**Mark D. Dollard DPM**
Loudoun Foot and Ankle Center
46440 Benedict Dr, Suite 111
Sterling VA 20164
(703) 444-9555

# *Calcaneal Apophysitis*

One of the most commonly overlooked causes of heel pain in children is calcaneal apophysitis, a condition in which the epiphysis (growth plate) of the calcaneus (heel bone) becomes irritated and inflamed (Figure 4.20).

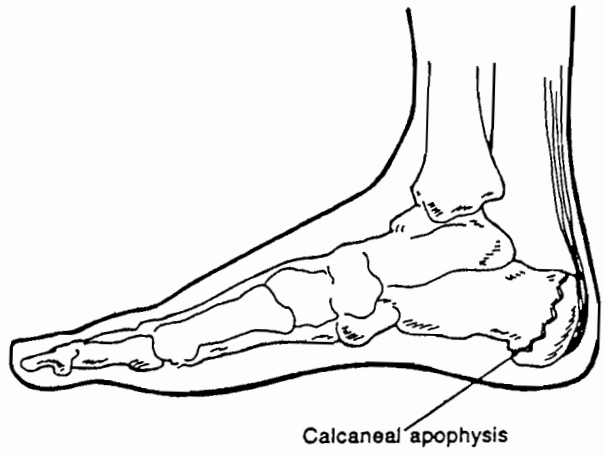


**Figure 4.20** Calcaneal apophysitis develops at the growth plate of the heel bone (calcaneus).

Calcaneal apophysitis occurs most often in children between the ages of 10 and 14, at a time when the bones of the feet are still ossifying and becoming mature. The child who is affected by this ailment complains of a dull, achy pain in one or both heels. The pain is most intense during and after physical activity—especially activity that involves continual pounding of the feet—but subsides with rest. Many times the pain is so severe it causes the child to limp. The heel may appear swollen, warm, and tender to the touch.

Several years ago it was thought that calcaneal apophysitis was rare in females, but with the increased participation of young girls in sports, the condition is found equally among boys and girls.

## *Causes*

The epiphyseal plate of the calcaneus is the weakest point of the developing heel and is much softer than the mature bone at either end. The heel is placed under considerable stress with walking, but the amount of stress at this point increases up to six times during activities such as basketball, soccer, and running. It is the result of repeated small amounts of stress, or microtrauma, that is believed to cause inflammation at the epiphysis.

A number of factors have been shown to be associated with calcaneal apophysitis, including two- or three-cleated heels on soccer shoes, faulty foot biomechanics, a tight gastrocnemius soleus (calf) muscle complex, excessive training, poorly constructed shoes, and repeated jumping.

## *Treatment*

Elimination or modification of one or more of the aggravating factors mentioned above may cure the symptoms of calcaneal apophysitis. Some simple changes:

1. Avoid soccer shoes with only two or three cleats at the heel. Shoes should have four-cleated heels to distribute the impact of foot strike more evenly.
2. Faulty foot biomechanics, such as a pronated (flat) or cavus (high-arch) foot structure, may lead to increased stress at the epiphysis. A prescription orthotic device from a sportsmedicine podiatrist often solves the problem.
3. The gastrocnemius soleus muscle complex blends together to form the Achilles tendon, which attaches to the rear fragment of mature bone. If the muscle complex is contracted or too tight, it causes increased pull on the rear fragment of bone in a direction away from the epiphysis. This problem sometimes can be corrected through the addition of a ¼-inch heel lift in each shoe or by stretching the calf muscles. An effective stretch for the calf can be done by standing facing a wall, 2 to 3 feet away, feet pointing straight ahead. Place your hands on the wall

and gradually lean forward, keeping knees straight and feet flat on the ground. Lean forward until tightness in calves and lower leg can be felt. Hold this position for 30 seconds. Straighten up. Repeat four times.

4. The amount of exercise any child can tolerate is individually determined, just as for adults. For one child, running 10 miles a week and playing soccer may be excessive and could induce enough heel trauma to cause calcaneal apophysitis, whereas another child may have no problem. Limiting the training schedule or play level is a good, safe way to initiate home treatment.
5. Due to the high cost of athletic footwear and the child's rapidly changing shoe size, shoes often are worn too long, or less expensive, poor-quality shoes are purchased. Particularly with running, poor footwear can add stress to the epiphysis because the shoes frequently do not offer enough protection or allow the foot to function optimally.
6. The kind of jumping done in basketball games is highly associated with the incidence of calcaneal apophysitis. Many times it is advisable for a child to sit out a season because the pounding aggravates the symptoms. An alternative activity such as swimming can be substituted to make the rest from basketball more acceptable to the child.

Once calcaneal apophysitis develops, the amount of activity must be reduced significantly until the pain diminishes. Only then should a slow increase back to the previous level of activity be attempted. Sometimes complete rest is necessary to relieve chronic inflammation of the epiphysis.

## *Severe Pain*

If the heel pain is severe enough to cause the child to limp, or if swelling is evident, investigation by a trained medical person is necessary. At the time of the exam, x-rays normally are taken of the heel area. This is done not so much to diagnose calcaneal apophysitis (because it often does not show up well on standard x-rays), as to rule out other possible causes of the pain, such as a bone tumor or infection. Once a diagnosis is made, the doctor's treatment is one or a combination of the above-mentioned therapies. If the heel pain is so severe that the child has difficulty walking, a last resort is to place a plaster cast from below the knee to the end of the foot for 3 to 4 weeks. After the cast is removed, activities should be resumed slowly.

## *Effects of Continued Activity*

Unlike some other conditions, calcaneal apophysitis resolves itself by the age of 14 or 15, after the growth plate has ossified. In this age of increased athletic activities for children, however, telling a child to stop all athletics for several seasons normally is not well received and should be done only when all indicated therapies have been attempted.

A common question concerns whether continued activity in a child with calcaneal apophysitis is harmful. Unfortunately, little long-term research and documentation have been done on this condition. It is always best to be conservative. Whenever a child complains of pain, or limps for an unknown reason, the cause should be investigated. See chapter 16, "Developmental Factors Affecting Children's Exercise" for additional information.