

Shin Splints

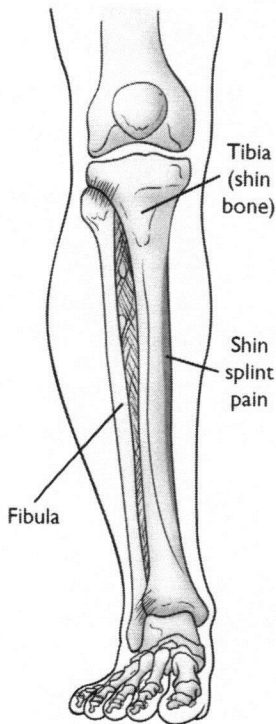
Shin splints are a common exercise-related problem. The term "shin splints" refers to pain along the inner edge of the shinbone (tibia).

Shin splints typically develop after physical activity. They are often associated with running. Any vigorous sports activity can bring on shin splints, especially if you are just starting a fitness program.

Simple measures can relieve the pain of shin splints. Rest, ice, and stretching often help. Taking care not to overdo your exercise routine will help prevent shin splints from coming back.

Description

Shin splints (medial tibial stress syndrome) is an inflammation of the muscles, tendons, and bone tissue around your tibia. Pain typically occurs along the inner border of the tibia, where muscles attach to the bone.



Shin splint pain most often occurs on the inside edge of your tibia (shinbone).

Reproduced and adapted with permission from Gruel CR: Lower Leg, in Sullivan JA, Anderson SJ (eds): Care of the Young Athlete. Rosemont, IL, American Academy of Orthopaedic Surgeon, 2000.

Cause

In general, shin splints develop when the muscle and bone tissue (periosteum) in the leg become overworked by repetitive activity.

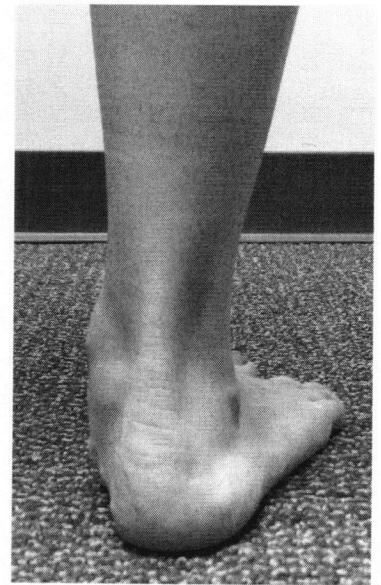
Shin splints often occur after sudden changes in physical activity. These can be changes in frequency, such as increasing the number of days you exercise each week. Changes in duration and intensity, such as running longer distances or on hills, can also cause shin splints.

Other factors that contribute to shin splints include:

- Having flat feet or abnormally rigid arches
- Exercising with improper or worn-out footwear

Runners are at highest risk for developing shin splints. Dancers and military recruits are two other groups frequently diagnosed with the condition.

Flat feet can increase stress on lower leg muscles during exercise.



Symptoms

The most common symptom of shin splints is pain along the border of the tibia. Mild swelling in the area may also occur.

Shin splint pain may:

- Be sharp and razor-like or dull and throbbing
- Occur both during and after exercise
- Be aggravated by touching the sore spot

Doctor Examination

After discussing your symptoms and medical history, your doctor will examine your lower leg. An accurate diagnosis is very important. Sometimes, other problems may exist that can have an impact on healing.

Your doctor may order additional imaging tests to rule out other shin problems. Several conditions can cause shin pain, including stress fractures, tendinitis, and chronic exertional compartment syndrome.



Your doctor will examine your lower leg, checking for pain and tenderness along the inner border of the tibia (shinbone).

Stress Fracture

If your shin splints are not responsive to treatment, your doctor may want to make sure you do not have a stress fracture. A stress fracture is a small crack(s) in the tibia caused by stress and overuse.

Imaging tests that create pictures of anatomy help to diagnose conditions. A bone scan and magnetic resonance imaging (MRI) study will often show stress fractures in the tibia.

Tendinitis

Tendons attach muscles to bones. Tendinitis occurs when tendons become inflamed. This can be painful like shin splints, especially if there is a partial tear of the involved tendon. An MRI can help diagnose tendinitis.

Chronic Exertional Compartment Syndrome

An uncommon condition called chronic exertional compartment syndrome causes symptoms like shin splints. Compartment syndrome is a painful condition that occurs when pressure within the muscles builds to dangerous levels. In chronic exertional compartment syndrome, this is brought on by exercise. Pain usually resolves soon after the activity stops.

The tests used to diagnose this condition involve measuring the pressure within the leg compartments before and after exercise.

Treatment

Nonsurgical Treatment

Rest. Because shin splints are typically caused by overuse, standard treatment includes several weeks of rest from the activity that caused the pain. Lower impact types of aerobic activity can be substituted during your recovery, such as swimming, using a stationary bike, or an elliptical trainer.

Nonsteroidal anti-inflammatory medicines. Drugs like ibuprofen, aspirin, and naproxen reduce pain and swelling.

Ice. Use cold packs for 20 minutes at a time, several times a day. Do not apply ice directly to the skin.

Compression. Wearing an elastic compression bandage may prevent additional swelling.

Flexibility exercises. Stretching your lower leg muscles may make your shins feel better.

Supportive shoes. Wearing shoes with good cushioning during daily activities will help reduce stress in your shins.

Orthotics. People who have flat feet or recurrent problems with shin splints may benefit from orthotics. Shoe inserts can help align and stabilize your foot and ankle, taking stress off of your lower leg. Orthotics can be custom-made for your foot, or purchased "off the shelf."

Return to exercise. Shin splints usually resolve with rest and the simple treatments described above. Before returning to exercise, you should be pain-free for at least 2 weeks. Keep in mind that, when you return to exercise, it must be at a lower level of intensity. You should not be exercising as often as you did before, or for the same length of time.

Be sure to warm up and stretch thoroughly before you exercise. Increase training slowly. If you start to feel the same pain, stop exercising immediately. Use a cold pack and rest for a day or two. Return to training again at a lower level of intensity. Increase training even more slowly than before.

Surgical Treatment

Very few people need surgery for shin splints. Surgery has been done in very severe cases that do not respond to nonsurgical treatment. It is not clear how effective surgery is, however.

Prevention

There are things you can do to prevent shin splints.

Wear a proper fitting athletic shoe. To get the right fit, determine the shape of your foot using the "wet test." Step out of the shower onto a surface that will show your footprint, like a brown paper bag. If you have a flat foot, you will see an impression of your whole foot on the paper. If you have a high arch, you will only see the ball and heel of your foot. When shopping, look for athletic shoes that match your particular foot pattern.

In addition, make sure you wear shoes designed for your sport. Running long distances in court-type sneakers can contribute to shin splints.

Slowly build your fitness level. Increase the duration, intensity, and frequency of your exercise regimen *gradually*.

Cross train. Alternate jogging with lower impact sports like swimming or cycling.

Barefoot running. In recent years, barefoot running has gained in popularity. Many people claim it has helped to resolve shin splints. Some research indicates that barefoot running spreads out impact stresses among muscles, so that no area is overloaded. However, there is no clear evidence that barefoot running reduces the risk for any injury.

Like any significant change in your fitness regimen, a barefoot running program should be started very gradually. Begin with short distances to give your muscles and your feet time to adjust. Pushing too far, too fast can put you at risk for stress injuries. In addition, barefoot runners are at increased risk for cuts and bruises on their feet. Several brands of minimalist shoes with "toes" are available and these also require a slow working in period as your body adjusts to this different activity.

If your shin splints do not improve after rest and other methods described above, be sure to see a doctor to determine whether something else is causing your leg pain.

Last Reviewed

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Foot and Ankle Conditioning Program

Purpose of Program

After an injury or surgery, an exercise conditioning program will help you return to daily activities and enjoy a more active, healthy lifestyle. Following a well-structured conditioning program will also help you return to sports and other recreational activities.

This is a general conditioning program that provides a wide range of exercises. To ensure that the program is safe and effective for you, it should be performed under your doctor's supervision. Talk to your doctor or physical therapist about which exercises will best help you meet your rehabilitation goals.

Strength: Strengthening the muscles that support your lower leg, foot, and ankle will help keep your ankle joint stable. Keeping these muscles strong can relieve foot and ankle pain and prevent further injury.

Flexibility: Stretching the muscles that you strengthen is important for restoring range of motion and preventing injury. Gently stretching after strengthening exercises can help reduce muscle soreness and keep your muscles long and flexible.

Target Muscles: The muscle groups of the lower leg are targeted in this conditioning program, as well as the tendons and ligaments that control movement in your feet. These include:

- Gastrocnemius-soleus complex (calf)
- Anterior tibialis (shin)
- Posterior tibialis (center of calf)
- Peroneus longus (outside of lower calf)
- Peroneus brevis (outside of lower calf)
- Soleus (calf)
- Dorsiflexors (ankle)
- Plantar flexors (ankle)
- Invertors (ankle)
- Evertors (ankle)

Length of program: This foot and ankle conditioning program should be continued for 4 to 6 weeks, unless otherwise specified by your doctor or physical therapist. After your recovery, these exercises can be continued as a maintenance program for lifelong protection and health of your feet and lower legs. Performing the exercises three to five days a week will maintain strength and range of motion in your foot and ankle.

Getting Started

Warm up: Before doing the following exercises, warm up with 5 to 10 minutes of low impact activity, like walking or riding a stationary bicycle.

Stretch: After the warm-up, do the stretching exercises shown on Page 1 before moving on to the strengthening exercises. When you have completed the strengthening exercises, repeat the stretching exercises to end the program.

Do not ignore pain: You should not feel pain during an exercise. Talk to your doctor or physical therapist if you have any pain while exercising.

Ask questions: If you are not sure how to do an exercise, or how often to do it, contact your doctor or physical therapist.



Foot and Ankle Conditioning Program

STRETCHING EXERCISES

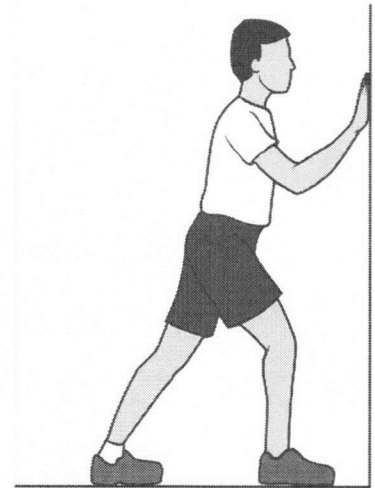
1. Heel Cord Stretch

Repetitions	Main muscles worked: Gastrocnemius-soleus complex You should feel this stretch in your calf and into your heel
2 sets of 10	
Days per week	Equipment needed: None
6 to 7	

Step-by-step directions

- Stand facing a wall with your unaffected leg forward with a slight bend at the knee. Your affected leg is straight and behind you, with the heel flat and the toes pointed in slightly.
- Keep both heels flat on the floor and press your hips forward toward the wall.
- Hold this stretch for 30 seconds and then relax for 30 seconds. Repeat.

Tip Do not arch your back.



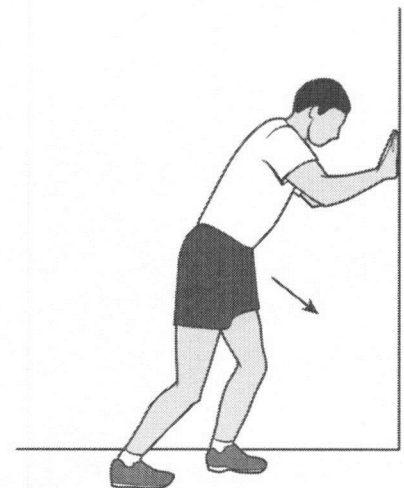
2. Heel Cord Stretch with Bent Knee

Repetitions	Main muscles worked: Soleus You should feel this stretch in your calf, the sides of your ankle, and into your heel
sets of 10	
Days per week	Equipment needed: None
to 7	

Step-by-step directions

- Stand facing a wall with your unaffected leg forward with a slight bend at the knee. Your affected leg is behind you, with the knee bent and the toes pointed in slightly.
- Keep both heels flat on the floor and press your hips forward toward the wall.
- Hold the stretch for 30 seconds and then relax for 30 seconds. Repeat.

Tip Keep your hips centered over both feet.





Foot and Ankle Conditioning Program

STRETCHING EXERCISES

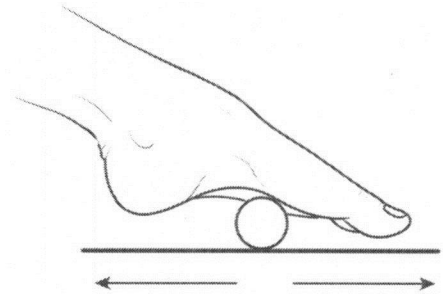
3. Golf Ball Roll

Repetitions	Main muscles worked: Plantar fascia ligament You should feel this exercise along the bottom of your foot
1	
Days per week	Equipment needed: Golf ball
Daily	

Step-by-step directions

- Sit on a stable chair with both feet planted on the floor.
- Roll a golf ball under the arch of your affected foot for 2 minutes.

Tip Sit up tall and keep your foot toward your chair.



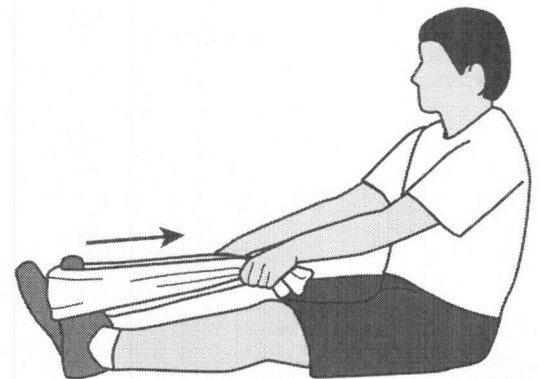
4. Towel Stretch

Repetitions	Main muscles worked: Gastrocnemius-soleus complex You should feel this stretch in your calf and into your heel
2 sets of 10	
Days per week	Equipment needed: Hand towel
to 7	

Step-by-step directions

- Sit on the floor with both legs out in front of you.
- Loop a towel around the ball of your affected foot and grasp the ends of the towel in your hands.
- Keep your affected leg straight and pull the towel toward you.
- Hold for 30 seconds and then relax for 30 seconds. Repeat 3 times.

Tip Sit up tall and keep your legs straight.





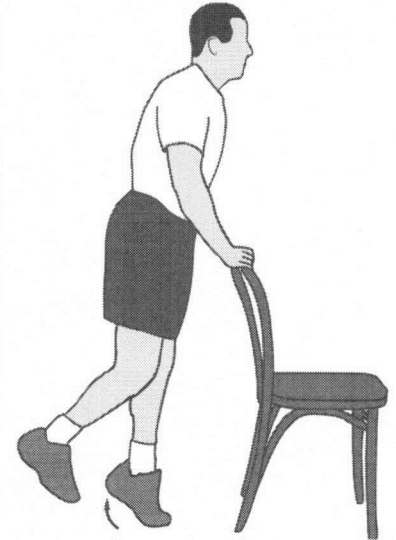
Foot and Ankle Conditioning Program **STRENGTHENING EXERCISES**

5. Calf Raises

Repetitions	Main muscles worked: Gastrocnemius-soleus complex You should feel this exercise in your calf
2 sets of 10	
Days per week	Equipment needed: Chair for support
6 to 7	

Step-by-step directions

- Stand with your weight evenly distributed over both feet. Hold onto the back of a chair or a wall for balance.
- Lift your unaffected foot off of the floor so that all of your weight is placed on your affected foot.
- Raise the heel of your affected foot as high as you can, then lower.
- Repeat 10 times.



Tip Do not bend the knee of your working leg.

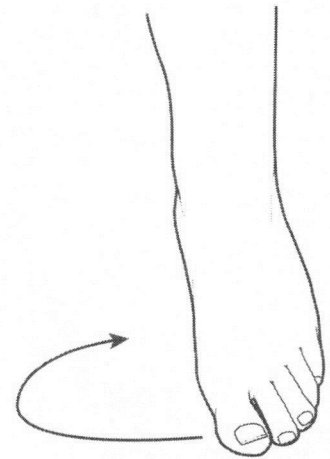
6. Ankle Range of Motion

Repetitions	Main muscles worked: Dorsiflexors, plantar flexors, invertors, evertors You should feel this exercise at the top of your foot and throughout your ankle
2 sets	
Days per week	Equipment needed: None
Daily	

Step-by-step directions

- Sit down so that your feet do not touch the floor.
- Use your foot to write each letter of the alphabet in the air. Lead with your big toe.

Tip Keep the movements small, using just your foot and ankle.



7. Marble Pickup

Repetitions



Foot and Ankle Conditioning Program **STRENGTHENING EXERCISES**

20

Main muscles worked: Plantar flexors

You should feel this exercise at the top of your foot and toes

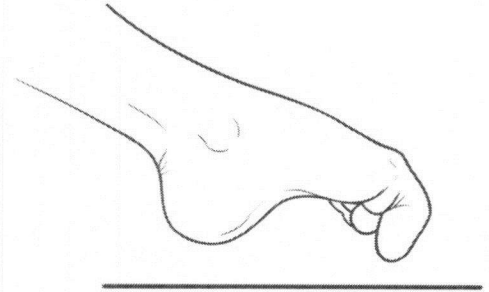
Days per week

Daily

Equipment needed: 20 marbles

Step-by-step directions

- Sit with both feet flat and place 20 marbles on the floor in front of you.
- Use your toes to pick up one marble at a time and place into a bowl.



Tip

Do not place the marbles too far out in front or to the side.



Foot and Ankle Conditioning Program **STRENGTHENING EXERCISES**

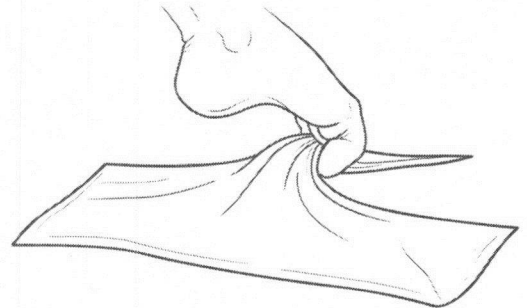
- Repeat until you have picked up all the marbles.

8. Towel Curls

Repetitions	Main muscles worked: Plantar flexors You should feel this exercise at the top of your foot and your toes
5	
Days per week	Equipment needed: Hand towel
Daily	

Step-by-step directions

- Sit with both feet flat and place a small towel on the floor in front of you.
- Grab the center of the towel with your toes and curl the towel toward you.
- Relax and repeat.



9. Ankle Dorsiflexion/Plantar Flexion

Repetitions	Main muscles worked: Anterior tibialis, gastrocnemius-soleus complex You should feel this exercise at your calf, shin, the back of your heel, and the top of your foot
3 sets of 10	
Days per week	Equipment needed: Use an elastic stretch band of comfortable resistance
3	

Tip You can make this exercise more challenging by placing a weight on the edge of the towel.

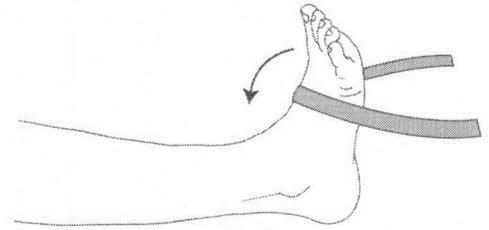


Foot and Ankle Conditioning Program **STRENGTHENING EXERCISES**

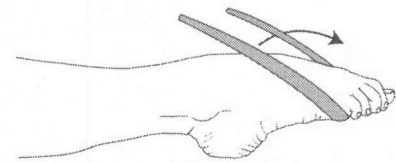
Step-by-step directions

- Sit on the floor with your legs straight out in front of you.
- For dorsiflexion, anchor the elastic band on a chair or table leg, then wrap it around your foot.
- Pull your toes toward you and slowly return to the start position. Repeat 10 times.
- For plantar flexion, wrap the elastic band around your foot and hold the ends in your hand.
- Gently point your toes and slowly return to the start position. Repeat 10 times.

Tip Keep your leg straight and heel on the floor for support.



Dorsiflexion



Plantar flexion