# Hind-foot endoscopic decompression of the retrocalcaneal space as an appropriate treatment for refractory Haglund's syndrome

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**Background**
The traditional operative management of Haglund deformity and retrocalcaneal bursitis consists of an open excision of the inflamed bursa, resection of the posterosuperior calcaneal tuberosity, and debridement of the Achilles tendinopathy. In an effort to reduce morbidity and recovery time, an endoscopic technique was used for the management of this condition.
The purpose of the current study was to evaluate the results from our patient series through the use of endoscopic bony and soft-tissue decompression of the retrocalcaneal space, calcaneal tuberosity resection, and Achilles tendon debridement as an appropriate treatment for refractory Haglund's syndrome.
**Patients and methods**
Between January 2014 and June 2015, endoscopic management of Haglund's syndrome was performed on 26 feet in 22 patients. The study included six males (six heels) and 16 females (20 heels), with a mean age of 24.3 years (range, 18–35 years). All patients experienced symptoms for a mean duration of 12.9 months (range, 8–20 months) before the operation.
Patients were evaluated preoperatively and postoperatively with the American Orthopaedic Foot and Ankle Society Ankle-Hindfoot Scale.
**Results**
The mean follow up period was 18 months. All patients (26 heels) were available for follow-up. The American Orthopaedic Foot and Ankle Society scores averaged 62 preoperatively and 97 postoperatively. There were 17 excellent results, seven good results, and two poor results.
One major complication occurred was an Achilles tendon rupture 3 weeks after surgery and residual pain and swelling that required reoperation through an open procedure.
There were no wound complications or postoperative infections.
**Conclusion**
An endoscopic procedure seemed to be a safe and efficacious option for surgical treatment of Haglund's syndrome. Sufficient exposure of the Achilles tendon and removal of the calcaneal prominence and retrocalcaneal bursa can be done effectively using an endoscopic technique and has a low morbidity and high patient satisfaction. The time to return to normal activity level is short.

**Keywords:**
bursitis, endoscopic, Haglund syndrome, retrocalcaneal bursa

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## Introduction

Haglund's deformity, first described in 1928, is a posterosuperior prominence of the calcaneal tuberosity and is a common cause of posterior heel pain [1]. When this bony enlargement rubs against the Achilles tendon and the overlying bursa, inflammation of the retrocalcaneal bursa, the supracalcaneal bursa, and the Achilles tendon occurs.

It is a major, although not universally attributable, cause of Haglund's syndrome, the painful, thickening of the soft-tissue of the hind-foot characterized clinically by the appearance of a painful 'pump bump,' a radiographically identifiable exostosis [2].

Haglund's deformity is often called 'pump bump' because the rigid backs of pump-style shoes can create pressure that aggravates the enlargement when walking. In fact, the deformity does occur in young women who wear pumps but does not exclusively occur in that population [3]. Conservative management is the mainstay of treatment, whereas surgery may be offered in difficult or complex cases, and those that are refractory to conservative treatment. The main aims

of nonsurgical management are to reduce underlying inflammatory bursitis and relieve tension in the Achilles tendon. Treatments include modifications to reduce friction between the patient's footwear and the inflamed retrocalcaneal bursa, using heel lifts and heel pads to reduce pressure on the heel when walking, and performing daily calf-stretching exercises to relieve tension from the Achilles tendon.

Conservative treatment has been routinely advocated as a first-line therapy, and many cases respond well to modalities aimed at minimizing pressure over the osseous ridge [4–7]. In cases where conservative treatment fails, surgery may be indicated.

Several methods of surgical treatment have been described previously including excision of the retrocalcaneal bursa, calcaneal osteotomy, and calcaneal ostectomy with Achilles tendon debridement [1,5,8–10]. The results of surgical treatment, however, have been varied and inconsistent, adding to confusion as to when surgery is indicated and what procedures result in optimal clinical outcomes [8,11,12].

Many open and endoscopic-guided techniques have been described, with varying outcomes. Good to excellent outcomes have been reported in 73–97% of heels that underwent open operative procedures [13]. Endoscopic-guided surgery for Haglund's disease is usually performed using two-portal or three-portal techniques, and good outcomes have been reported in the literature.

## Patients and methods

Between January 2014 and June 2015, endoscopic management of Haglund's syndrome was performed on 26 feet in 22 patients. The study included six males (six heels) and 16 females (20 heels), with a mean age of 24.3 years (range, 18–35 years). The study was approved by the institutional ethics committee in the Orthopedic Department of Orthopaedic Surgery, Tanta University, Egypt. All patients experienced symptoms for a mean duration of 12.9 months (range, 8–20 months) before the operation and received conservative treatment for a minimum 6 months.

The presence of Haglund's syndrome was diagnosed by the clinical symptoms, physical examination, plain radiographs, and MRI.

Typical presentation involved pain, local swelling, and stiffness in the hindfoot. In all patients, a bony prominence was palpated at the region of the posterosuperior part of the calcaneus. Pain was reproduced with palpation just lateral and medial to the Achilles tendon at the level of posterosuperior calcaneal prominence, but without tenderness of the Achilles tendon itself.

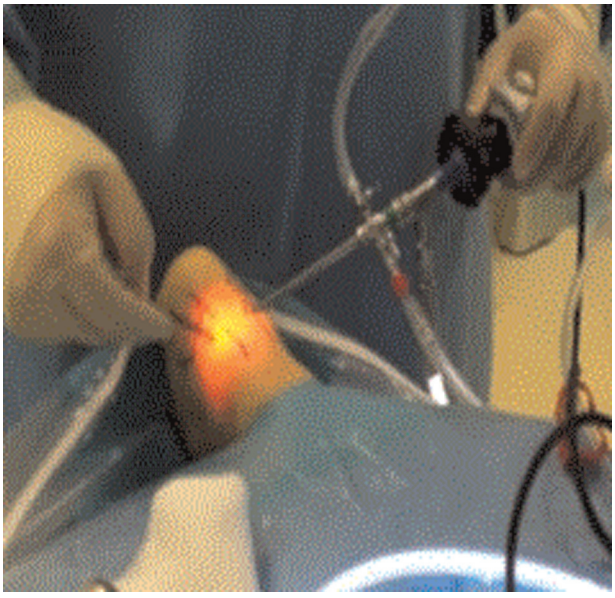
Preoperatively, lateral radiograph and MRI of ankle were obtained in all patients. The lateral radiographs (Fig. 3a) demonstrated a remarkable posterosuperior calcaneal prominence with positive parallel pitch lines in all patients. Moreover, the MRI showed a retrocalcaneal bursa with inflammation and swelling.

### Surgical technique

The endoscopic procedure was performed with the patient in the prone position under either general or spinal anesthesia. A tourniquet was applied at the thigh. The affected foot was positioned over the distal border of the operation table. Dorsiflexion of the foot was controlled by the surgeon's body. This enabled the surgeon to place the foot against his body while using both hands to operate the endoscopic instruments.

A lateral portal was made through a vertical incision at the level of the superior aspect of the calcaneus. This incision was slightly anterior to the Achilles tendon and posterior to the sural nerve (Fig. 1). It is important to bluntly dissect and spread the soft tissues when making the lateral portal to minimize the risk of injury to the sural nerve. The retrocalcaneal space was entered with a blunt trocar. A 4.0-mm endoscope was then placed

**Figure 1**



Prone position of the foot with two endoscopic portals.

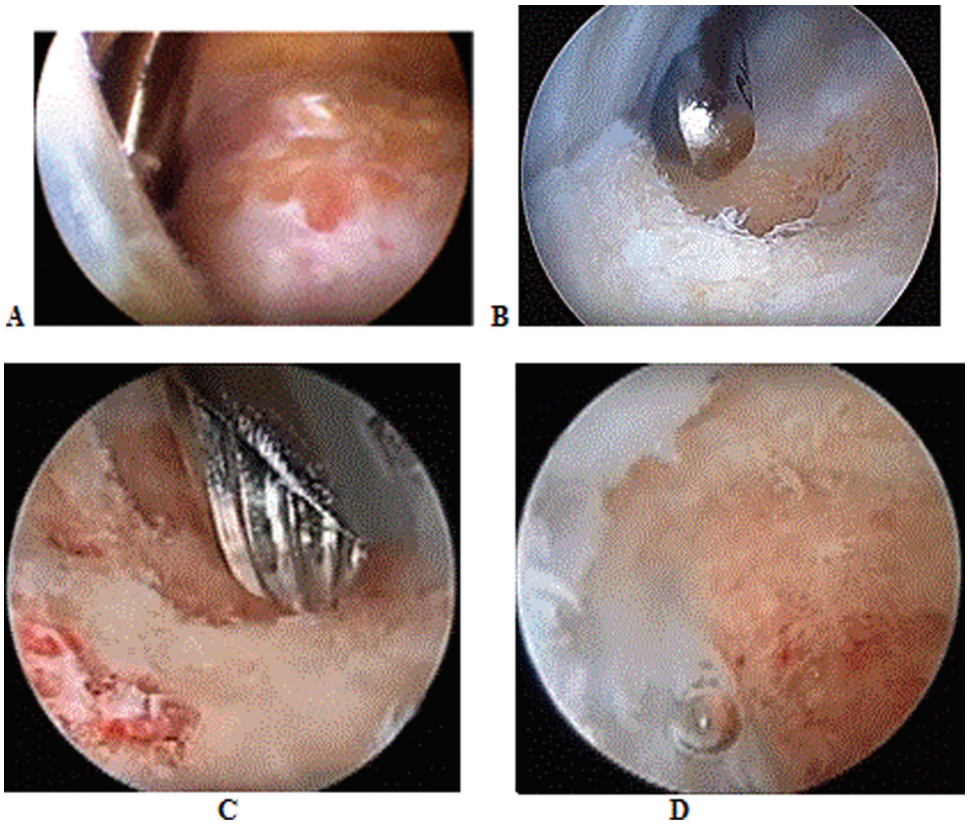
into the retrocalcaneal space. The medial portal was similarly established just anterior to the Achilles tendon using the light of the endoscope as a guide. A 4.0-mm endoscopic shaver was introduced into the medial portal, and the bursal tissue was removed. Once working space had been created, there was access to the posterior calcaneus and Achilles tendon attachment (Fig. 2a). Under direct endoscopic supervision, it was found that fibrous cartilage covering the calcaneal prominence and the anterior aspect of the Achilles tendon formed a joint-like structure, and the impingement location was determined when the foot was maximally dorsiflexed. The endoscopic shaver or a 4.0-mm endoscopic burr or both were used to resect the posterosuperior calcaneal prominence. The hooded portions of the instruments were kept toward the tendon to protect the tendon (Fig. 2b). Bone resection was done systematically usually from a posterior to anterior direction (Fig. 2c). Two portals were interchanged for the burr to perform adequate bony resection. The extent of bony resection was judged dynamically with the ankle moving through a full range of motion. Elimination of impingement in maximal dorsiflexion of the foot indicated adequate removal of the bone (Fig. 2d).

In some cases, fluoroscopic image intensifier was used to determine and document the extent of the resection fluoroscopically. Damaged or diseased Achilles tendon was selectively exposed, identified, and removed with the endoscopic shaver. In some cases, an 18-G needle was inserted several times into the tendon. The rationale for this technique was to initiate a vascular response within the tendon for healing and was performed after debridement. An endoscopic probe was inserted into the retrocalcaneal space to confirm attachment of the Achilles tendon. The foot was then hyperplantarflexed and dorsiflexed to verify any last areas of impingement. The retrocalcaneal space was irrigated and suctioned to remove any loose tissue. The portal sites were closed with two or three sutures. A compressive dressing was applied, and the foot was splinted in slight equinus.

### Postoperative care

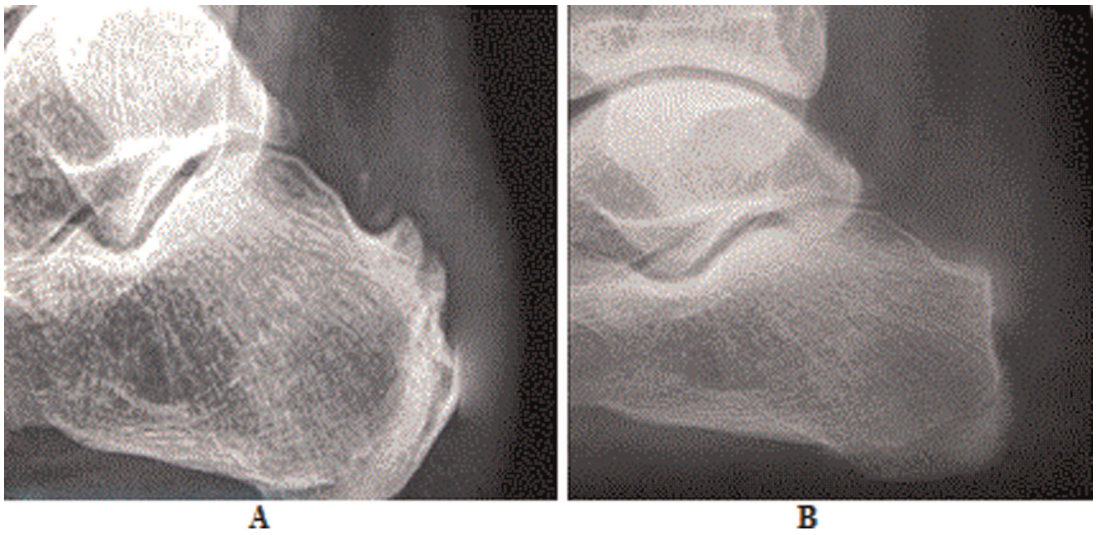
Postoperatively, the patient was encouraged to perform elevation of the foot for the first week along with range-of-motion exercises. Partial weight bearing was performed for the first 2 weeks with gradual full weight bearing in the third week. Conventional footwear was not allowed to be worn during the first

**Figure 2**




(a) An endoscopic probe demonstrates the working space created to see the posterior calcaneus and Achilles tendon attachment. (b) An endoscopic shaver is used on the posterosuperior calcaneus for soft-tissue debridement. (c) An endoscopic burr is used on the posterosuperior calcaneus for bonny resection. (d) Photograph demonstrating removal of the posterosuperior prominence.

**Figure 3**




(a) Preoperative radiograph showing Haglund's deformity. (b) Postoperative radiograph showing satisfactory resection.

8 weeks, and physical activities should not be performed for 3 months.

#### Statistical analysis

Patients were evaluated with the parallel pitch lines, as well as the American Orthopaedic Foot and Ankle Society (AOFAS) score preoperatively and at final follow-up. On the basis of the postoperative AOFAS score, the outcome was rated as excellent (90–100), good (80–89), fair (70–79), or poor (<70) [13].

The difference in preoperative AOFAS score and that evaluated at final follow-up was analyzed by using *P* value less than 0.001 to determine significance.

## Results

No patients were lost to follow-up, and the average follow-up was 12 months (range, 8–15 months). In all patients, the bony prominence and the inflamed retrocalcaneal bursa were found under the endoscopic view.

The mean surgical time was 40 min in the initial 12 heels (range, 32–45 min), whereas the average time for the following cases was 30 min (range, 20–38 min).

None of the patients were converted to open surgery. In 26 heels, postoperative lateral radiographs (Fig. 3b) showed achievement of adequate bony removal and negative parallel pitch lines. In three heels, parallel pitch lines were still positive. The average AOFAS score improved from preoperatively 63.3±11.9 to 86.8 ±10.1 points at the final follow-up ($P<0.0001$). There were 17 excellent results, seven good results, and two poor results. The two poor outcomes in the AOFAS score were from the same patient with the bilaterally affected heel.

There were no permanent neurovascular injuries and no wound infections related to the technique.

## Discussion

Haglund's deformity is generally thought to be a developmental condition and postulated to be associated with chronic calcaneal apophysitis experienced in childhood [5]. Structural factors implicated in its etiology include, but are not limited to, a high-arched cavus foot and the presence of a varus heel [6]. A combination of these factors can affect foot dorsiflexion, make the heel more prominent, and cause it to be more susceptible to increased pressure from shoe counters and tendons The treatment of Haglund's syndrome resultant from Haglund's deformity remains a significant orthopedic challenge. Many patients do not respond to conservative treatment, leaving surgery as a last alternative. The various surgical methods described to treat this syndrome have, however, produced mixed results, making it difficult for physician and patient alike to decide under what circumstances and with what methods to intervene surgically.

Currently, open surgical resection of a calcaneal prominence has been a widely accepted approach for treating Haglund's syndrome. Numerous authors have reported substantial postoperative improvements with different outcome measures [3,5,6]. However,

open surgical treatment is associated with several complications, including skin breakdown, Achilles tendon avulsion [7], altered sensation [8], and stiffness.

To avoid these problems associated with the open surgical technique, the endoscopic technique is an up-and-coming procedure. The accuracy and precision of this procedure have been confirmed [4,9,10].

The endoscopic technique of decompressing the retrocalcaneal space was developed to reduce the morbidity and decrease the time to recovery for patients with retrocalcaneal bursitis. The endoscopic technique has been shown to have fewer complications and to produce a better cosmetic appearance when compared with an open procedure [11].

There is still a controversy over the amount of bony resection in calcaneoplasty. Both underresection and overresection of calcaneal prominences can result in surgical failure in calcaneoplasty. Nesse and Finsen [12] confirmed that bony underresection is a vital reason why the posterior heel pain persists postoperatively. However, bony overresection places patients at great risks of lesion of the Achilles tendon insertion and calcaneus fracture [13]. Various radiographic measurements are used to judge the extent of the required bony resection [14–20], but there is absence of a perfect radiographic measurement [6,8,14,20,22]. In our study, the amount of the required bony resection was confirmed by using a dynamic endoscopic examination. In three feet, their postoperative parallel pitch lines were still positive, but they are satisfied with the endoscopic outcomes and have good results in the AOFAS score at the final follow-up.More recently, Leitze *et al.* [21] compared endoscopic decompression with the standard open technique. Patient outcomes and recovery times were similar, but there were fewer complications and a better cosmetic appearance with the endoscopic technique. In this current study of 26 heels, there were 17 excellent results, seven good results, and two poor results. There were no postoperative infections or skin complications.

There are still some limitations in our study. The first is the lack of a control group. The second is the small number of patients, and the short follow-up. Controlled studies and larger patient series are needed to verify whether our technique will improve the results, although our reported results are promising. Lastly, a longer follow-up is necessary to determine whether endoscopic treatment for Haglund's syndrome may persist in symptomatic relief and perform adequate bony resection instead of insufficient resection or excessive resection.

## Conclusion

An endoscopic procedure seemed to be a safe and efficacious option for surgical treatment of Haglund's syndrome and has a low morbidity and high patient satisfaction. The time to return to normal activity level is short. Sufficient exposure of the Achilles tendon and removal of the calcaneal prominence and retrocalcaneal bursa can be done effectively using an endoscopic technique.

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Nil.

**Conflicts of interest**

There are no conflicts of interest.

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