

Endoscopic management of retrocalcaneal pain: a prospective observational study

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ABSTRACT

Background: Retrocalcaneal pain is commonly caused by retrocalcaneal bursitis, Haglund's deformity, and noninsertional Achilles tendinosis. Open surgical techniques are associated with wound complications and prolonged recovery. To reduce morbidity and improve outcomes, endoscopic techniques have been introduced. The present study was undertaken to evaluate the functional outcomes of endoscopic management of retrocalcaneal pain using the American Orthopaedic Foot and Ankle Society (AOFAS) score. **Methods:** This prospective observational study included 40 patients (52 heels) aged 18–80 years with retrocalcaneal pain refractory to conservative treatment. All patients underwent endoscopic decompression of the retrocalcaneal bursa with excision of posterosuperior calcaneal prominence. Two portals—medial and lateral—were established over the posterosuperior aspect of the calcaneus to access the retrocalcaneal space. Inflamed bursal tissue was excised and prominent bony spurs were resected. Functional outcomes were

assessed pre- and postoperatively using the AOFAS score. **Results:**

Retrocalcaneal bursitis was observed in 70% of cases, Haglund's deformity in 17.5% (confirmed on lateral ankle radiographs), and non-insertional Achilles tendinosis in 12.5%. The mean operative time was 54.2 minutes. The mean hospital stay was 13.1 ± 2.02 days, and the mean follow-up duration was 66 days (range: 30–180 days). The mean AOFAS score improved significantly from 66.5 preoperatively to 97.3 at final follow-up. Functional outcomes were graded as excellent in 15 heels, good in 7, fair in 2, and poor in 2 cases. **Conclusions:** Endoscopic management of retrocalcaneal bursitis and Haglund's deformity is a safe and effective surgical option, providing excellent functional outcomes with minimal morbidity and rapid recovery.

Keywords: Retrocalcaneal bursitis, Haglund deformity, Non-insertional Achilles tendinosis, Endoscopic surgery

Introduction

Retrocalcaneal bursitis is defined as inflammation of the bursa located between the posterior surface of the

calcaneus and the anterior surface of the Achilles tendon [1]. The retrocalcaneal bursa is a horseshoe-shaped structure situated superior and posterior to the calcaneus and facilitates smooth gliding of the Achilles tendon during ankle motion [2]. Inflammation of this bursa is most commonly associated with excessive prominence of the posterosuperior aspect of the calcaneus, leading to mechanical impingement of the Achilles tendon. This condition was first described by Patrick Haglund and is commonly referred to as **Haglund's deformity** [3].

The etiological factors implicated in Haglund's deformity include repetitive microtrauma, overuse, and external pressure caused by tight-fitting footwear or high-heeled shoes [4]. Retrocalcaneal bursitis may also be associated with systemic inflammatory conditions such as gout, rheumatoid arthritis, and spondyloarthropathies [5]. Persistent bursitis often results in insertional Achilles tendinopathy, characterized by degeneration of the distal 2 cm of the Achilles tendon at its calcaneal insertion [6].

Clinically, patients present with posterior heel pain, swelling, and tenderness that are exacerbated by activity and shoe wear. The diagnosis is usually confirmed by a lateral radiograph of the ankle, which may reveal posterosuperior calcaneal prominence and intratendinous calcification [3]. Ultrasonography and magnetic resonance imaging (MRI) serve as useful adjuncts for evaluating soft-tissue involvement and confirming the diagnosis [3].

Conservative management remains the first-line treatment and includes footwear modification, heel pads, stretching exercises, moist heat application, non-steroidal antiinflammatory drugs, local

corticosteroid injections, and extracorporeal shock wave therapy [3,10]. However, patients who fail to respond adequately to prolonged nonoperative treatment may require surgical intervention. Various surgical techniques have been described, including excision of the retrocalcaneal bursa, calcaneal osteotomy with or without Achilles tendon debridement, and endoscopic decompression of the retrocalcaneal space [7,11].

Compared with traditional open procedures, minimally invasive endoscopic techniques provide better visualization of the retrocalcaneal space, reduced postoperative pain, shorter recovery periods, and lower complication rates [8]. Endoscopic decompression involves excision of inflamed retrocalcaneal bursal tissue with or without resection of the posterosuperior calcaneal prominence and has gained increasing popularity in recent years.

The present study was undertaken to evaluate the efficacy of endoscopic decompression of the retrocalcaneal bursa with excision of posterosuperior calcaneal bony spurs in patients presenting with retrocalcaneal pain refractory to conservative management.

Methods

Study Design and Participants This prospective observational study was conducted in the Department of Orthopaedics from **October 2024 to November 2025**. Ethical clearance was obtained from the Institutional Ethics Committee, and written informed consent was obtained from all participants after explaining the purpose and nature of the study.

A total of **40 patients (52 heels)** were included, comprising **27 females and 13 males**. Patients with a clinical history and physical examination suggestive of retrocalcaneal bursitis,

Haglund's deformity causing mechanical impingement, or noninsertional Achilles tendinosis, and who had failed conservative management for **6–36 months** (including footwear modification, non-steroidal antiinflammatory drugs, and physiotherapy), were included in the study.

Patients with marked calcified Achilles tendinosis, insertional Achilles tendinosis, active infection, or a history of previous hindfoot surgery were excluded.

All patients underwent detailed preoperative evaluation including history taking, clinical examination, routine laboratory investigations, and lateral radiographs of the calcaneus to confirm eligibility. In patients with bilateral involvement, **only the more severely symptomatic heel** was operated upon.

Preoperative Preparation

Patients were taken up for surgery after completion of routine investigations and clearance for anesthesia. Separate informed consent for surgery was obtained after explaining the operative procedure and potential complications

Outcome Assessment

Functional outcomes were assessed using the **American Orthopaedic Foot and Ankle Society (AOFAS) Ankle–Hindfoot Score** preoperatively and postoperatively at **3 weeks, 6 weeks, and 6 months**. The AOFAS score evaluates **pain (40 points), function (50 points), and alignment (10 points)**, with a maximum score of 100.

Operative Technique

The endoscopic procedure was performed with the patient in the **prone position**, with the foot hanging freely over the edge of the operating table, under **spinal anesthesia and tourniquet control**.

Prophylactic antibiotics (intravenous ceftriaxone 1 g and gentamicin 80 mg) and tetanus toxoid were administered one hour prior to surgery.

All bony prominences were adequately padded. The operative leg was supported on a padded bolster to maintain the foot in a neutral position, while the contralateral limb was positioned approximately **20° lower** than the operative limb (Figure 1). Ankle dorsiflexion could be achieved by positioning the surgeon's



to the patients and their attendants.

body against the foot, allowing both

Figure 1 (a and b): Patient positioning

Preoperative preparation included shaving of the operative limb from knee to foot one day prior to surgery.

An imaginary horizontal line was drawn from the tip of the lateral malleolus perpendicular to the axis of

hands to remain free for manipulation of the arthroscope and surgical instruments.

the Achilles tendon. Two additional lines were drawn parallel to the medial and lateral borders of the Achilles

tendon. The endoscopic portals were created at the intersection of these lines,

Achilles tendon at the same level as the lateral portal to localize the medial



**Figure 2 (a and b):
Marking and making
port.**

Figure 3: Surgical setting for retrocalcaneal endoscopy.



inferior to the horizontal line and lateral to the borders of the Achilles tendon (Figure 2a, 2b).

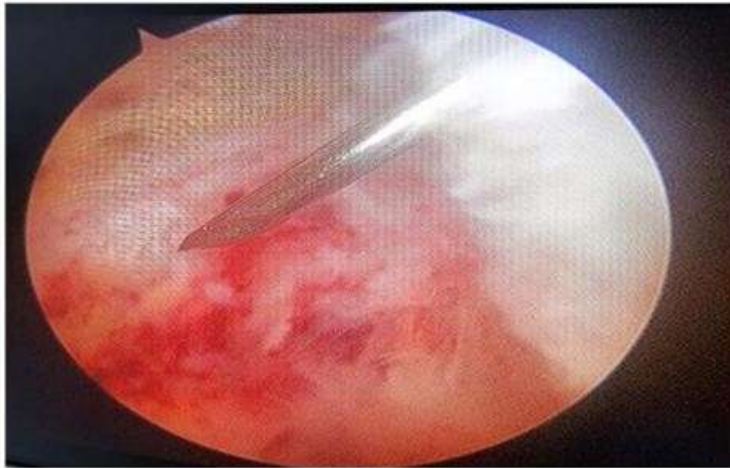
The skin incision was made slightly anterior to the Achilles tendon and posterior to the sural nerve. A blunt trocar was introduced through the lateral incision to create a working space. A **4-mm arthroscope** (Stryker, San Jose, California) was then inserted into the retrocalcaneal space, with correct positioning confirmed fluoroscopically.

Under direct visualization, a spinal needle was introduced just medial to the

. portal. The medial portal was then established in a similar manner, positioned anterior to the Achilles tendon. The **lateral portal served as the viewing portal**, while the **medial portal functioned as the working portal**, using a Stryker endoscopy video system with a **30° arthroscope**. A **4.0-mm arthroscopic shaver** was introduced through the medial portal (Figure 3), and inflamed retrocalcaneal bursal tissue was excised. Once an adequate working space was created, the posterior surface of the calcaneus

and the Achilles tendon insertion were clearly visualized

Depending on the bone quality, a **4.0mm arthroscopic shaver**, a **4.0-mm arthroscopic burr**, or a



combination of both was used to resect the posterosuperior calcaneal prominence. A spinal needle was then inserted percutaneously through the Achilles tendon and visualized arthroscopically to aid in orientation within the retrocalcaneal space (Figure 4). The hooded portions of the arthroscopic instruments were consistently directed toward the needle tip to protect the Achilles tendon during bony resection.

Resection of the osseous prominence was performed in a systematic manner, generally progressing from **posterior to anterior**. Bone removal was extended both medially and laterally into the calcaneal sulcus and inferiorly up to the level of the Achilles tendon insertion. The position of the Achilles tendon was repeatedly confirmed by

percutaneous needle insertion to prevent inadvertent injury.

Adequate exposure and complete resection of the bony prominence were achieved using combined **visual, tactile, and needle-guided confirmation**.

Areas of damaged or degenerated Achilles tendon, when present, were selectively debrided using the arthroscopic shaver. An arthroscopic probe was then introduced into the

retrocalcaneal space to confirm the integrity and attachment of the Achilles tendon.

Finally, the ankle was taken through a full range of motion to identify and eliminate any residual sites of impingement. All bone debris and softtissue fragments were thoroughly irrigated and suctioned from the operative field.

Figure 4: Needle passing through the Achilles tendon and pointing towards

retrocalcaneal space.

Postoperative Care and Rehabilitation

Wound closure was performed using **40 nylon sutures** in a single-layer

technique. A **below-knee plaster slab** was applied with the ankle maintained in **10–15° of plantar flexion** for a period of **two weeks**. Postoperatively, **non-weight bearing** was advised for the first two weeks.

All patients were instructed to keep the operated limb elevated whenever not ambulatory, particularly during the first **five postoperative days**, to minimize swelling. After slab removal, patients were allowed to ambulate using **modified footwear** for three months, followed by a gradual transition to normal footwear. Postoperative complications such as transient neuralgia, swelling, and scar tenderness were observed in a few patients.

Statistical Analysis

Statistical analysis was performed using the **Statistical Package for the Results**

A total of **40 patients (52 heels)** were included in the study. Of these, **27 patients (67.5%)** were female and **13 patients (32.5%)** were male, with a mean age of **46.3 ± 7.9 years** (range:

Social Sciences (SPSS) for Windows, version 24.0. Continuous variables were expressed as **mean ± standard deviation (SD)**, while categorical variables were presented as **frequencies and percentages**.

Changes in continuous variables over time were analyzed using **repeatedmeasures analysis of variance (ANOVA)**, followed by **Bonferroni post hoc testing** to compare preoperative scores with postoperative scores at **3 weeks, 6 weeks, and 6 months**. A **p-value ≤ 0.05** was considered statistically significant. **25–65 years**) (Table 1). The mean duration of non-operative treatment prior to surgery was **13.1 ± 2.02 months** (range: **6–30 months**) (Table 2).

Table 1: Demographic profile of patients.

Variables		No of patients	%
Age (in years)	<25	00	0
	26-35	8	20
	36-45	15	37.5
	46-55	11	27.5
	56-65	6	15
Gender	Male	13	32.5
	Female	27	67.5

Table no.2: Mean duration of non-operative treatment.

Duration of month	No of patients	%
6 to 10	17	42.5
11 to 20	19	47.5
>20	4	10

Table 2: Average AOFAS score

Variables	N	Pre-operative	Post-operative		
			3 Weeks	6 weeks	6 months

Mean ±SD	40	66.5±9.5	79.1±13.7	93.4±10.7	97.3±8.2
P-value			<0.001	<0.001	<0.001

Among the study population, **70% of patients were diagnosed with retrocalcaneal bursitis, 17.5% with Haglund's deformity** as confirmed on lateral ankle radiographs, and **12.5% with non-insertional Achilles tendinosis** (Table 4). The mean operative time was **54.2 minutes**. The mean duration of hospital stay was **3.92 ± 1.5 days**, and the mean followup period was **66 days** (range: 30–180 days).

In the cohort of **40 heels**, the mean preoperative AOFAS score was **66.5 ± 9.5**. Postoperatively, the mean AOFAS score improved to **79.1 ± 13.7 at 3 weeks, 93.4 ± 10.7 at 6 weeks, and 97.3 ± 8.2 at the final follow-up of 6 months** (Table 2). Repeated-measures ANOVA demonstrated a **statistically significant improvement** in AOFAS scores across all follow-up periods (**p < 0.001**).

Table no.4: Distribution of participants as per the etiology of pain

	No of patients	%
Retrocalcaneal bursitis	28	70
Haglund deformity	7	17.5
Non insertional Tendinosis	5	12.5

Discussion

Retrocalcaneal pain is a disabling condition with a multifactorial etiology, including retrocalcaneal bursitis, insertional and non-insertional Achilles tendinosis, superficial retrocalcaneal bursitis, and gastrocnemius contracture [12]. In the present study, retrocalcaneal pain was primarily attributed to **retrocalcaneal bursitis, Haglund's deformity, and noninsertional Achilles tendinosis**. Non-operative management remains the first-line treatment for retrocalcaneal pain. All patients in this study had undergone prolonged conservative treatment, including footwear modification, heel lifts, nonsteroidal anti-inflammatory drugs, physical therapy, avoidance of

highimpact activities, and night splinting, with minimal symptomatic improvement. The mean duration of non-operative treatment prior to surgery was **13.1 ± 2.02 months** (range: 6–30 months). Although local corticosteroid injections may be considered in refractory cases, repeated injections are associated with an increased risk of Achilles tendon rupture [13]. For this reason, corticosteroid injections were not administered to any patient in the present study. Previous studies have reported variable success rates with conservative treatment. Myerson and Clement observed success rates ranging from **85% to 95%** [14,15], whereas Leitze et al reported that approximately **10% of patients** remained symptomatic and required surgical intervention [4]. In

contrast, Sammarco and Taylor reported a conservative treatment failure rate of **65%**, with persistent symptoms despite an average treatment duration of 62 weeks [16]. Patients who fail adequate non-operative management are therefore appropriate candidates for surgical intervention. The goal of surgical treatment in Haglund's deformity and retrocalcaneal bursitis is complete resection of the posterosuperior calcaneal prominence and decompression of the inflamed retrocalcaneal bursa and surrounding soft tissues. This can be achieved using either open or endoscopic techniques. Endoscopic management has gained popularity due to its minimally invasive nature and favorable outcomes. Compared with open procedures, endoscopic techniques offer several advantages, including reduced approach-related complications, improved visualization of the tendon–bone interface, shorter operative time, less postoperative pain, faster rehabilitation, and superior cosmetic outcomes [8]. Enhanced visualization allows precise bony resection and assessment of residual Achilles tendon impingement, while smaller incisions facilitate easier wound closure and reduced postoperative morbidity. Open calcaneal resection has shown variable success rates ranging from **50% to 100%**. Angermann et al reported that 70% of patients were cured or improved following open resection, while 20% showed no change and 10% had worse outcomes, with complications such as superficial infection, hematoma, and delayed wound healing [18]. Pauker et al reported good outcomes in 15 of 19 patients treated with open resection without bursal excision; poor outcomes were attributed to inadequate bone resection [17]. Leitze et al described the use of preoperative radiographic measurements and

intraoperative fluoroscopy to guide bone resection but found no correlation between the angle of resection and clinical outcome [4]. In the present study, bone resection was continued endoscopically until no residual impingement of the Achilles tendon was observed during ankle dorsiflexion. Although pre- and postoperative radiographs were obtained in all patients, no attempt was made to correlate the extent of radiographic bone resection with functional outcome. Several studies have demonstrated favorable outcomes with endoscopic decompression. van Dijk et al reported **19 good to excellent results** in a series of 20 patients with no operative complications or postoperative infections [18]. Morag et al observed excellent outcomes with no pain, disability, or range-of-motion limitation after endoscopic calcaneoplasty in four patients at a mean follow-up of two years [19]. Jerosch and Nasef reported seven excellent and three good outcomes in ten patients following endoscopic calcaneoplasty [20]. More recently, Leitze et al (2023) found comparable functional outcomes between open and endoscopic techniques but reported fewer complications and better cosmetic results with the endoscopic approach [4].

In the present study, the **mean AOFAS score improved significantly** from **66.5 ± 9.5 preoperatively to 79.1 ± 13.7 at 3 weeks, 93.4 ± 10.7 at 6 weeks, and 97.3 ± 8.2 at 6 months**, with statistically significant improvement across all follow-up periods (**p < 0.001**). These results are comparable with previously published studies (Table 5). The progressive improvement in functional scores indicates that symptomatic and functional recovery continues for several months after surgery, and patients should be counseled accordingly. Functional outcomes in this study were assessed using the AOFAS ankle– hindfoot score. Since

Surgical Position, Technical Considerations, and Complications

Endoscopic calcaneal surgery can be performed with the patient in either the **supine or prone position**. Most published series have utilized the

the AOFAS score does not categorize outcomes into excellent, good, fair, or poor, and the Ogilvie–Harris scoring system was not used, direct categorization of outcomes into these groups was not performed

contralateral leg lowered approximately **20° relative to the operative leg**, allowing **uninterrupted visualization and instrumentation** of the retrocalcaneal space.

Table 5: AOFAS score of our study when compared to other studies.

Studies	Pre-operative AOFAS score	Final AOFAS score
Our study	66.5±9.5	97.3±8.2
Ortmann et al14	62±12.7	97±6.1
Kaynak32	52.6*	98.6*
Leitze et al52	61.8±12.9	87.5±15.0
Kondreddi et al54	57.9±6.224	89.08±5.267
Wu et al64	63.3±11.9	86.8±10.1

supine position. While supine positioning may be preferable in patients with comorbidities such as obesity or cardiovascular disease, it is associated with frequent contact of the arthroscope and shaver with the operating table. In this study, we utilized the **prone position**, with the

Although a **2.7-mm arthroscope** may be used, we preferred a **4.0-mm scope** due to improved fluid flow and visualization. Endoscopic calcaneoplasty has a **steep learning curve**: the first procedures in our series took approximately **90 minutes**, whereas the final case was completed in **24 minutes**, consistent

with prior reports [18]. For surgeons new to this technique, marking the superior aspect of the calcaneus under **fluoroscopic guidance** may assist in orientation. Conversion to open surgery should always be considered as a contingency. One major risk during posterior calcaneal resection is **Achilles tendon rupture**. Anatomical studies suggest that up to **50% of the tendon may be safely resected** superiorly to inferiorly; however, intraoperative assessment of tendon depth is challenging. In our series, a percutaneous needle was inserted through the tendon and visualized arthroscopically to guide orientation. The shaver and burr were oriented **away from the tendon**, and a below-knee slab was applied for **two weeks postoperatively**. Consequently, no Achilles tendon ruptures occurred. Ortmann et al. reported one rupture in a patient who ambulated without a protective boot [21].

In this study, **postoperative complications occurred in two patients (10%)**: one patient developed transient neuralgia that resolved within six weeks with oral methylcobalamin, and another experienced swelling and scar tenderness, which resolved within three weeks. Donnewerth and Roukis, in a systematic review of five studies involving 452 ankles, reported a complication rate of **3.8%**, including wound healing problems, recurrent symptoms, neuritis, transient sensory deficits, sural neuroma, and superficial peroneal neuritis [22]. Nickish et al. reported a complication rate of **8.5%** in their review [23].

Limitations

Several limitations of this study should be acknowledged:

1. While the technique effectively relieves retrocalcaneal pain, it does **not distinguish between pain due to tendinopathy versus retrocalcaneal bursitis**.
- 2.
3. The exact number of patients requiring significant Achilles tendon debridement could not be precisely quantified.
- 4.
5. The **follow-up period was relatively short**, limiting assessment of long-term outcomes and recurrence.
- 6.

Conclusion

Endoscopic calcaneal resection is a safe and effective alternative to open resection, with several advantages. Surgeons familiar with arthroscopic techniques may find the procedure **quicker, technically easier, and more precise**, with superior visualization of the retrocalcaneal space. The **small incision** minimizes the risk of wound dehiscence, painful scarring, and nerve entrapment, while providing **better cosmetic outcomes**. Postoperative pain and recovery times are comparable to those after open procedures, and the technique demonstrates **excellent functional improvement**.

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