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Sever Disease

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Introduction

Sever's Disease, or calcaneal apophysitis, is a common cause of heel pain in the skeletally immature athlete due to overuse. The overuse injury to the secondary ossification center is thought to be caused by a traction apophysitis at the heel, correlating with the Achilles tendon insertion site. Thus, the condition often coincides with the onset of a pediatric/adolescent patient's rapid growth spurt, or a sudden increase in sports-related activity. The latter is appreciated in sports requiring repetitive running and/or jumping.[1][2]

The classic findings from a thorough history taking during the clinical evaluation will often include resolution of pain during periods of rest or inactivity. Clinical exam is notable for tenderness over calcaneal insertion of Achilles tendon and a positive squeeze test. Diagnosis is clinical and does not require imaging studies. The course of the disease is self-limited, and management includes activity modification or relative rest as guided by pain. Symptoms may be managed with ice, anti-inflammatory medications, heel cups or heel lifts, and in severe cases, immobilization. A rehabilitation regimen focusing on heel cord stretching and strengthening should be included in the plan of care to both improve symptoms and correct predisposing underlying biomechanical factors.

Etiology

Sever's disease is an overuse injury due to repetitive strain and microtrauma caused by the force of the strong Achilles tendon and resulting in irritation and potential partial avulsion of the relatively soft calcaneal apophysis. The force is increased after periods of rapid growth and with increased activity. Rarely, trauma may lead to full avulsion fracture. Contributing factors include increased or excessive sports activity (especially sports requiring repetitive running and jumping), heel cord tightness, weak ankle dorsiflexion, poorly cushioned or worn out athletic shoes, and running on hard surfaces. Additional biomechanical factors contributing to poor shock absorption such as genu varum, forefoot varus, pes cavus, or pes planus can predispose one to this condition.[3]

Epidemiology

Sever's disease most commonly occurs during a period of rapid growth in active adolescent patients between 9 and 12 years of age and is the most common cause of heel pain in this specific age group. Symptoms can be unilateral, but up to 60% of cases can present with bilateral pain. Sever's disease occurs more commonly in males, presenting most frequently at a median age of 12 years for males and 11 years for females. The most commonly involved sports in these cases require repetitive running and jumping such as in basketball, soccer, track, cross-country, and gymnastics. Risk factors for Sever's disease include general risk factors for overuse injury such as long or year-round activities, poorly fitting or worn out footwear, or poor training mechanics. Additional biomechanical factors such as poor heel cord flexibility, pes cavus, pes planus, genu varum, or forefoot varus can predispose patients to the development of the condition.[1][4]

Pathophysiology

The posterior calcaneus develops as a secondary ossification center that provides attachment for the Achilles tendon. During the early adolescent growth spurt, bone growth exceeds the ability of the muscle-tendon unit to stretch sufficiently to maintain previous flexibility which in turns leads to increased tension across the unossified or incompletely ossified apophysis. The apophysis is the weakest point in the muscle-tendon-bone-attachment (as opposed to the tendon in an adult), and therefore it is at risk for overuse injury from repetitive stress. Excessive and repetitive traction from the strong Achilles tendon results in microtrauma and chronic irritation causing thickening and pain at the apophysis.

History and Physical

Typical presentation includes an active adolescent with unilateral or bilateral heel pain that is worse during and after activity, especially running and jumping, and often in the setting of a recent growth spurt or starting a new sport/training. There is usually no preceding trauma. Pain improves with rest and typically is absent in the morning. Over time, the pain may progress in severity enough to limit activity. The physical exam should be negative for erythema or ecchymosis, but tenderness and mild swelling may be present at the Achilles insertion on the heel. The exam may also reveal pain with passive ankle dorsiflexion. Pain is reproduced with compression of the posterior calcaneus (squeeze test) and aggravated by standing on tiptoes (Sever sign). Poor heel cord flexibility or weakness with dorsiflexion may be present as predisposing factors.

Evaluation

Sever's disease is a clinical diagnosis, and imaging is usually not necessary. If the presentation is atypical, severe, or persistent, consider obtaining plain radiographs to evaluate rule out infection, neoplasm, or occult fracture. Plain radiographs may show fragmentation, sclerosis, or increased density of the calcaneal apophysis.; however, these changes also can be seen in normal variants. If ordering radiographs, consider bilateral imaging to delineate osseous abnormality versus normal variant in the individual patient.[5]

Treatment / Management

Sever's disease is ultimately a self-limiting condition that resolves with maturation and closure of the apophysis.

Nonoperative modalities

There is no role for operative treatment in the management of Sever's disease.

In general, non-operative options include:

- Rest/periods of inactivity (guided by pain)
    - This may also include holding out of sport/practice until symptoms subside
- Orthotic use/casting
    - Patient-specific treatment protocols should be dictated as necessary by the treating clinician. Immobilization including periods of casting or use of a CAM boot may be necessary depending on symptom severity
    - Heel cups or heel pads
- Achilles tendon stretches
- Ice application
    - Before and after sporting activity
- NSAIDs

Footwear should be well-maintained and up-to-date. A rehabilitation regimen is essential and should include heel cord stretching in addition to dorsiflexor strengthening. If pain does not respond to conservative measures, a walking boot or short leg cast may be used for short-term immobilization. Symptoms are usually self-limited with improvement within 6 to 12 months and complete resolution with apophyseal closure. There is no role for injection therapy or surgical intervention in the treatment of Sever's disease. There are no long-term complications, and the prognosis is excellent.[6]

Prognosis

Recurrence is relatively common

Pearls and Other Issues

Preventative measures include general counseling to avoid overuse injuries. Patients should be encouraged to maintain adequate hydration, diet, and sleep and avoid increasing activity level > 10% per week.

Ensure the use of proper equipment and techniques, encourage stretching to maintain flexibility, and consider recommending against early single sport specialization.

The decision to avoid or limit activity should be shared between provider, patient, and parent and include a discussion of short term and long term goals and primarily be driven by the degree of pain.

As patients generally are very active in multiple arenas (multiple sports or multiple teams in same sport) in the same season, consider eliminating one team/sport as opposed to complete cessation of activity which can be difficult to achieve patient buy-in.

Enhancing Healthcare Team Outcomes

Sever's disease is relatively common in young people but often does not come to attention as it is self-limited. Patients may present to the emergency department, to the primary caregiver or the urgent care clinic. Nurses and doctors need to be familiar with this condition as it is sometimes mistaken for plantar fasciitis. Sever's disease is managed conservatively with most people having symptom relief once the overactivity is discontinued.[7][8]

Patients (including parents and family members) should be educated regarding using patient-reported symptoms as the guide for treatment and a possible return to play. Also, patients and parents need to be informed about the relatively high incidence of recurrence of symptoms until skeletal maturation and closure of the apophysis occurs. The growth plate usually starts to close sometime between the ages of 8 and 14 years old.

Questions

To access free multiple choice questions on this topic, click here.

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