Sever's Disease

Sever's disease (also known as calcaneal apophysitis) is one of the most common causes of heel pain in growing children and adolescents. It is an inflammation of the growth plate in the calcaneus (heel).

Sever's disease is caused by repetitive stress to the heel, and most often occurs during growth spurts, when bones, muscles, tendons, and other structures are changing rapidly. Children and adolescents who participate in athletics—especially running and jumping sports—are at an increased risk for this condition. However, less active adolescents may also experience this problem, especially if they wear very flat shoes.

In most cases of Sever's disease, simple measures like rest, over-the-counter medication, a change in footwear, and stretching and strengthening exercises will relieve pain and allow a return to daily activities.

Description

The bones of children and adolescents possess a special area where the bone is growing called the growth plate. Growth plates are areas of cartilage located near the ends of bones.

When a child is fully grown, the growth plates close and are replaced by solid bone. Until this occurs, the growth plates are weaker than the nearby tendons and ligaments and are vulnerable to trauma.

An x-ray of an adolescent foot shows the open growth plate of the calcaneus. The x-ray appearance of Sever's disease looks similar to those without symptoms.

Reproduced from JF Sarwark, ed: Essentials of Musculoskeletal Care, ed 4. Rosemont, IL, American Academy of Orthopaedic Surgeons, 2010.

Sever's disease affects the part of the growth plate at the back of the heel where bone growth occurs. This growth area serves as the attachment point for the Achilles tendon—the strong band of tissue that connects the calf muscles at the back of the leg to the heel bone.

Repetitive stress from running, jumping, and other high-impact activities can cause pain and inflammation in this growth area of the heel. Additional stress from the pulling of the Achilles tendon at its attachment point can sometimes further irritate the area.

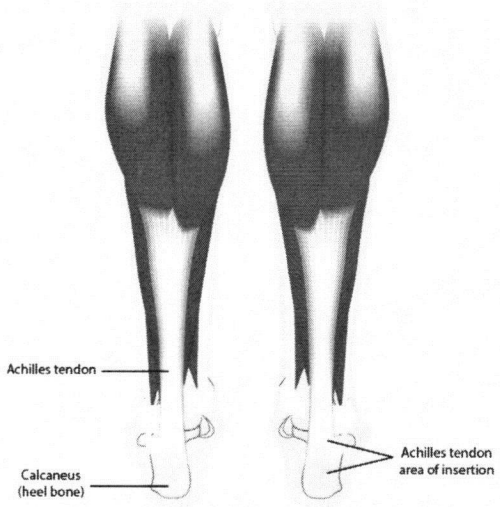
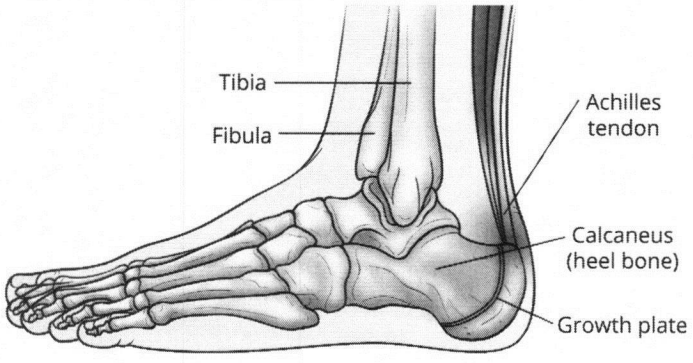


Illustration shows the area where the Achilles tendon attaches (inserts) into the heel bone.

Symptoms

Painful symptoms are often brought on by running, jumping, and other sports-related activities. In some cases, both heels have symptoms, although one heel may be worse than the other. Symptoms may include:

- Heel pain and tenderness underneath the heel
- Mild swelling at the heel



The red shading shows the typical areas of pain from Sever's disease.

Doctor Examination

During the appointment, your doctor will discuss your child's symptoms and general health. He or she will conduct a thorough examination of the foot and ankle to determine the cause of the pain. This will include applying pressure to the heel bone on both the bottom of the bone and along the sides, which should be tender or painful for a child with Sever's disease. In addition, your doctor may ask your child to walk, run, jump, or walk on his or her heels to see if the movements bring on painful symptoms.

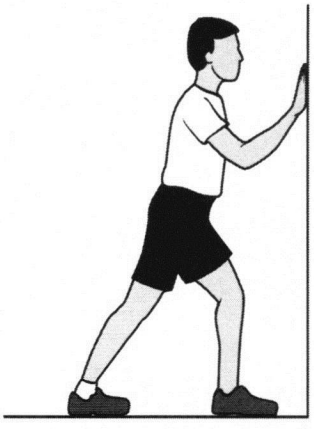
Treatment

Treatment for Sever's disease focuses on reducing pain and swelling. This typically requires limiting exercise activity until your child can enjoy activity without discomfort or significant pain afterwards. In some cases, rest from activity is required for several months, followed by a strength conditioning program. However, if your child does not have a large amount of pain or a limp, participation in sports may be safe to continue.

Your doctor may recommend additional treatment methods, including:

- **Heel pads.** Heel cushions inserted in sports shoes can help absorb impact and relieve stress on the heel and ankle.
- **Wearing shoes with a slightly elevated heel.** Elevating the heel may relieve some of the pressure on the growth plate.
- **Stretching exercises.** Stretches for the Achilles tendon can reduce stress on the heel, help relieve pain, and hopefully prevent the disease from returning.
- **Nonsteroidal anti-inflammatory medication.** Drugs like ibuprofen and naproxen can help reduce pain and swelling.

In cases where the pain is bad enough to interfere with walking, a "walker boot" might be required to immobilize the foot while it heals.

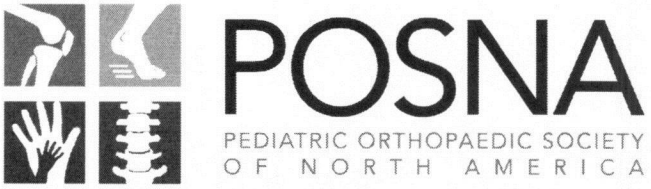


Heel cord stretch. *You should feel this stretch in your calf and into your heel.*

Outcome

It is not unusual for Sever's disease to recur. This typically happens when a child once again increases sports activities. Wearing sports shoes that provide good support to the foot and heel may help prevent recurrence.

Sever's disease will not return once a child is fully grown and the growth plate in the heel has matured into solid bone.



Reviewed by members of

POSNA (Pediatric Orthopaedic Society of North America)(https://posna.org/)

The Pediatric Orthopaedic Society of North America (POSNA) is a group of board eligible/board certified orthopaedic surgeons who have specialized training in the care of children's musculoskeletal health.

Last Reviewed

July 2018

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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.

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Foot and Ankle Conditioning Program

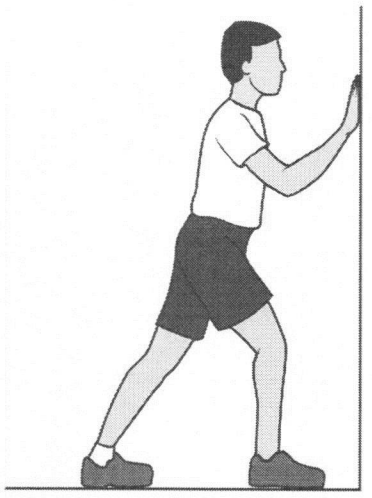
STRETCHING EXERCISES

1. Heel Cord Stretch

Repetitions
2 sets of 10
Days per week
6 to 7

Main muscles worked: Gastrocnemius-soleus complex
You should feel this stretch in your calf and into your heel

Equipment needed: None



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.

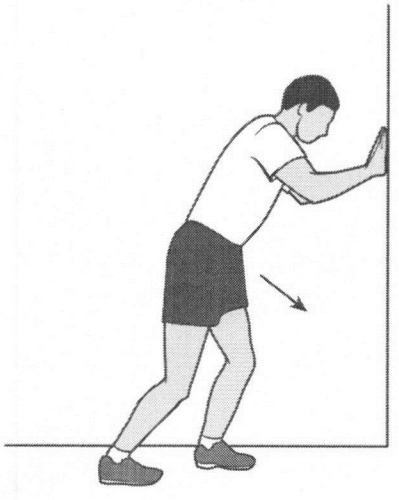
Tip	Do not arch your back.

2. Heel Cord Stretch with Bent Knee

Repetitions
sets of 10
Days per week
to 7

Main muscles worked: Soleus
You should feel this stretch in your calf, the sides of your ankle, and into your heel

Equipment needed: None



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.

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Foot and Ankle Conditioning Program

STRETCHING EXERCISES

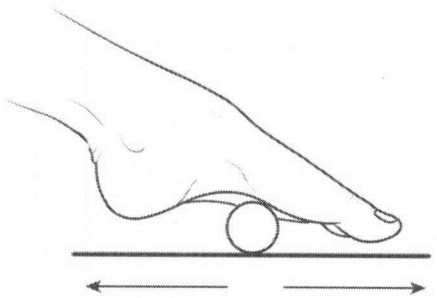
3. Golf Ball Roll

Repetitions
1

Days per week
Daily

Main muscles worked: Plantar fascia ligament
You should feel this exercise along the bottom of your foot

Equipment needed: Golf ball



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.

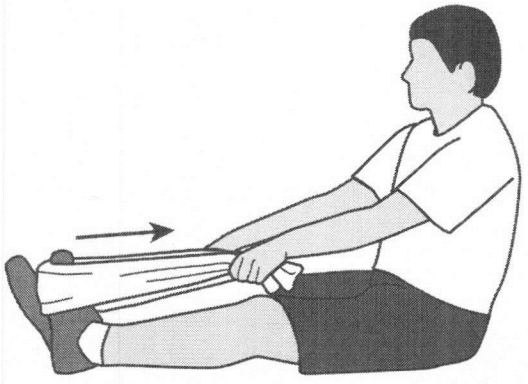
4. Towel Stretch

Repetitions
2 sets of 10

Days per week
to 7

Main muscles worked: Gastrocnemius-soleus complex
You should feel this stretch in your calf and into your heel

Equipment needed: Hand towel



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.

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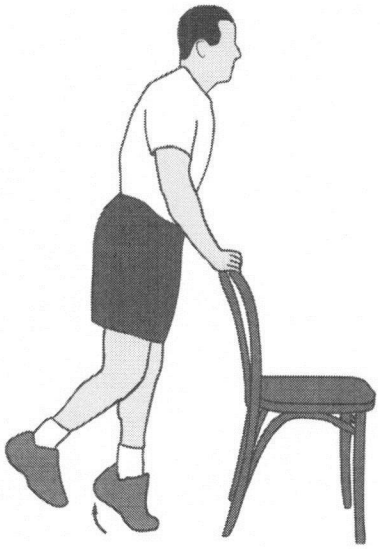
Foot and Ankle Conditioning Program STRENGTHENING EXERCISES

5. Calf Raises

Repetitions
2 sets of 10
Days per week
6 to 7

Main muscles worked: Gastrocnemius-soleus complex
You should feel this exercise in your calf

Equipment needed: Chair for support



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.

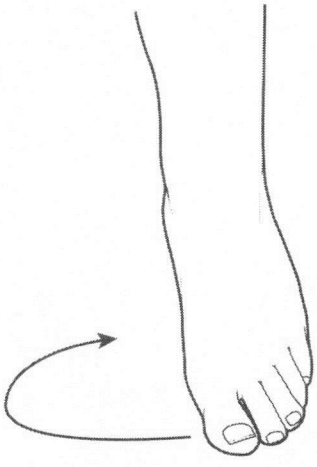
Tip	Do not bend the knee of your working leg.

6. Ankle Range of Motion

Repetitions
2 sets
Days per week
Daily

Main muscles worked: Dorsiflexors, plantar flexors, invertors, evertors
You should feel this exercise at the top of your foot and throughout your ankle

Equipment needed: None



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

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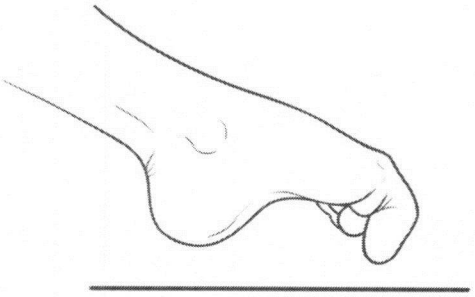
Foot and Ankle Conditioning Program STRENGTHENING EXERCISES

20

Main muscles worked: Plantar flexors
You should feel this exercise at the top of your foot and toes

Equipment needed: 20 marbles

Days per week
Daily



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.

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Foot and Ankle Conditioning Program STRENGTHENING EXERCISES

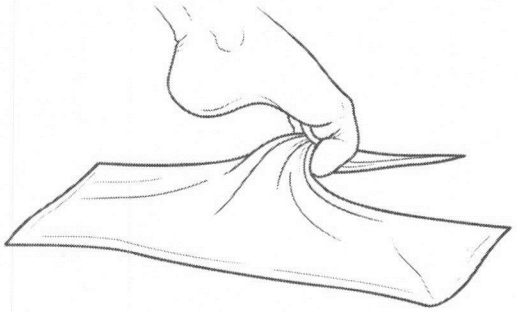
- Repeat until you have picked up all the marbles.

8. Towel Curls

Repetitions
5
Days per week
Daily

Main muscles worked: Plantar flexors
You should feel this exercise at the top of your foot and your toes

Equipment needed: Hand towel



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
3 sets of 10
Days per week
3

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

Equipment needed: Use an elastic stretch band of comfortable resistance

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

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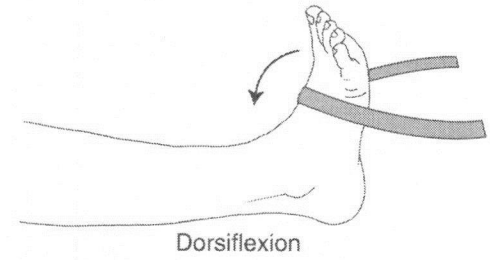
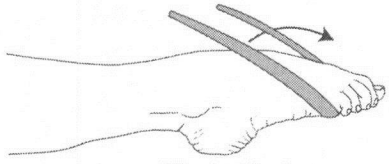
Foot and Ankle Conditioning Program STRENGTHENING EXERCISES

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

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