

## A NEW RADIOGRAPHIC TECHNIQUE FOR EVALUATION OF RETROCALCANEAL EXOSTOSIS

*Nick M. Gabbay, D.P.M.*

*John A. Ruch, D.P.M.*

Retrocalcaneal exostosis and Haglund's deformity are two of the most common causes for posterior heel pain. Either condition can present with obvious prominence, tenderness and swelling at the insertion of the Achilles tendon. A classic Haglund's deformity or "pump bump" will usually present with the main area of involvement over the posterior, superior lateral aspect of the os calcis. There may also be significant inflammation of the Achilles bursa. (Fig. 1) Radiographically, Haglund's deformity has been described by Fowler and Phillip and others, as a

boat-shaped prominence of the posterior aspect of the calcaneus.<sup>1,2</sup> (Fig. 2)

A retrocalcaneal exostosis or posterior calcaneal step defect is often associated with inflammatory symptoms or enthesitis at the insertion of the Achilles tendon. Radiographically, a retrocalcaneal exostosis is usually visualized at the middle one-third of the posterior surface of the calcaneus. Soft tissue calcifications within the distal Achilles tendon may also be present. (Fig. 3)



Figure 1A. Haglund's deformity.



Figure 1B. Notice the marked edema and inflammation associated with the posterior aspect of the heel.



Figure 2. Haglund's deformity. Note the "boat-shaped" prominence at the posterolateral aspect of the os calcis.



Figure 3. Intratendinous calcifications associated with the retrocalcaneal exostosis.



Figure 4A. Inadequate resection of the posterior heel spur with residual intratendinous calcifications.



Figure 4B. Vertical calcaneal axial view.

Disappointing clinical results with continued pain and swelling at the Achilles insertion are not uncommon following posterior calcaneal spur resection. Ultimately, radiographic identification of residual posterior calcaneal spurring due to inadequate intraoperative resection (Fig. 4) have led to an attempt to better evaluate and assess the amount of calcification and extent of posterior spurring of the typical posterior calcaneal spur.

The usual radiographic views ordered for evaluation of a posterior calcaneal spur include a standard weight-bearing lateral image and occasionally an axial projection of the calcaneus. The standard weight-bearing lateral radiograph is taken with the foot against and parallel to the radiographic cassette with the x-ray beam perpendicular to the foot. Unfortunately, this conventional technique may actually produce an "oblique" image of the calcaneus where the posterolateral edge of the calcaneus is superimposed over the actual posterior surface of the bone. This oblique view is created by the internal angulation of the posterior aspect of the calcaneal tuber and the actual posterior surface of the os calcis itself.

Christman noted in a radiographic study of the calcaneus<sup>3</sup> that the posterior surface of the calcaneus is not seen in an accurate tangential view utilizing standard radiographic techniques. The gross anatomic specimen demonstrates an angulation of

the posterior surface of the calcaneus in a medial direction. This positional relationship makes the posterolateral edge of the calcaneus the most prominent surface in a standard lateral radiographic projection. The actual posterior surface of the calcaneus and the medial edge of the bone are then obscured due to superimposition on the lateral edge and substance of the posterior calcaneal tuber.

Christman concluded that the lateral projection limits the visualization of the potentially pathologic regions of posterior surface of the os calcis and therefore may actually "hide" significant posterior spurring. He has suggested that "oblique" projections of the calcaneus may be valuable in further and more accurate evaluation of the posterior surface of the calcaneus.

Two modified views of the posterior surface of the calcaneus have been suggested and utilized to clearly demonstrate the pathologic anatomy at the Achilles insertion. These modified views include an oblique lateral stance position of the calcaneus and a modified axial view of the posterior surface of the os calcis.

The modified lateral technique is taken with the weight-bearing foot internally rotated, i.e., the great toe against the film and the heel taken away from the surface of the film. The foot is placed in an approximate 30-degree angulation to the cassette. (Fig. 5) This technique places the posterior surface

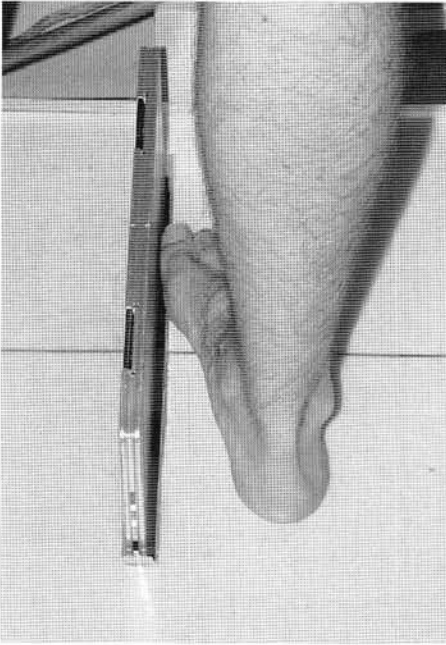


Figure 5A. Lateral technique with 30 degrees of internal rotation.

perpendicular to the x-ray film. The x-ray beam is then aimed at the posterior aspect of the calcaneus or the Achilles insertion and provides a true “tangential” image of the posterior surface of the os calcis.(Fig. 6)

The second radiographic technique is simply a posterior calcaneal axial view with the x-ray beam angulated 10 degrees from the perpendicular. This view provides an impressive image of the posterior surface of the calcaneus and allows for determination of the full lateral to medial extent of the posterior calcaneal spur.(Fig. 7)

A third factor in assessment of Achilles enthesitis includes soft tissue enhancement techniques for identification of intratendinous calcification. The standard lateral radiographs may simply be taken with lower KVp or lower tissue penetration to better visualize any soft tissue calcification that may be present within the substance of the Achilles tendon itself.

The combination of the two simple radiographic views provides a better assessment of the pathology at the Achilles insertion. With more accurate preoperative information, a more complete surgical plan can be constructed with the goal of achieving more successful clinical results.

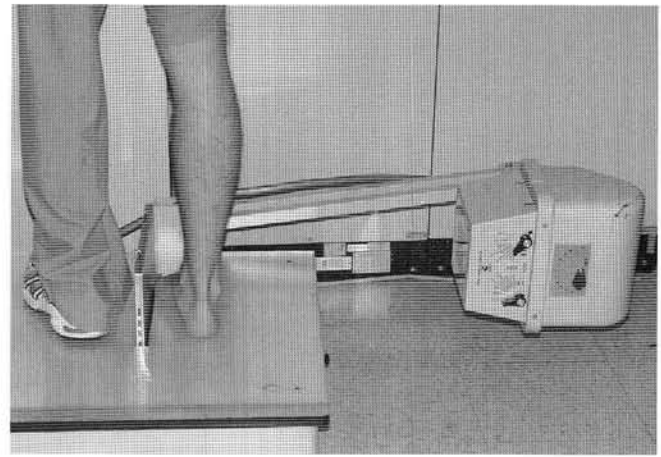


Figure 5B.



Figure 6A. Standard lateral radiograph

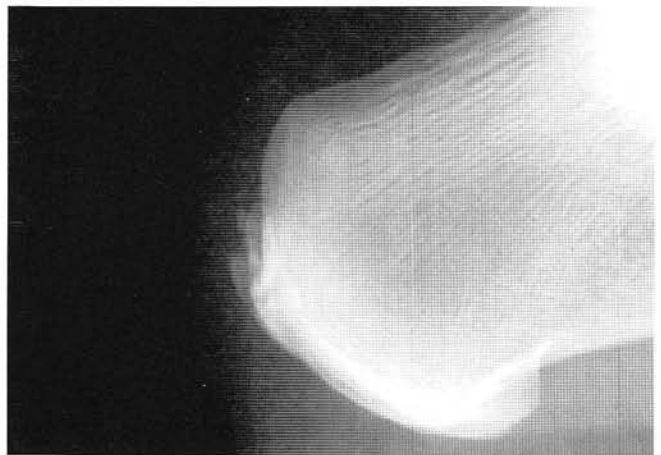


Figure 6B. Lateral radiograph with 30 degrees of internal rotation. Notice the pathology at the posterior heel visualized on this view when compared to the standard lateral radiograph in 6A.



Figure 7A, 7B. Calcaneal axial technique with 10 degrees angulation.



Figure 7B.

### REFERENCES

1. Fowler A, Phillip JR: Abnormality of the calcaneus as a cause of painful heel: its diagnosis and operative treatment. *Br J Surg* 32:494-498, 1945.
2. Ruch JA: Haglund's disease *J Am Podiatry Assoc* 64:1000-1003, 1974.
3. Christman RA: Radiographic anatomy of the calcaneus, Part II: posterior surface. *J Am Podiatry Assoc* 77:581-585, 1987



Figure 7C. Calcaneal axial radiograph with 10 degrees angulation to perpendicular. Notice the broad retrocalcaneal spur.