INJURY PREVENTION FOR TRIATHLETE'S

Presented By:

Sports Medicine Institute International

260 Sheridan Avenue, Suite B40
Palo Alto, CA 94306
(650) 322-2809
(650) 325-6980 FAX
www.smiweb.org

1) WHY DO TRIATHLETE'S GET INJURED?

-TOO MUCH TOO SOON!
-Not allowing for proper recovery.
-Not listening to your body.
-Strength and flexibility imbalances.
-Weakness.
-Inflexibility.
-Improper or over worn shoes.
-Improperly fitted cycle.

2) HOW DO YOU PREVENT INJURIES?

-Follow a sensible training program which incorporates appropriate rest.
-Listen to your body.
-Strengthen muscles specific to running, swimming and cycling.
-Stretch muscles prone to tightness.
-Apply cold water and ice when appropriate or necessary.
-Pay attention to your equipment.
-Massage (self massage and professional massage)

3) HOW DO YOU KNOW IF YOU ARE ALLOWING FOR PROPER RECOVERY?

A sensible training program, which, IF FOLLOWED, should get you to the starting line in shape and injury free. However, even with the most sophisticated training programs, failing to allow recovery is a common error. Be alert to mood changes, increased morning heart rate, increased restlessness and disturbed sleep. Consider reducing the mileage or intensity of your workouts or both, particularly if you notice more than one of these symptoms occurring simultaneously.

4) WHAT DO STRENGTHENING AND STRETCHING ACCOMPLISH?

Stretching and strengthening exercises help to correct imbalances which can develop among different muscle groups. If these imbalances are allowed to persist they will place undue stress on particular areas of the body which may ultimately result in an injury. For example, weak and inhibited gluteal muscles can lead to an IT Band injury. Tight anterior shoulder muscles contribute to "Swimmer's Shoulder," a tendon impingement injury. Tight hamstrings contribute to low back injuries and "Breast stroker's Knee."

Tight groin muscles lead to strains of the adductor muscles especially in swimmers. Many injuries are due to weakness on "one" side of a joint. If that weak muscle is fighting a tight muscle on the opposite side then fatigue sets in more quickly leading to poor biomechanics which compromises joint integrity, and an injury results. Muscle tightness can result in poor posture, contributing to neck, back and shoulder problems. Stretching starts blood circulating through the muscles and warms them up making it easier for them to reach their full range of motion without strain.

5) WHAT ARE APPROPRIATE STRENGTHENING EXERCISES AND WHEN SHOULD THEY BE DONE?

Exercises to strengthen crucial muscles are a great way to reduce the muscles imbalances mentioned above. The Strength section of this packet describes and explains some of the more important strengthening exercises. Each of these exercises aims to strengthen muscles which commonly present problems. The exercises should ideally be performed 2 to 3 times a week, with 2 to 3 sets of 15 to 20 repetitions per exercise. When starting these exercises, gradually build the number of sets, repetitions and resistance. Remember that strengthening is reserved for healthy muscles. If you are experiencing pain or functional problems you may need to go through a rehabilitative process, which may include rest and/or treatment of the injured tissue followed by movement and stretching, before the strengthening should be started.

6) WHAT ARE THE APPROPRIATE STRETCHES AND WHEN SHOULD THEY BE DONE?

Research shows that running is more likely to cause an overuse injury than either swimming or cycling. Specific stretching and use of a roller for self massage, as shown in the Stretching and Self Massage section can significantly improve flexibility, reduce post exercise soreness, reduce the amount of time it takes your body to recover from a particular training session and, best of all, help to avoid injury. Stretching may be uncomfortable, but it should never be painful or sharp. Do not force the stretch, wait for he tissue to relax. It usually takes from 15 to 60 seconds to achieve an effective, deep stretch. Stretch every day whether you run or not; you may tighten up more on an off day, particularly if you have a sedentary desk job. Stretch more intensely and deeply after exercise while you are still warm. You can also perform deeper stretching at another time but you need to warm up your muscles first; never stretch intensely when muscles are cold.

7) WHAT ARE THE BENEFITS OF COLD WATER AND ICE AND WHEN DO YOU USE THEM?

Cold water and ice are an athlete's best friends! They are the cheapest doctors in the world and many times more effective. A 10 to 15 minute soak in cold water between 55 and 65 degrees helps prevent post exercise muscle soreness and inflammation. Ice should be used on any acute injury, such as a sprained ankle or pulled muscle, as soon as possible - in minutes if its available. Application of ice is most effective in the first 24 to 48 hours following an injury. By timely icing, you can dramatically reduce the severity of an injury. It is also valuable for treating chronic inflammations, such as Achilles tendonitis, plantar fasciitis, shin splints and other tendon injuries. Ice can be used in the form of an ice cup by continuously applying the ice with movement over a treatment area. However, to prevent frostbite when using an ice bag, be sure to use a thick bag or place a thin cloth between your body and the ice bag. Treatments should last from 10 to 20 minutes depending on the size of the area. For example, 10 minutes on an Achilles tendon and 20 minutes on a strained hamstring belly. Icing should not be repeated until the treatment area returns to normal body temperature, generally 30 to 40 minutes. Be careful when using reusable gel packs with plastic rather than cloth covers. They can be too cold and easily cause frostbite. Put a thin cloth between your skin and the pack.

8) ARE TRIATHLETES LESS SUSCEPTIBLE TO INJURIES THAN RUNNERS?

A triathlete is naturally cross training and less likely to develop muscle imbalances than a pure runner. Furthermore, no single activity is as long in duration or as high in intensity as with competitive running, swimming or cycling alone. This is definitely a benefit with regard to preventing overuse injuries. However, there are more skills to master and more varied possibilities for injury. Although more injuries tend to be related to running, you may develop shoulder injuries from swimming or other injuries from improperly adjusted cycles. Triathletes also must remember that their fitness level and skill in one sport does not automatically translate into adaption for another. Each area, running, cycling and swimming must be individually progressive; start at an easy level and progress the intensity and duration gradually.

9) HOW DO YOU SELECT APPROPRIATE SHOES AND HOW MANY MILES CAN ONE EXPECT FROM THEM.

The best way to select an appropriate running show is to visit a local speciality running show store and try on many different models of shoes. The sales person can help you find the appropriate kind of show based on your foot type, and whether or not you pronate or supinate excessively. In general, a motion control shoe is best for over pronators with flat, floppy feet, and a shoe with extra cushioning is best for those with a rigid, high arched foot. Once you find a pair of shoes which seem to work, you need to continuously monitor how worn the shoes become. Many running injuries can be due to training in shoes which have broken down and no longer provide sufficient support. In general, you should not run in a particular pair of shoes for more than 400-500 miles.

10) WHICH CYCLE ADJUSTMENTS ARE CRUCIAL TO PREVENTING INJURIES?

Saddle Height:
If you have no knee pain, correct saddle height allows for 25 to 30 degrees of flexion of the extended leg when the pedal is at bottom dead center with the ball of your foot on the pedal. If you do have knee pain you will want greater than 30 degrees flexion and therefore the seat should be lower than normal.

Fore and Aft Saddle Position:
In proper neutral fore-aft saddle position, with the pedal at 90 degrees, a plumb line placed on the front edge of the kneecap should fall to the end of the crankarm. Some triathletes prefer to have the front of their knee 2 to 3 inches in front of this neutral position. This latter position will probably require a frame with significantly steeper seat tube angle than comes standard on most road bikes.

Upper Body Position:
To find the proper stem length (extension), you should be seated on the bicycle with your arms bent comfortably, your hands in the drops and your head looking forward. Then, have an assistant drop a plumb line from the tip of your nose. It should bisect the handlebars in the center of the stem.

After making adjustments for a proper fit, minor aches and pains may develop. This is normal, so resist the temptation to fiddle with the position. You should become adapted to the adjustments in a few rides. If you are still having problems after that, seek an expert fitter.

11) CAN DEEP TISSUE MASSAGE IMPROVE PERFORMANCE AND REDUCE INJURY?

We at SMI believe that sports massage, both self-massage and professional massage, should be an integral part of every athletes training. We approach massage from three different perspectives: performance enhancement, injury prevention and injury rehabilitation.

Performance Enhancement:
Tight muscles do not get normal circulation and can become inhibited and irritated. Inflexibility associated with tightness can cause holding patterns which prevent relaxed, efficient training and performance. By comparison, relaxed muscles get better circulation, test stronger and tolerate training at a higher intensity with less pain and breakdown. Deep tissue massage reduces restrictive and sometimes painful muscle contractions and trigger points. With regular treatments, many athletes are able to change old holding patterns, allowing them to improve strength, speed and endurance.

Injury Prevention:
Tightness can be a setup for muscle strain and other soft tissue injury. If tight and shortened muscle tissue is over stretched during activity, strain can occur even if the activity was no different from the previous day. In addition, chronic tightness can cause muscle and connective tissue injury and inflammation, resulting in back and shoulder pain, tennis elbow, iliotibial band syndrome, shin splints, Achilles tendonitis and plantar fasciitis. An experienced therapist can feel tightness and focus massage and stretching in those areas, helping to prevent the onset of injury.

Injury Rehabilitation:
When added to medical treatment and physical therapy, deep tissue work provides a faster and more complete recovery. Mild strains, not involving torn muscle fibers, can usually be eliminated with a few sessions of deep tissue massage. More serious strains do involve torn muscle fibers. Scar tissue develops as the muscle heals which often causes pain when the muscle contracts and limits range of motion. After healing, scar tissue can be broken down by deep longitudinal strokes accompanied by joint movement and followed by assisted stretching. Chronic tendonitis is associated with scar tissue and adhesions in tendons and may be resolved by 6 to 12 sessions of deep cross-fiber friction massage.

Most of the injuries which Triathletes experience are overuse injuries which result in muscle strain and tightness. These types of injuries respond readily to expert deep tissue therapy. Self massage using a foam roller is a great way to get some of the benefits of professional massage and to monitor muscle tightness and sensitivity. It can also act as an early warning system for potential problems. SMI is a resource for assessing flexibility problems and determining if aches and pains are serious enough to see a physician about. The therapists at SMI are themselves highly experienced athletes and can assist you with self massage, stretching, functional strength training and in progressing back to the program after setbacks. They will also help you decide if you need to see a physician and the type of physician or health care professional who is best equipped to administer the treatment you require.

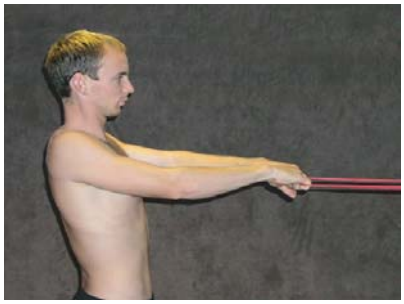
You are welcome to call SMI regarding issues of performance, injury prevention or problems with no obligation. Call the Clinic Director Mark Fadil at (650) 322-2809 ext. 315 or talk to any of the 11 therapists. You may also visit our web site at www.smiweb.org.

STRENGTH EXERCISES

Upper Back (Rhomboids)

Start

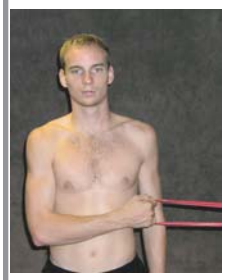
This exercise is an effective way to help attain full retraction of the shoulder blades with is important for maintaining proper form in swimming. Start with light weight and use good form. Reach forward to allow full protraction (forward reach) followed by full retraction (as in picture) of the shoulder blades. Elbows must remain straight as the shoulder blades are pinched together.



Finish

Push-Up Plus

This exercise strengthens the serratus anterior which helps to stabilize the shoulder during swimming and cycling. Start with a normal push-up. When your arms are straight, do an extra slow push toward the ceiling, fully protracting the scapula. Push your back up as far as your shoulders will allow. If this is too difficult, you can reduce the weight on your arms by pushing from a kneeling position.



Start

Finish

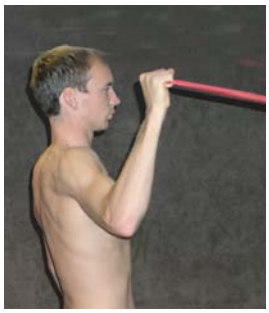
External Rotators

This exercise helps to strengthen the external rotators of the shoulder to prevent rotator cuff injuries. Stand with your elbow pushed snug against your body and bent to a 90 degree angle. Rotate your forearm away from your body keeping your elbow snug against your body. When your forearm is perpendicular with your body slowly return to the starting position.

External Rotators

Start with your elbow at 90 degrees and your shoulder extended to horizontal as shown. Rotate your shoulder back as far as it will go or until perpendicular with the ground. Return slowly and controlled.

Start



Finish

Start

Finish

Internal Rotators

Stand with elbow bent to 90 degrees and your forearm perpendicular to your body. Rotate your arm across your body as shown. Keep your elbow snug against your body throughout the entire movement. Return to the starting position.

STRENGTH EXERCISES CONTINUED

The Runner

Start with your knees bent and both feet flat on the ground. Push your low back into the ground by contracting your abdominals. Slowly bring your left knee up towards your head. (FIGURE A) When your left hip is bent 90 degrees hold this position for 2 seconds and bring your leg back to the starting position. Repeat with your right leg. To make the exercise more difficult put your right leg straight out in front of you and hold the leg approximately 4 inches off of the ground. (FIGURE B) Again push your low back into the ground by contracting your abdominal muscles. Slowly bend your right knee and hip bringing your right knee up towards your head. When your right hip is bent 90 degrees, lower your left leg back towards the ground by straightening your left leg. Stop when your left leg is approximately 4 inches above the ground and reverse the direction of movement.

Figure A

Figure B

Prone Core Stabilization

Balance all your weight on your toes and your forearms. Keep your back as straight as possible while rotating the bottom of your pelvis towards the floor. Maintain this position while you slowly lift your left foot 6 inches off the ground. Hold for two seconds and return your foot to the ground. Repeat with right leg.

Start

Stork Drill

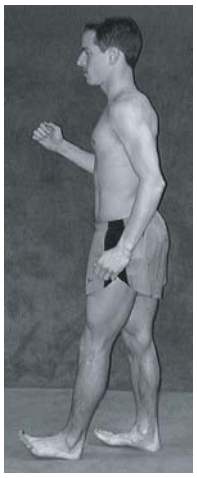
This is a great overall drill to strengthen all of the stabilizer muscles in the ankle, knee and hip. Bend your left knee 30 degrees but do not let your knee go forward of your toes. Try to keep your knee directly over your foot. Prevent both your knee and your ankle from wobbling from side to side. You should be able to hold this position for 2 minutes.

Finish

STRENGTH EXERCISES CONTINUED

Lunges

Start with your feet together. Move your left leg and right arm straight ahead. Do not bend your left knee past 90 degrees. (keep your knee as stable as possible, straight above your ankle). Do not bounce your right knee onto the ground. Bring your left foot back to the original starting position. Repeat by bringing your left leg 45 degrees to the left and repeat again bringing your left leg 45 degrees to the right. Repeat all three angles with your right leg.

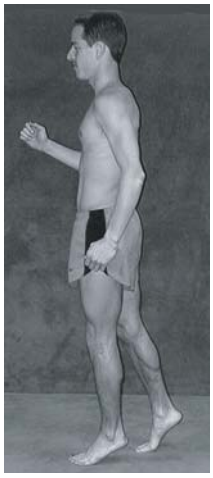


Heel Walking

This exercise should help to prevent shin splints. Keep your upper body erect with your eyes looking forward. Walk for 15 meters on your heels, with your toes pointed straight ahead. Your toes should never touch the ground. Repeat with your toes pointed out and again with your toes pointed in for a total of three times.

Toe Walking

This exercise should help prevent Achilles tendonitis. Your upper body should remain the same as with heel walking. As your left foot lands, let your left heel come as close to the ground as possible without touching and then come as high onto your toes as possible before pushing off the ground. Walk for 15 meters with your toes pointed straight ahead and repeat with toes pointed in and toes pointed out.



TOE GRASPING

Stand barefooted with your feet hip-width apart. Curl the toes of your right foot as though you were grasping something. Repeat with your left. You should do a total of 50 repetitions with each foot. Rest for one minute and complete two more sets. As you become more skilled try to pull yourself across the floor for a distance of 3 to 6 feet.

POOL RUNNING

Pool running is a great low stress way to cross train. It consists of simulated running in the deep end of a pool aided by a flotation vest or belt that keeps your head above water. When using a belt it should be very snug around your waist. Your form in the pool should imitate your form on dry land. You should keep your upper body erect with a slight forward lean and your elbows close to your body. You should have relatively quick leg turnover. You can be held in one place by a cord or you may actually run through the water across the width of the pool. No contact is made with the bottom of the pool. Pool running is also excellent for rehabilitation of injuries.

You can get a comparable workout to running on land if you run hard enough to raise your heart rate to 90% of that which you achieve running on land. In other words, pool running does not require as high a heart rate for the same workout effect.

UPPER BODY STRETCHING

Front of Shoulder and Chest

Standing in a doorway, bend your right elbow 90 degrees and elevate your upper arm so that it is parallel to the ground. Place your forearm against the doorway and push your chest forward though the doorway. You should feel a stretch in the front of your right shoulder and in the right side of your chest. Repeat with your upper arm slightly elevated from parallel to the ground and slightly lower than parallel to the ground.

External Rotators

Grasp your elbow and pull your arm across your chest to stretch the back of your shoulder. This stretch can be dramatically increased by lying on your back and having someone push the heel of their hand into your armpit to stabilize the scapula.

Triceps

Hold your right arm above and behind your head with your elbow bent. Use the uninvolved side to deepen the stretch by pulling the elbow of the stretched arm down further. Repeat with the opposite side.

Back of Neck

Place your hands behind your head as shown. Gently pull your chin towards your chest.

Upper Traps and Scalenes

Put your right hand on top of your head and pull your right ear down towards your right shoulder. You should feel a stretch on the left side of your neck and the top of your shoulder This stretch can be intensified by sitting on your left hand to stabilize the left shoulder.

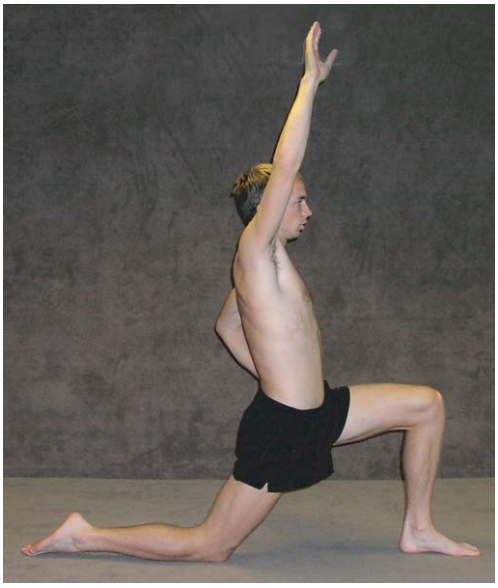
Neck Rotators

Turn your head to one side and place the opposing hand behind your head. Place your other hand on your face as shown and gently stretch. Repeat the stretch on the opposite side.

Lat and Pec Stretch

Holding a rope or towel between your hands raise your arms straight above your head. Pinch your shoulder blades together and push your arms back behind your head. Stretch should be felt on both side simultaneously.

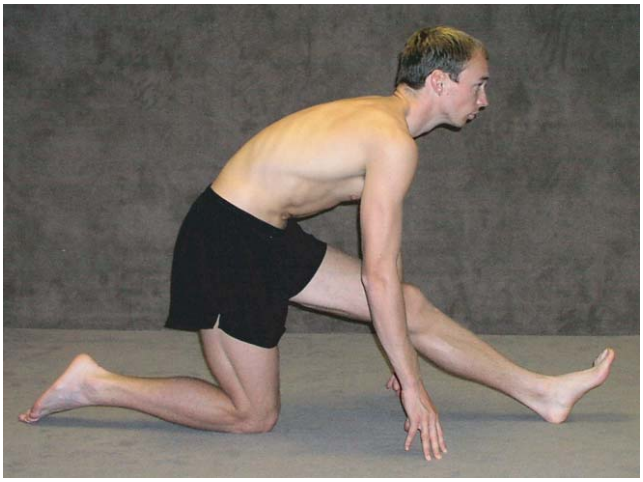
STRETCHING AND SELF MASSAGE



Hip Flexor Stretch

Push the bottom of your pelvis forward. Pinch the buttocks together and keep your knees pointed slightly inwards.

You will feel a stretch inside the top of the thigh and upwards towards the waistline.



Rotational Hamstring Stretch
Floor Version

Start on your right knee with your left leg lunged forward and straight. Bend forward from your waist bringing your chest towards your left knee until you feel a good stretch. Keep your back straight.

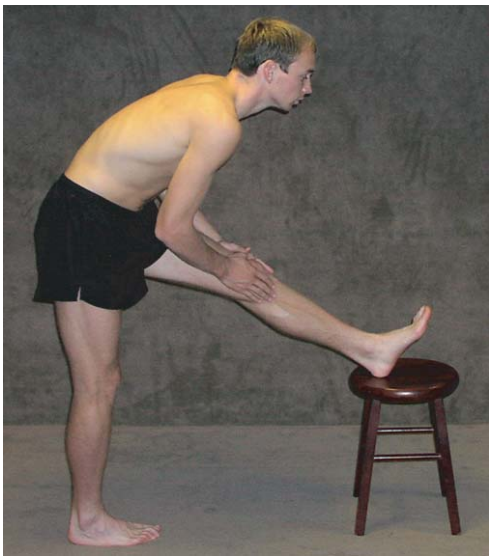
Rotate the torso to the left or to the right to emphasize the outer or inner hamstring.

Point your toes towards your head and away from your head to vary the location of the stretch.

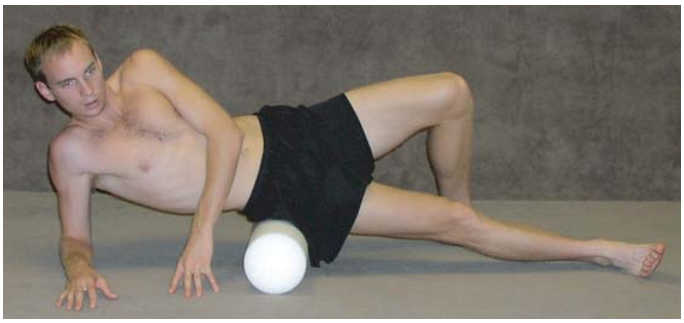
Rotational Hamstring Stretch
Standing Version

Stand on your right foot and place your left heel on a surface well below waist level. Face straight forward and keep both knees locked. Lean forward from the waist and keep your back straight until you feel a good stretch. Rotate your torso right and then left so that you are alternately facing to the inside and outside of your leg. Repeat for 20 reps while gradually increasing the stretch. Stay relaxed and keep you movements slow and controlled. Try pointing your toes towards your head and away from your head in order to modify the stretch.

Repeat above exercises reversing the positions and movements of the right and left legs.



STRETCHING AND SELF MASSAGE CONTINUED



Gluteal Self massage

Treatment is shown for right gluteals. Place roller as shown. Use your left leg to adjust the positioning of your body. Place your left leg behind your right to focus more on the back side of the glutes. Place the left leg in front of your right to focus more on the front side of the glutes. Hold on tight spots until tissue begins to release. Do not hold on any one spot for longer than a minute.

Posterior Gluteal Stretch

Stretch is shown on the left gluteal region. Try different knee angles and explore stretches up to 90 degrees.

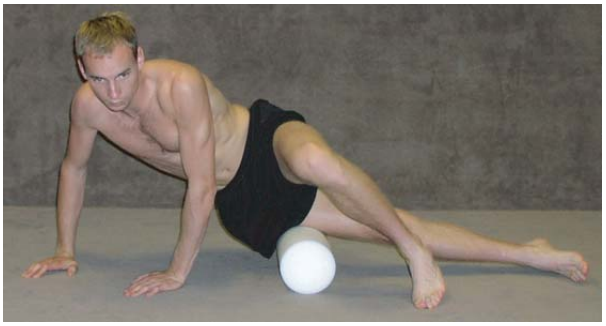
Mid Gluteal Stretch

Piriformis and Lateral Rotator Stretch

Stretch is shown for right leg. Cross your right foot over your left knee and pull your right knee towards your left shoulder. Left hip and knee can be bent more or less to change the positioning of the stretch.

Gluteal and IT Band Stretch

Stretch is shown for left side. Keep knee fully extended to focus more on the IT Band. If you feel the stretch more in the hamstrings it means that your hamstrings are tight. If that is the case stretch your hamstrings before doing this stretch.



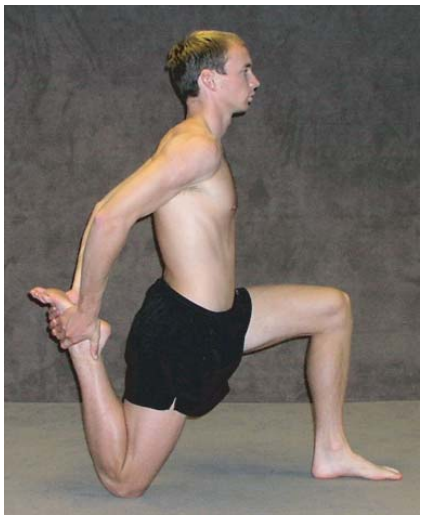
IT Band Self massage

Roll from the pelvis down the muscled area on the outside of the leg. Don't roll onto the knee itself. Place the roller on tight and painful areas and gradually increase pressure. Use your opposite leg to control the amount of pressure being applied. For full pressure place opposite leg on top of the leg being treated. Hold on tight spots until they begin to soften. Do not hold any one spot for longer than a minute.

STRETCHING AND SELF MASSAGE CONTINUED

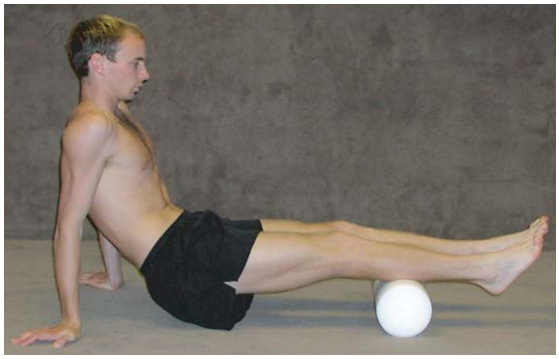
Quadriceps Self Massage

Roll from top of pelvis to above knee. Stay on muscle tissue and don't roll onto tendons or knee cap. Don't roll over areas which are too painful or don't roll smoothly. Place the roller and apply pressure gradually over tender areas. Apply pressure until muscle softens. Do not hold in one spot for longer than one minute.



Quadriceps Stretch

Make sure you have some form of cushion underneath the knee of the quad being stretched! Pull your left foot up towards your butt and push the bottom of your pelvis forward. Pull your foot slightly out from your body to focus the stretch more on the inside of your quad. Pull your foot slightly across your body to focus the stretch more on the outside of your quad.



Calf Self Massage

Place roller as shown. Support your body weight with your hands and calves only. Do not let your butt rest on the floor. Roll from your heel to the top of the muscle belly. Do not roll over the back of your knee.

For more intensity, point the toes as shown. For even more intensity, cross one leg over the other and place all of your weight on one calf.

Calf Stretch

Adjust distance from wall according to your height. Bend the knee closest to the wall and let your pelvis shift forward. Stretch is on the leg furthest from the wall.

Gastrocnemius Aspect

Keep your back knee locked.

Soleus Aspect

Perform the stretch with your knee bent.

YOUR WEIGHT SHOULD BE SUPPORTED ON YOUR HEEL, NOT YOUR FOREFOOT.

Tri-Plane Achilles Stretch

Start in the same position as for the soleus stretch with the knee bent. The only difference is that you turn the slant 45 degrees clockwise as well as 45 degrees clockwise to focus the stretch more on the inside or the outside of the Achilles.

Sports Medicine Institute International

260 Sheridan Avenue, Suite B40
Palo Alto, CA 94306
650-322-2809
650-325-6980 FAX
www.smiweb.org

***SMI** is a non-profit public benefit corporation dedicated to the prevention and treatment of overuse injuries, optimization of human function and enhancement of athletic performance. Through education, research and the operation of a charitable therapy clinic and human performance lab we help active individuals and athletes of all abilities maximize their potential and function at the highest level possible.*

FACILITIES

SMI provides the highest level of care in the best possible environment. Our facility boasts nine private rooms for advanced manual therapy and a Physical Therapy clinic specializing in performance enhancement and the treatment and prevention of overuse injuries. Our newly constructed Human Performance Lab allows physiologists to conduct sophisticated exercise testing that complements our therapy services and provides our clients with the most advanced level of care available in the Bay Area. Our community center acts as a locale for athletes of all levels to stretch, strengthen, use cold hydrotherapy tanks, discuss training and just get together after hard workouts; all of which are free of charge to SMI clients, athletes and patients.

DONATIONS

SMI is a Public Benefit Nonprofit Corporation 501(c)(3) organized exclusively for education and charitable purposes. We are an institute, clinic and community center whose mission is to promote research, clinical development and delivery to the public of functional health services and advanced manual therapy treatments, particularly in the fields of injury prevention, injury rehabilitation and athletic performance. It is a further purpose of this corporation to support under-funded competitive amateur athletes from the youth level through the collegiate and post-collegiate levels, by offering affordable services and financial assistance. Our donation programs are designed to help subsidize the reduced rates that we offer our beneficiaries. If you have any questions regarding donations please contact our Development Manager Rachael Holloway at 650-322-2809 x329. Please keep in mind that donations made to SMI are tax deductible. Our federal tax ID # is 94-3256879.

LEUKEMIA AND LYMPHOMA SOCIETY/ TEAM FRIENDS

SMI has developed a partnership with the Leukemia and Lymphoma Society's **Team In Training** (TnT). We provide TnT with injury prevention, stretching, strengthening and injury rehabilitation services. SMI staff provides support for TnT with coaching, injury prevention and rehabilitation, strengthening and stretching. SMI has also developed partnerships with other Bay Area Teams and organizations. These include **Team Sheeper**, **TRIbe Triathlon**, **Team Diabetes**, **Asha** and **Joints in Motion**. All Team in Training members and Team Friends receive a discount on SMI services.

MAP