COMMON LEG INJURIES AND THERAPEUTIC STRATEGIES

By George P. Kousaleos, LMT, NCTMB

The first therapeutic massage I ever witnessed was in the fall of 1968 in the Harvard University Athletic Training Room. I was a football player for the freshman team and like most days I was having my ankles taped before practice. Across the room I watched one of Harvard's senior athletic trainers perform a deep-tissue massage routine on the thigh of a varsity cross-country runner. His hands moved with a skill that fascinated me, and the depth of his work on the quadriceps, adductors, hamstrings, and iliotibial band gave the impression that the muscles were made of soft dough. I still remember thinking that my thigh muscles were too dense and contracted to allow any treatment resembling what I was observing.

Later that fall I suffered an injury to my lateral thigh and hip that required regular treatment, including hydrotherapy, cryotherapy, and therapeutic massage. The same athletic trainer whom I watched just months earlier was assigned to my case. Indeed, my earlier thoughts proved to be true. He told me that the tightness and restriction of my musculature would need to be modified before he could apply the deeper pressure that would improve my condition. While the injury was clearly along the iliotibial band he worked the whole hip, thigh and knee every treatment. At first the pressure seemed unbearable, but later I welcomed his decisive touch, even though it was accompanied by a burning sensation that slowly decreased over time. He recommended that I include more flexibility exercises to my workout regimen, especially for the back, hips, and legs. Like many football players of that era flexibility was something that I knew little about. Only years later, after experiencing a neck injury while playing rugby (Common Neck Injuries and Treatment Strategies, On The Massage Scene, Issue 40, June 2008) did I finally commit myself to flexibility training.

This article will look at three common leg injuries – **iliotibial band syndrome**, **shin splints**, and **plantar fasciitis** - that affect the thigh, lower leg and foot. The treatment strategies can be added to any therapeutic massage routine, but clearly focus on the fascial bands that wrap and support each region.

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TREATMENT STRATEGIES

Plantar Fasciitis

1. With the client in supine position apply general techniques to warm the foot, ankle, lower calf and calcaneal tendon.
2. Apply plantar flexion and dorsiflexion range-of-motion for ankle, foot and toes.
3. Apply specific techniques to the retinaculum of the ankle and to the calcaneal tendon and its attachments to the calcaneus.
4. Apply broad strokes (thumb pads or soft fist) to full planter surface of the foot, include vertical and horizontal planes of force.
5. Use deep circular friction on affected areas of the plantar surface of the calcaneus and the arches. Locate all tender points and work thoroughly.
6. Complete treatment with general techniques and check for improved range-of-motion of ankle, foot, and toes.

—George P. Kousaleos

Range of motion for ankle and foot

Broad to specific myofascial techniques for releasing retinaculum

Specific stretch for calcaneal tendon

The Thigh and Iliotibial Band Syndrome

The musculature of the thigh provides for some of the most powerful and explosive movements available to the human body. The quadriceps and hamstrings are often considered to be the critical pair that keeps us standing, moving, kicking, and jumping. The adductors of the medial thigh stabilizes the knee and also medially rotates the femur, adding support and force to any side-to-side movement. Because of the intricate web of these functional muscle groups that attach the leg to the pelvis and the thigh to the lower leg, it is critical to understand the layers of fascia that surround and support the thigh.

The iliotibial band (ITB) is the most important layer of dense, fibrous connective tissue that supports the interrelationship of the hip, thigh and knee. Located along the lateral line of the thigh, the ITB runs vertically, with emerging fibers from the gluteal fascia and from the tensor fascia lata (TFL). At the lateral pelvis and upper thigh the ITB is a broad layer of fascia that eventually narrows into a thick and strong cable that attaches distally at the tibial tubercle just below the lateral knee. Because of its close proximity to the vastus lateralis of the quadriceps group, the ITB plays an important role in stabilizing the leg, from hip to knee, during all movement.

Iliotibial Band Syndrome (ITBS) is normally a result of excessive friction between the ITB and the lateral epicondyle of the femur, which creates sharp pain at the side of the knee, most often during running or related exercise. ITBS can also cause pain at the side of the hip when trauma has affected the function of the TFL. ITBS is most common with runners and cyclists, especially when their training levels have recently increased, or for runners when they train on uneven or sloped surfaces. ITBS can also be associated with court and racquet sports, strength training (especially from weight-bearing squats), and even pregnancy. Leg-length differences and misalignments of the pelvis can also be contributing factors.

The real cause of the pain is the repetitive movement of the cabled portion of the ITB sliding back and forth across the outer surface of the lateral epicondyle. In running this happens on the average of 90 times per minute or 22,000 times for a 4-hour marathon. If the ITB is too weak or too tight this constant movement across the lateral epicondyle will inflame the fascial membranes of both the ITB and the periosteum of the epicondyle. Most coaches, athletic trainers, and sports massage practitioners recommend using the RICE (Rest, Ice, Compression, & Elevation) formula for treatment. While this will help calm the agitated tissues and the copious amount of sensory neurons in the affected area, this formula for treatment will not improve strength or flexibility. A balanced treatment strategy should also include an improved training regimen that includes strengthening and lengthening of both the lateral and medial tissues of the thigh. Massage techniques can assist in reducing the tightness of the ITB while restoring the tonicity of the soft tissue.

The Lower Leg & Shin Splints

The lower leg is responsible for a myriad of movements or actions required in standing, walking, running, jumping, swimming and cycling. The lower leg is divided into four fascial compartments, each containing muscles and tendons that support movement specific to that compartment. The muscles of the **anterior compartment**, located at the front of the shin, are primarily responsible for dorsiflexion of the foot and toes. The anterior tibialis may also assist with inversion of the foot. The **lateral compartment** contains the muscles that produce eversion of the foot and also assist with plantar flexion of the foot. These muscles used to be known as peroneus longus and brevis but have been recently renamed fibularis for the lateral bone of the lower leg. The **posterior compartment** contains the large muscles of the calf (gastrocnemius, soleus, and plantaris) that produce plantar flexion of the foot, while the **deep posterior compartment contains** intrinsic muscles that either flex the toes (flexor digitorum longus), invert the foot (tibialis posterior), or flex the big toe (flexor hallicus longus). These muscles may also assist with plantar flexion.

Fist techniques for longitudinal and transverse arches

Circular friction for longitudinal arches and ball of metatarsals

Circular friction for calcaneus

Shin splints are injuries to the portion of the anterior leg that is closest to the lateral or medial edge of the tibia. The term shin splint has been more recently called medial tibial stress syndrome or anterior compartment syndrome. Often associated with overuse in runners, basketball players, and aggressive walkers, shin splints can be mildly uncomfortable or can become so painful that exercise must be discontinued. The most common shin splint is located along the medial edge of the tibia in an area that runs from just above the medial malleolus through the mid-portion of the lower leg. The associated pain is found both on the edge of the bone and in the mass of soft tissue just behind and medial to the tibia. Hard surface running, improper shoe support, toe running, or affiliated injuries to several ligaments in the posterior knee can also cause shin splints. Shin splints can be associated with stress fractures or micro fractures to the tibia, or from periostiitis, an inflammation to the periosteum of the tibia. Treatment strategies include RICE protocols and manual therapy that will improve structural balance, adhesion reduction, and myofascial tonicity.

TREATMENT STRATEGIES

Shin Splints

1. Apply general techniques to warm the tissues of the compartments of the lower leg. Include range-of-motion exercises for ankle joint.
2. With client in supine position apply broad myofascial techniques to all tissues immediately medial and lateral of tibia, starting immediately above the ankle and progressing to the knee.
3. Using deeper circular friction techniques work the affected areas of the tibial periosteum and surrounding soft-tissue adhesions.
4. Apply balancing techniques to both sides of the tibia and return to range-of-motion exercises to check flexibility improvement.

—George P. Kousaleos

Broad myofascial spreading techniques for lateral tibial tissues

Broad myofascial spreading techniques for medial tibial tissues

Deeper fisted technique for anterior compartment

Specific friction along medial tibia—include circular friction for adjacent adhesions

The Foot & Plantar Fasciitis

The most important functions of the foot include the twin responsibilities of weight bearing and propulsion. While these two primary functions require a strong measure of stability, it is also necessary for the foot to be flexible, allowing it to adapt to uneven surfaces while standing or moving. The foot is divided into three sections, which include the forefoot, the midfoot, and

the hindfoot. The forefoot consists of the five metatarsal bones and the phalanges. The midfoot includes five of the seven tarsal bones while the hindfoot includes the calcaneus and the talus. The musculature of the foot is either classified as intrinsic or extrinsic. The intrinsic muscles are located in the foot and primarily operate the various movements of the toes. The extrinsic muscles are located in the lower leg and their tendons cross the ankle joint to attach to various bones of the foot, supporting plantar flexion, dosiflexion, eversion, and inversion. The plantar region of the foot contains three arches, which give the foot its supportive shape. The medial longitudinal arch includes the calcaneus, talus, navicular, cuneiforms, and the first three metatarsals. The lateral longitudinal arch is normally lower and flatter than the medial arch and includes the calcaneus, cuboid, and the fourth and fifth metatarsals. The transverse arch includes the cuneiforms, the cuboid, and the five metatarsal bases. These three arches are covered by the plantar fascia, one of the densest and most resilient layers of fascia in the body.

Plantar Fasciitis is considered to be an overuse injury to the plantar tissues of the foot. It affects the fascia that comprise the soft tissue of the arches with inflammation, sharp pain, or a burning sensation (fascial pain). In the majority of cases plantar fasciitis is located in the center of the plantar surface of the calcaneus, but it can also occur along the longitudinal arches, and sometimes across the balls of the foot. This condition is often associated with long periods of exercise and weight bearing, arches that are too flat or too high, improper ankle and foot mechanics, obesity, inactivity, or from shoes that don't effectively support the arch. Treatment plans should also include rest, cryotherapy, and increased flexibility training for the calf musculature and the calcaneal (Achilles) tendon.

All of these common injuries are related to overuse, trauma, or under use of the myofascial compartments of the thigh, lower leg, and foot. Studying the anatomy and physiology of fascia and myofascia is essential for developing effective treatment plans. Recognizing the interrelationships of these tissues with the sensory nervous system, the lymphatic system, and the venous return system encourages the massage therapist to develop a treatment strategy that will improve acute or chronic injuries while promoting client-education and improved biomechanical performance

TREATMENT STRATEGIES

Iliotibial Band Syndrome

1. Apply general techniques to full thigh to warm the tissues. Balance the techniques between the four sides of the thigh.
2. From the side-lying position, with the thigh supported by pillow or bolster, apply broad myofascial spreading/broadening strokes that work across the ITB tissues. Work from hip to lateral knee.
3. With forearm, apply progressively deeper strokes to the full length of the ITB, the lateral quadriceps, and the lateral hamstrings.
4. With fingertips or fist apply deeper strokes across the affected areas of the ITB (the distal third of the ITB is normally more sensitive).
5. With finger pads of both hands lift and stretch the ITB from mid-thigh through lower thigh.
6. Finish treatment with moderate techniques that increase parasympathetic response.

—George P. Kousaleos

Myofascial spreading of iliotibial band

Longitudinal forearm 'ironing' of iliotibial band

Deeper horizontal fist technique for iliotibial band

Lifting stretch of mid-to-lower section of iliotibial band

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George will be presenting workshops in the UK in 2009:

- ***CORE Myofascial Therapy Intensive: Back Specific and Chest, Neck and Head – 21/22 March 2009 – London***
- ***Sports & Performance Bodywork: A 4-system Approach – 28/29 March 2009 - Edinburgh***

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