syndrome

Check out our video about Resolving Iliotibial Band Syndrome.

http://youtu.be/l-4klP_BpE8



Iliotibial Band Release using a ball

Try our video about Myofascial Release of the Iliotibial Band.

http://youtu.be/JbmE2Q_LAdk

It's Not Just the Piriformis Muscles (continued)

In reality though, the Deep Six muscles are part of a larger kinetic chain that is comprised of an interlinked group of muscles, tendons, ligaments, and fascia centered on the hip. As *Thomas Meyers of Anatomy Trains* states “*These muscles are sequenced around the side of the hip like the leaves of an opened fan. So it is worthwhile to see these muscles as part of a continuum, not as an isolated group.*”

At Kinetic Health, we view the entire body as a “continuum”, or as one functional unit. From this perspective, we often find that hip pain that involving the Deep Six muscles is often the end result of a number of cumulative strain/sprain injuries, altered movement patterns, joint restrictions, and postural compensations.

“My hip and buttock pain increases after I have been sitting for about 20 minutes” and “I get a deep pain at the side of my glutes when I get up from a sitting or squatting position” are common complaints we hear from patients that are suffering from a Deep Six related muscle injury.

Most patients with a musculoskeletal condition that involves the Deep Six muscles also demonstrate many of the muscle imbalances we've discussed in our other articles, such as tight hip flexors (*iliopsoas*) and weak gluteal (*gluteus medius, gluteus maximus*) muscles. Regardless of what the cause is (overtraining, prolonged sitting, groin injury), once the hip flexors become shortened, they will in effect “turn off” the gluteal muscles. This is known as **reciprocal inhibition** – where muscles on one side of a joint relax to allow muscles on the other side of the joint to contract. If the larger gluteal muscles are “turned off” then the deeper gluteal muscles will often attempt to compensate for any muscle weakness.

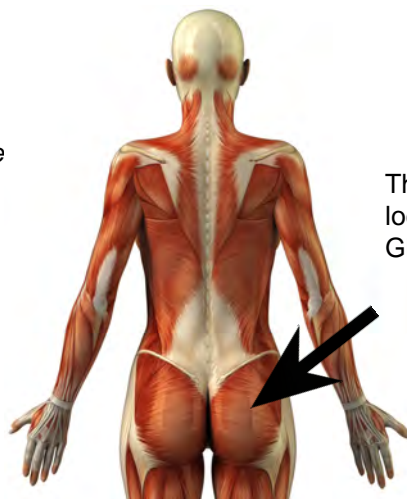
Over time, the Deep Six muscles will become fatigued and strained, and this can lead to inflammation and the development of soft-tissue restrictions. In some cases, the *sciatic nerve* can become entrapped as it courses through the Deep Six muscle group – often at the *piriformis* or *obturator internus*.

The Deep Six muscles can also directly impact the hip joint, leading to the development of stiffness and pain within the joint. As I mentioned earlier, all of the Deep Six muscles attach onto the outer part of the hip (greater trochanter of the femur). Therefore, any restrictions within the muscle group will limit the range of motion within the hip joint and alter movement patterns resulting in dysfunction.

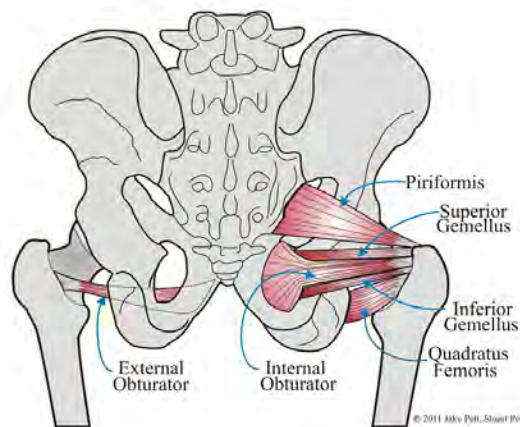
As you can see, the Deep Six muscles are vital to proper hip function and are an integral part of the hip's kinetic chain. We have found that Self Myofascial Release in conjunction with soft-tissue treatment therapies (Active Release Techniques, Fascial Manipulation, and Graston), Chiropractic adjustments, and exercise can help resolve even the most chronic of deep gluteal muscle conditions. Watch our video about the Deep Six muscles. It provides you with good information and will guide you in how to effectively use a foam roller to release the Deep Six muscle group.

Hopayian K. The clinical features of the piriformis syndrome: a systematic review. *Eur Spine J.* Dec 2010; 19(12): 2095–2109.

Boyajian-O'Neill L.A. Diagnosis and Management of Piriformis Syndrome: An Osteopathic Approach. *J Am Osteopath Assoc.* 2008;108:657-664



The Deep Six are located under your Gluteal muscles



Myofascial Release of the Deep Six

Watch our video about releasing the Deep Six external rotators with a ball.

<http://youtu.be/vS4xYZIuVcg>



Myofascial Release of the Adductors

Use our video to release the adductor muscles with a ball. When the Deep Six are tight, it is often necessary to release these muscles.

<http://youtu.be/ReNYZO-5b08>

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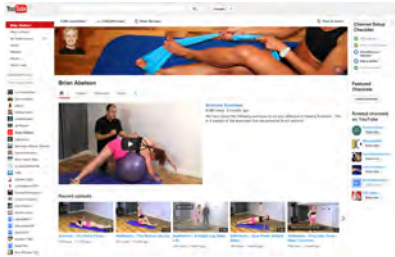
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This is the link to our **YouTube** channel. We are constantly updating our channel with videos about new exercises, conditions, biomechanical analysis, local races (marathons, triathlon's), and even cultural events and travel. Please check us out, and feel free to *share* our videos with anyone that you think could use this information.



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