The Journal of Foot & Ankle Surgery xxx (2017) 1–9

Contents lists available at ScienceDirect

The Journal of Foot & Ankle Surgery

journal homepage: www.jfas.org

Original Research

Achilles Impingement Tendinopathy on Magnetic Resonance Imaging

Mark J. Bullock, DPM [1], Jan Mourelatos, MD [2], Alice Mar, BA [3]

[1] Surgeon, Saginaw Valley Bone and Joint Center, Saginaw, MI
[2] Doctor, Eastpointe Radiologists, PC, Grosse Pointe Woods, MI
[3] Research Assistant, St. John Hospital and Medical Center, Detroit, MI

ARTICLE INFO

Level of Clinical Evidence: 3

Keywords:
Achilles compression
Achilles tendinitis
Achilles tendinosis
Haglund's deformity
insertional Achilles

ABSTRACT

Haglund's syndrome is impingement of the retrocalcaneal bursa and Achilles tendon caused by a prominence of the posterosuperior calcaneus. Radiographic measurements are not sensitive or specific for diagnosing Haglund's deformity. Localization of a bone deformity and tendinopathy in the same sagittal section of a magnetic resonance imaging scan can assist with the diagnosis in equivocal cases. The aim of the present cross-sectional study was to determine the prevalence of Haglund's syndrome in patients presenting with Achilles tendinopathy and note any associated findings to determine the criteria for a diagnosis of Haglund's syndrome. We reviewed 40 magnetic resonance imaging scans with Achilles tendinopathy and 19 magnetic resonance imaging scans with Achilles high-grade tears and/or ruptures. Achilles tendinopathy was often in close proximity to the superior aspect of the calcaneal tuberosity, consistent with impingement (67.5%). Patients with Achilles impingement tendinopathy were more often female ($p < .04$) and were significantly heavier than patients presenting with noninsertional Achilles tendinopathy ($p = .014$) or Achilles tendon rupture ($p = .010$). Impingement tendinopathy occurred medially (8 of 20) and centrally (10 of 20) more often than laterally (2 of 20) and was associated with a posterior prominence or hyperconvexity with a loss of calcaneal recess more often than a superior projection (22 of 27 versus 8 of 27; $p < .001$). Haglund's deformity should be reserved for defining a posterior prominence or hyperconvexity with loss of calcaneal recess because this corresponds with impingement. Achilles impingement tendinopathy might be more appropriate terminology for Haglund's syndrome, because the bone deformity is often subtle. Of the 27 images with Achilles impingement tendinopathy, 10 (37.0%) extended to a location prone to Achilles tendon rupture. Given these findings, insertional and noninsertional Achilles tendinopathy are not mutually exclusive and impingement might be a subtle, unrecognized cause of Achilles tendinopathy and subsequent rupture.

Haglund's deformity is a bony prominence of the superior aspect of the calcaneal tuberosity and is a common cause of posterior heel pain (1). Different theories exist regarding the bony prominence that constitutes Haglund's deformity. The Fowler–Philip angle identifies a posterior prominence (Fig. 1) or a more vertical posterior calcaneal surface, which leads to a more posterior and hyperconvex bony prominence. This hyperconvex bursal projection was found to be a site of Achilles pathology in a histologic study by Rufai et al (2). The parallel pitch lines were developed to measure a superior projection on lateral radiographs (Fig. 2) (3). Pavlov et al (4) found positive parallel pitch lines were more common in symptomatic patients than in controls. The Chauveaux–Liet angle (Fig. 3) measures the posterior prominence but overcomes limitations of the Fowler–Philip angle showing a greater association with pathology. False-positive and false-negative results are still common with the Chauveaux–Liet angle (5–7). In recent studies, an ill-defined posterior recess, anteroposterior Achilles diameter >9 mm, retrocalcaneal exostosis, Achilles calcifications, and increased calcaneal pitch angle have a greater association with pathologic features (7–11). Kang et al (11) could not identify an association between Haglund's deformity and insertional Achilles tendinopathy; however, Haglund's deformity was diagnosed using radiographic measurements, which are unreliable.

Haglund's syndrome refers to retrocalcaneal bursitis and Achilles tendinopathy associated with Haglund's deformity (12). This tendinopathy is caused by impingement against a hard heel counter or impingement with dorsiflexion of the ankle (4,13). Many investigators have noted Haglund's deformity in association with Achilles tendinopathy or insertional Achilles tendinopathy (12–17). Throughout our report, Haglund's syndrome is used interchangeably with Achilles impingement tendinopathy.

Financial Disclosure: None reported.
Conflict of Interest: None reported.
Address correspondence to: Mark J. Bullock, DPM, Saginaw Valley Bone and Joint Center, 5483 Gratiot Road, Saginaw, MI 48638.
E-mail address: markbullockdpm@gmail.com (M.J. Bullock).

1067-2516/$ - see front matter © 2017 by the American College of Foot and Ankle Surgeons. All rights reserved.
http://dx.doi.org/10.1053/j.jfas.2017.01.024

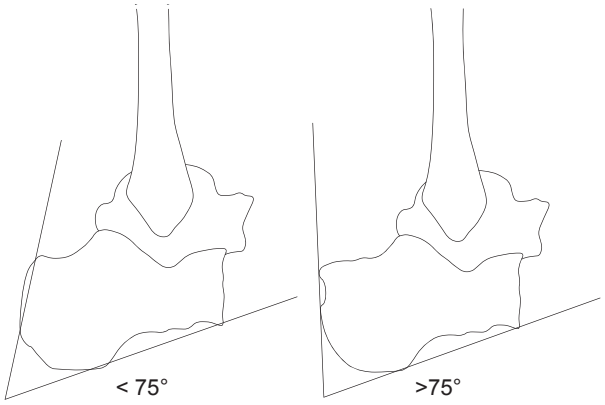

Fig. 1. Fowler–Philip angle: a measure of posterior calcaneal prominence and loss of calcaneal recess.

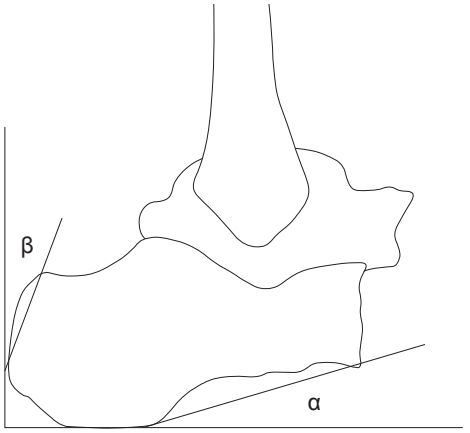

Fig. 3. Chauveaux–Liet angle (α – β): a measure of posterior calcaneal prominence, loss of calcaneal recess, and calcaneal inclination.

Haglund's syndrome on magnetic resonance imaging (MRI) has been described as bone marrow edema with increased signal within the Achilles tendon on T_2-weighted imaging (5,14–16). Sundararajan and Wilde (5) evaluated insertional Achilles tendinopathy in 20 patients and noted a 25% incidence of Haglund's syndrome on MRI and clinical examination. They defined Haglund's syndrome on MRI as bone marrow edema within the "posterior superior calcaneal eminence." They noted "attritional" Achilles tendinopathy at the site of Haglund's deformity. The study did not account for the impingement tendinopathy that can occur in the absence of bone marrow edema (Fig. 4). A histologic study of Haglund's deformity found that the bursal synovial layers were replaced with calcified fibrocartilage, possibly serving a protective function for the bony deformity and tendon (2). This finding might prevent bone marrow edema and retrocalcaneal bursitis in the presence of impingement tendinopathy. Activity modification might allow the bone marrow edema in the calcaneus to resolve, while a degenerative lesion in the Achilles tendon remains.

The incidence of Achilles tendinopathy caused by impingement is not known. The proximal extent of tendinopathy caused by Haglund's deformity has not been reported in published studies to the best of our knowledge. Achilles tendinopathy has been reported at both the insertion and the mid-portion of the tendon in some patients (18). It is not known whether Achilles impingement tendinopathy extends to a location predisposed to Achilles tendon rupture. Acute ruptures are said to occur within the watershed region and are less common near the myotendinous junction or insertion (19,20). The exact location of ruptures has not always been specified in these studies. The etiology of Achilles tendinopathy and Achilles tendon rupture is poorly understood, and it is possible that the role of Achilles impingement has been underestimated.

The present cross-sectional descriptive study had several aims:

1. To determine the proportion of patients presenting for MRI with the appearance of Achilles impingement using predefined criteria
2. To determine the age, weight, and gender predilection for Achilles impingement tendinopathy, noninsertional Achilles tendinopathy, and Achilles ruptures or high-grade tears
3. To compare the frequency of a large superior eminence of the calcaneal tuberosity in the impingement tendinopathy population with a control population

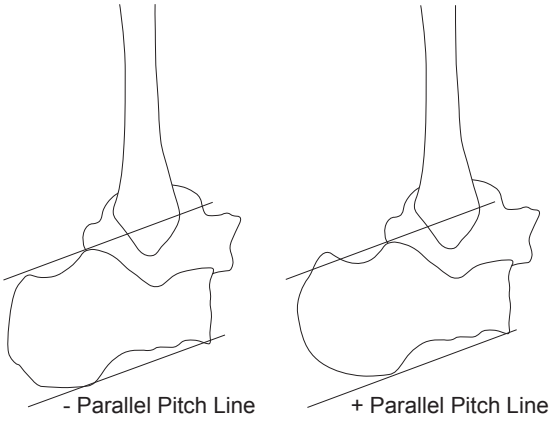

Fig. 2. Parallel pitch lines: a measure of superior prominence of the calcaneal tuberosity.

Fig. 4. Magnetic resonance imaging scan showing extensive Achilles impingement tendinopathy in the absence of bone marrow edema. A posterior exostosis is present at the site of impingement.