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### Achilles tendinopathy: new insights in cause of pain, diagnosis and management

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**Publication date**  
2012

[Link to publication](#)

#### **Citation for published version (APA):**

van Sterkenburg, M. N. (2012). *Achilles tendinopathy: new insights in cause of pain, diagnosis and management*.

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# Chapter 9

## Appearance of the weight-bearing lateral radiograph in retrocalcaneal bursitis

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## **ABSTRACT**

### **Background and purpose**

A retrocalcaneal bursitis is caused by repetitive impingement of the bursa between the Achilles tendon and the posterosuperior calcaneus. The bursa is situated in the posteroinferior corner of Kager's triangle (retrocalcaneal recess), which is a radiolucency with sharp borders on the lateral radiograph of the ankle. In case of inflammation, the fluid-filled bursa is less radiolucent, making it difficult to delineate the retrocalcaneal recess. We assessed if the radiographic appearance of the retrocalcaneal recess on plain digital (film-less) radiographs could be used in the diagnosis of a retrocalcaneal bursitis.

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### **Methods**

Obliteration of the retrocalcaneal recess (yes/no) on 74 digital weight-bearing lateral radiographs of the ankle was independently assessed by 2 observers. Radiographs were of 24 patients (25 heels) with retrocalcaneal bursitis (confirmed on endoscopic calcaneoplasty); the control group consisted of 50 patients (59 heels).

### **Results**

The sensitivity of the test was 83% for observer 1 and 79% for observer 2. Specificity was 100% and 98% for observer 1 and 2. The interobserver reliability test calculated a kappa-value of 0.86. For observer 1 intraobserver reliability was 0.96 and 0.92 for observer 2.

### **Interpretation**

There is a typical appearance of the retrocalcaneal recess on digital weight-bearing lateral radiographs of a retrocalcaneal bursitis.

## INTRODUCTION

A symptomatic inflammation of the retrocalcaneal bursa is caused by repetitive impingement of the bursa between the anterior aspect of the Achilles tendon and a bony posterosuperior calcaneal prominence<sup>1,9,10</sup>.

Most publications focus on this protrusion, some describe a loss of radiolucency in *Kager's triangle* on lateral radiographs. Ultrasonography or MRI can be used to confirm the diagnosis.

Kager's fat pad, also known as the pre-Achilles fat pad, occupies Kager's triangle<sup>11</sup>. Normally this fat pad, as seen on a weight-bearing lateral radiograph of the ankle, is a triangular radio-lucency with sharp, gently curving borders<sup>4</sup> (Figure 1).

The retrocalcaneal bursa is situated in the *posteroinferior corner* of the pad. In bursitis, the normally sharply outlined radiolucent retrocalcaneal recess is obliterated (Figure 2).

There are few reports on the appearance of the retrocalcaneal recess on radiography and the series are small<sup>5-7</sup>. These authors did not yet have the benefit of digital (film-less) examinations with its advances of allowing images to be captured, viewed and reproduced digitally. This offers several advantages, since contrast, brightness and magnification can be digitally adjusted, and therefore a more sharp and detailed view is obtained.

We determined the reliability of the radiographical appearance of the retrocalcaneal recess of Kager's triangle in diagnosing a retrocalcaneal bursitis.

## METHODS

24 patients (25 heels, 13 men) who had digital radiographs and had undergone endoscopic calcaneoplasty for chronic retrocalcaneal bursitis from 2000-2008 were included (Figure 3). 1 patient underwent surgery on both ankles on different occasions. Mean age was 42 (15-73) years. Patients with previous hindfoot surgery were excluded.

A control group matched for age and sex of 50 patients (59 heels, 30 men) with ankle problems not related to the hindfoot, was retrieved from our hospital's archives from the same period. From the 10 subjects with bilateral radiographs we randomly selected 1 heel, thus the study comprised 74 heels (24 patients, 50 controls). Their mean age was 42 (15-72) years.

All heels had been examined with lateral weight-bearing radiographs in 20 degrees endorotation, as is standard procedure in our hospital.

### Observers

To test interobserver reliability, all radiographs were independently evaluated by 2 experienced observers: an orthopedic surgeon, and a radiologist. They rated the radiographs *positive* or

*negative* for the appearance of the retrocalcaneal recess (measurement 1). On a positive radiograph the retrocalcaneal recess of Kager's triangle was less radiolucent, meaning that it was obliterated and had a whiter appearance; on a negative radiograph the retrocalcaneal recess was radiolucent, meaning that it had a black appearance and its borders were sharp. Both observers were blinded to the patient's history. For intraobserver reliability testing, both observers evaluated the radiographs 2 weeks later, which were now arranged in a different order (measurement 2).

### Statistics

Descriptive statistics on the patient's demographics were performed. Sensitivity and specificity were calculated to determine the validity of the test in predicting abnormality of the retrocalcaneal recess of Kager's triangle in retrocalcaneal bursitis.

Additionally, positive (PPV) and negative predictive values (NPV) were calculated.

For testing inter- and intraobserver reliability the Cohen's kappa value was used. Kappa values greater than 0.81 indicate high association. 95% confidence intervals were calculated for each outcome.

SPSS for Windows version 15.0 was used to perform the analyses.



**Figure 1.** (A) Kager's triangle with a normal appearance. (B) This triangular lucency with sharp, smoothly curving borders is indicated with the dotted line. (C) The arrowhead indicates the retrocalcaneal recess: the 'bursal wedge' of Kager's fat pad, which normally forms a radiolucent corner posterosuperior to the calcaneus



**Figure 2.** A patient with a chronic retrocalcaneal bursitis: the retrocalcaneal recess has disappeared because of the less radiolucent fluid in the distended retrocalcaneal bursa



**Figure 3.** (A) Clinical image, (B) Radiograph of a patient with a retrocalcaneal bursitis. The retrocalcaneal recess is obliterated by a chronic inflamed bursa (arrow). (C) Endoscopic view of a patient with a retrocalcaneal bursitis

## RESULTS

We found a high sensitivity and specificity in both measurements for both observers as well as high positive- and negative predictive values (PPV respectively NPV) (Table 1).

The interobserver reliability test for measurement 1 and 2 showed a high association (Table 2). Intraobserver reliability also showed a high association in both observers (Table 3).

## DISCUSSION

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The terminology is confused when describing a retrocalcaneal bursitis, a syndrome of combined bony and soft tissue pathology. Often, Haglund's syndrome, Haglund's disease, Haglund's deformity, pump-bump and retrocalcaneal bursitis are used interchangeably. To avoid confusion, we chose to use the term 'retrocalcaneal bursitis', which is part of Haglund's syndrome and can be part of Haglund's deformity. The bursal inflammation is the cause of pain and the main reason for treatment.

We have found 2 studies on the appearance of the retrocalcaneal recess on conventional radiographs. Pavlov et al. (1982)<sup>7</sup> described 10 symptomatic heels and a control group of 78 heels. The goal of their study was to evaluate and describe all available clinical and radiological findings in patients with Haglund's syndrome. The appearance of the retrocalcaneal recess was part of this evaluation. In 1 patient the retrocalcaneal recess was sharp, and in 9 it was

**Table 1.** Validity

Observer	1	2
<b>Sensitivity (95% CI)</b>	0.83 (0.58-0.96)	0.79 (0.54-0.93)
<b>Specificity (95% CI)</b>	1 (0.90-1)	0.98 (0.87-1)
<b>PPV (95% CI)</b>	1 (0.75-1)	0.94 (0.68-1)
<b>NPV (95% CI)</b>	0.93 (0.81-0.98)	0.92 (0.79-0.97)

**Table 2.** Interobserver reliability

Radiographs	Kappa (95% CI)
Measurement 1	0.86 (0.71-1)
Measurement 2	0.87 (0.73-1)

**Table 3.** Intraobserver reliability

Radiographs	Kappa (95% CI)
Observer 1	0.96 (0.87-1)
Observer 2	0.92 (0.80-1)

ill-defined. Heneghan and Wallace (1985)<sup>6</sup> described the appearance of the retrocalcaneal recess in children.

6 heels were symptomatic, and the control group consisted of 24 heels. The purpose of that study was to describe the osseous and soft tissue findings of retrocalcaneal bursitis and to introduce roentgen criteria to substantiate the diagnosis. The retrocalcaneal recess was one of these criteria. That study also found consistent loss of the sharp definition of the retrocalcaneal recess in symptomatic patients.

What should be noted is that our lateral ankle radiographs are made weight-bearing and in 20 degrees of endorotation, for parallel alignment of the lateral and medial malleolus and to make sure the lateral and medial aspects of the talus overlap to be able to see the ankle joint. This is not standard procedure everywhere, and if any, we are unaware of the effect on the appearance of the retrocalcaneal recess.

When digital techniques are not available, conventional radiography may still suffice. It is known that lowering the photon energy can be used to clarify details of soft tissues. The results are essentially similar to increasing contrast in the evaluation of a digital radiograph, which has been used in the past to assess patients with Achilles tendon problems<sup>2,3,8</sup>.

In conclusion, the radiographic appearance of the retrocalcaneal recess confirms the clinical diagnosis of a retrocalcaneal bursitis. Further diagnostic evaluation is not necessary, resulting in a higher cost-effectiveness and quicker treatment.



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