

## Original Research Article

# Surgical resection of Haglund deformity by lateral approach: our institutional experience on 29 heels

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## ABSTRACT

**Background:** Haglund deformity is a common cause of posterior heel pain and consists of a constellation of soft tissue and osseous abnormalities. The treatment starts with conservative approach and ends with surgical treatment in case conservative treatment fails and the symptoms are bothersome. Different surgical procedures and approaches have been used for this deformity. But in the literature, the results have been inconsistent. In this study we evaluated the clinical and functional outcome of osteotomy of the calcaneal tuberosity with debridement of the retrocalcaneal bursa and the Achilles tendon using a lateral approach at our institute.

**Methods:** A total of 29 feet in 25 patients that underwent surgical procedure from August 2013 to March 2017 at our institute were included in this study. The clinical and functional outcome was evaluated using AOFAS ankle-hind foot scale.

**Results:** The mean AOFAS ankle-hind foot score had improved by 32 points from the pre-operative mean score, with a mean score of 86 at the final follow up of one year. Five out of 29 operated feet had superficial surgical site infection in the postoperative period that responded to antibiotic therapy and regular antiseptic dressings. One patient had local betadine allergy.

**Conclusions:** We conclude lateral approach to debridement and calcaneal tuberosity resection is an effective method with good clinical and functional outcome in patients with refractory Haglund deformity.

**Keywords:** Haglund, Pump bump, Retrocalcaneal bursitis, Calcaneal osteotomy, Achilles tendon

## INTRODUCTION

Haglund deformity was first described by Patrick Haglund in the year 1927.<sup>1</sup> It is also known as pump bump, retrocalcaneal exostosis or Mulholland deformity, and is a common cause of posterior heel pain syndrome. The deformity is defined by the presence of a prominent bursal bony projection of the calcaneus. It is mostly an idiopathic condition but several contributory factors play a role. These include over practice in runners and athletes, tight fitting low back shoes, and certain inherited conditions of the foot like a high arched foot, tight Achilles tendon, and altered biomechanics of the foot

joint because of mal-aligned subtalar joint.<sup>2,3</sup> It usually affects the middle aged people and females have a higher predisposition than males. Bilateral involvement is a common feature. The clinical features include pain at the posterior aspect of the heel which is predominantly present when the patient begins to walk after a period of rest. A painful bump is usually present at the posterior aspect of the heel. Diagnosis can be made on the basis of lateral radiographs of the ankle, which reveals a bony prominence at the posterosuperior part of the calcaneal tuberosity, calcaneal bursal swelling and increased density in the pre-Achilles bursa.<sup>4</sup> MRI may be required for ambiguous and clinically equivocal cases. If present, a

bony bump along the postero-superior corner of the calcaneal tuberosity is well visualized on sagittal T1 weighted images. T2 weighted images will show excessive fluid in the retrocalcaneal bursa and fluid in the retro-Achilles bursa. There may be bone marrow oedema in the calcaneal tuberosity.<sup>1</sup> A number of conditions can mimic Haglunds syndrome. These include calcaneal bursitis, plantar fasciitis, insertional Achilles tendinosis, and avulsion of the calcaneal tendon. In calcaneal bursitis, tenderness is mostly palpable on the medial and lateral sides and in front of the Achilles tendon. Pain and tenderness is present over the sole of the feet in plantar fasciitis. In insertional Achilles tendinosis tenderness is present distally at the insertion of the Achilles tendon on the calcaneus. Avulsion of the Achilles tendon presents as a palpable defect and clinical tests like the Thompson test will be positive in the condition.

Conservative management in the form of modifications of shoe wear, anti-inflammatory drugs and physiotherapy are the main stay of treatment. Casting may be necessary for pain reduction in some cases. Mc Garvey et al reported improvement in 89% of their cases treated with conservative measures.<sup>5</sup> In patients where conservative methods fail, surgery may be indicated. Several methods have been described including excision of the retrocalcaneal bursa, calcaneal osteotomy, and calcaneal osteotomy with Achilles tendon debridement.<sup>6-8</sup> The results of surgical procedures have been varied and inconsistent.<sup>9</sup> The purpose of the current study was to determine the outcome of calcaneal tuberosity resection with retrocalcaneal bursal and Achilles tendon debridement for refractory cases of Haglund deformity.

## METHODS

This study was conducted on 29 feet in 25 patients in the Department of Orthopaedics of SKIMS Medical College and Hospital, Bemina from August 2013 to March 2017. Patients with history of smoking, diabetes mellitus and peripheral vascular disease were excluded from the study. Patients with a minimal follow up of one year after the surgical intervention were included. All the patients had received at least a 6 months trial of conservative treatment for being included. All the procedures were performed by a single surgeon.

Preoperative evaluation was done and included a lateral radiograph of the ankle for the demonstration of Fowlers-Philip angle, parallel pitch lines, and Achilles tendon calcification. Fowler angle is defined as angle formed by a line tangent to posterosuperior border of the calcaneus and the calcaneal tuberosity with longitudinal axis of the calcaneus (Figure 1a, 2a). Parallel pitch line is drawn as a tangent to the anterior tubercle and medial tuberosity with a second line parallel to it but tangential to posterior lip of talar articular facet. Normally the second line should be tangential to the tip of posterosuperior border of calcaneus. But if this posterosuperior bursal projection extends beyond this second line it is said to be positive or

pathological (Figure 1, 2). Calcification of the Achilles tendon is seen as a single or multiple opacities in the Achilles tendon (Figure 3).<sup>10-12</sup>

## Surgical procedure

All the procedures were performed under regional anaesthesia. A longitudinal incision was made one cm lateral to the Achilles tendon, extending 3-4 cms proximally and 2-3 cms distally from the superior calcaneal tuberosity. The ankle joint was plantar flexed, and by sharp and blunt dissection the Achilles tendon was identified. A retractor was placed between the Achilles tendon and the posterior and superior border of the calcaneal tuberosity. The retrocalcaneal bursa was exposed. In some cases it was necessary to resect some amount of the tendon from the calcaneum for proper exposure. The retrocalcaneal bursa was removed first, followed by excision of the superior aspect of the calcaneal tuberosity. Care was taken to excise the overlying periosteum by sharp dissection in total from the excised tuberosity to avoid new bone formation later on. The remnant sharp edges of the tuberosity were smoothed with a rasp and rongeur. Debridement of the Achilles tendon was done as required. The postoperative radiographs were taken in all the cases (Figure 1, Figure 2).

Following surgery the patients were placed in a short leg cast with the ankle placed in 15 degrees of plantar flexion. At 2 weeks following surgery the cast was replaced with ankle in neutral position. Patients were prohibited from weight bearing for the first 4 weeks following surgery. Subsequently patients were allowed to bear weight as tolerated. 6-8 weeks following surgery patients were allowed to ambulate as tolerated without aids. Physiotherapy in the form of gastro-soleus strengthening exercises was started. The patients were followed for at least 12 months following surgery.

The AOFAS ankle hind foot scale was employed to evaluate the patient's outcome. The AOFAS ankle- hind foot score evaluates pain (40 points), function (50 points) and alignment (10 points).<sup>13</sup> It was calculated prior to surgery and at the final post-operative follow-up. Complications in the postoperative period if any were recorded.

Statistical analysis was done using statistical package for the social sciences (SPSS) version 16 of 2009.

## RESULTS

In a total of 25 patients 29 heels were operated. In 10 patients there was right heel involvement, 7 had disease of the left side and in 8 patients both heels had Haglund deformity. Only 4 patients with bilateral involvement had surgical intervention on both the heels. There were no drop outs in the follow-up. The age of patients ranged from 25 to 60 years with a mean age of 38.7 years. There

were 16 female and 9 male patients. The mean follow up time was 13.5 months (range: 12 to 16 months).

The average Fowler angle measured on lateral radiographs was 59.42° with a range of 47 to 80°. Only

three heels out of 29 had Fowler angle greater than 75°. The parallel pitch lines were positive in 18 (60.1 %) heels. Achilles tendon calcification was evident on lateral view radiographs in 20 (69%) heels.

**Table 1: Patient demographics and clinical profile of the patients.**

Characteristics	Values	
<b>Age (years)</b>	Range 25 to 60 <b>38.7</b>	
<b>Sex</b>	Male (n)	9
	Female (n)	16
<b>Side</b>	Left (n)	7
	Right (n)	10
	Bilateral (n)	8
<b>Final follow up (months)</b>	Range 12 to 16 13.5	
<b>Fowler-Philip angle (degrees)</b>	Range 47 to 80 59.42	
<b>Parallel pitch lines</b>	Positive (h)	18 (62.1%)
	Negative (h)	11 (37.9%)
<b>Achilles tendon calcification</b>	Present	20 (69%)
	Absent	9 (31%)
<b>Pre-operative AOFAS score (mean)</b>	Range 35 to 79 54	
<b>Post-operative AOFAS score (mean)</b>	Range 60 to 97 86	
<b>Complications</b>	Superficial infection (h)	5
	Local Betadine allergy (h)	1

n=number of patients; h=number of heels.

The mean AOFAS score before surgical intervention was 54 which increased by 32 points to a mean of 86 at the final follow up (range 60-97). Majority of the patients had alleviation of pain at 1 year follow up except for the 4 heels that had mild to moderate daily pain. These patients had a mean AOFAS score of 72 (55-97). There was a delay in the recovery of two patients by 9 months. There were no major complications in our series. Five of the patients developed superficial infection at the surgical site which responded to oral antibiotics and regular dressings. One of the patient developed betadine allergy which subsided with anti-histaminic drugs and replacement by normal saline dressings.

## DISCUSSION

Many patients with Haglund deformity do not respond to conservative management. In such cases operative treatment is an alternative. However the various surgical methods have produced mixed results, making it difficult to set definite guidelines as to when operative treatment is needed.<sup>6,7</sup>

The use of various radiological parameters for Haglund deformity does not carry any clinical significance in terms of planning surgical intervention. Lu et al in their analysis and relation of Fowler angle and parallel pitch lines in Haglund deformity concluded the difference of these parameters between the Haglund heels and normal heels was not statistically significant. Their mean Fowler angle of 62.31° in the symptomatic group was comparable to 59.42° of our series. Parallel pitch lines

were positive in 56.8 % in their symptomatic group which is again comparable to our value of 60.1 %. Achilles tendon calcification was significantly higher (78.4%) in their symptomatic group. Similarly, 69 % of our cases had Achilles tendon calcification on radiographs.<sup>12</sup>

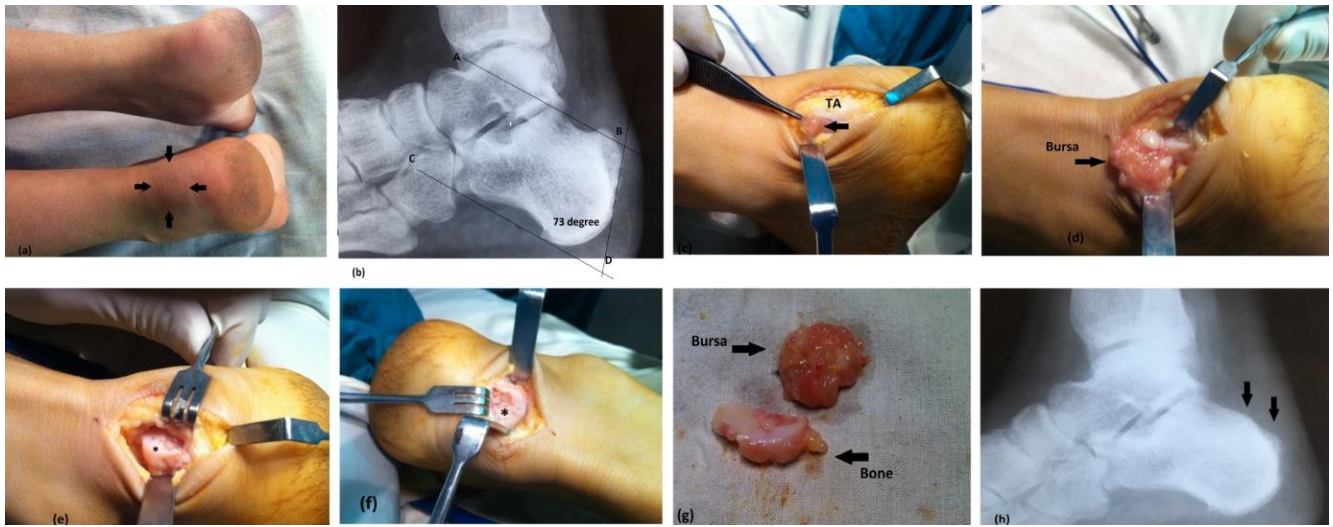
Fowler angle of 44 to 69° is considered normal and angle more than 75° is associated with prominent postero-superior prominence of the calcaneum a feature suggestive of Haglund deformity. In our series only three heels out of 29 had the angle greater than 75°. <sup>14</sup> These findings further suggest that these radiological parameters do not have any clinical significance. The only radiological parameter that proves helpful is calcification of the tendon, and is helpful to make decision for Achilles tendon debridement while planning surgical intervention.

Our study highlights the fact that calcaneal ostectomy produces outcomes that justify its use in patients with resistant cases. The mean AOFAS score was 86/100 at the final follow up and 84 % patients (21 out of 25) had alleviation of pain at 1 year follow up in our series. The results are similar to those reported by Samarcoet et al and Sella et al.<sup>15,16</sup> The results were however in contradiction to the results of Schneider et al who suggested that calcaneal resection does not result in consistent symptomatic relief for the patient.<sup>17</sup> This discrepancy may be because of the surgical procedure or the outcome evaluation tools used.



The time needed by patients to return to normal activity after surgery for Haglund deformity has been reported. In our study, all the patients returned to normal function by 9 months. The results are similar to those reported by

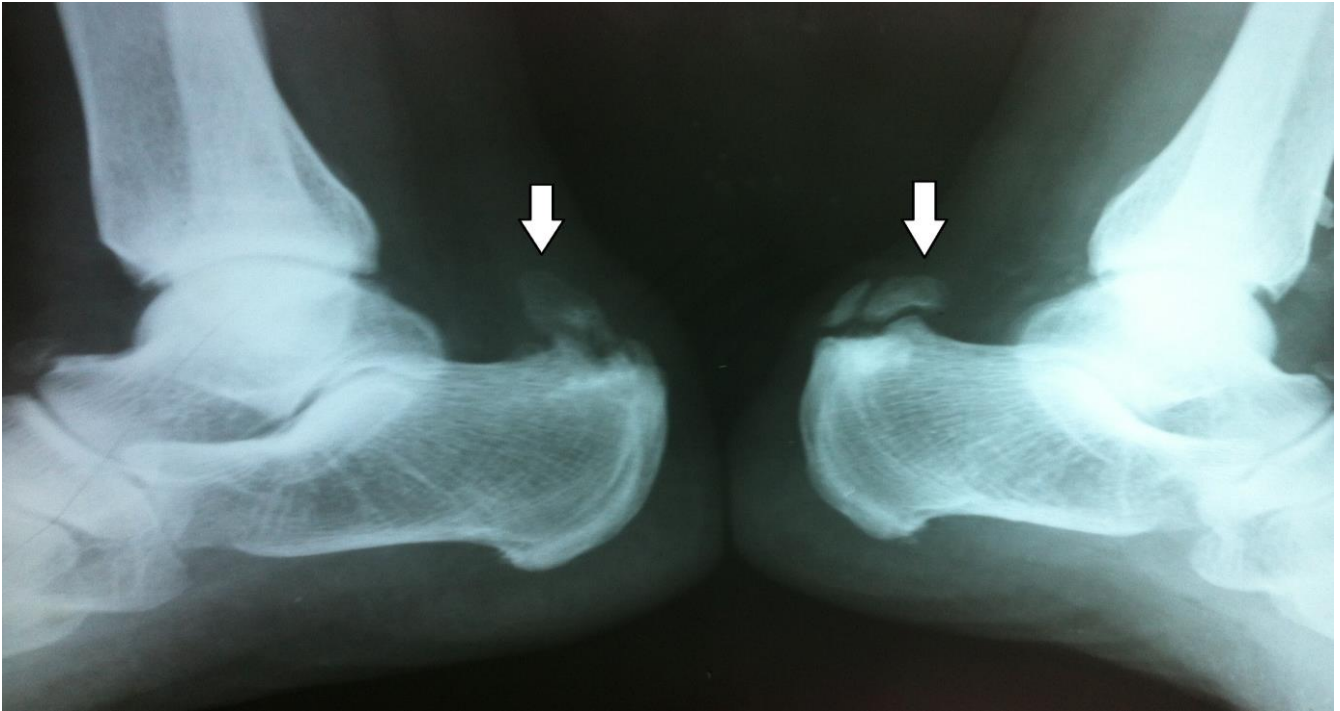
Natarajan et al who reported mean time to normal function of 6 months and Anderson et al who reported that patients returned to normal activity by 6 months following surgery.<sup>18,19</sup>



**Figure 1: Case No. 13. (a) Bump like swelling on posterior aspect of heel (Black arrows). (b) Lateral radiograph showing Fowler angle (BDC) of 73o and slightly positive parallel pitch line. (c) Herniation of bursa (black arrow) along lateral border of Achilles tendon (TA). (d) Excision of the bursa. (e) Posterosuperior bony prominence (\*). (f) Excision of part of the bony prominence (\*). (g) Excised tissue. (h) Postoperative lateral radiograph showing osteotomy of the posterosuperior part of calcaneum.**



**Figure 2: Case No. 25. (a) Clinical picture of Haglund deformity or swelling (white arrows). (b) Fowler angle of 53o with slight pathological parallel pitch lines. (c) Intra-operative picture showing approach lateral to Achilles tendon (TA) and partially excised bursa (B) and a part of posterosuperior tynerosity (T) is visible. (d) Postoperative radiograph.**



**Figure 3: Case No 9. Lateral radiographs of bilateral Haglund disease showing calcification (white arrows) of both Achilles tendon.**

The key to successful outcome is the adequate resection of the bone. Sella et al highlighted the importance of enough bone being resected to allow decompression of the tendon and retrocalcaneal bursa. If adequate bone is not excised there will be persistent irritation of the soft tissue with subsequent recurrence and failure of surgical intervention.<sup>16</sup> Adequate resection of the periosteum on the medial side is difficult through the lateral approach. To successfully perform resection of periosteum on the medial side, Anderson et al suggested that tendon splitting approach allows for better surgical results.<sup>19</sup> But tendon splitting may result in delayed healing and excessive scar formation with adherence of overlying skin to tendon leading to shoe wear problems.

### CONCLUSION

The lateral approach to calcaneal osteotomy and surgical debridement is an effective alternative for those suffering from refractory Haglund deformity. The radiological parameters do not carry any significance and judgement to plan for surgery should be purely on clinical grounds. The chief limitation of the surgical procedure is prolonged recovery time. The prolonged recovery times should be explained to the patients before embarking on the journey of the surgical procedure.

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