



**"STUDY OF FUNCTIONAL OUTCOME OF SURGICAL EXCISION OF THE POSTERIOR CALCANEAL TUBEROSITY THROUGH A MEDIAL LONGITUDINAL INCISION WITH DEBRIDEMENT, REATTACHMENT OF THE ACHILLES TENDON USING BONE ANCHORS IN HAGLUND'S DEFORMITY"**

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### ABSTRACT

The aim of this study of functional outcome of surgical excision of the posterior calcaneal tuberosity through a medial longitudinal incision with debridement, reattachment of the Achilles tendon using bone anchors in Haglund deformity. Haglund deformity is a prominence in the postero superolateral aspect of the calcaneum. Haglund deformity is a prominence in the postero superolateral aspect of the calcaneum, causing a painful bursitis, which may be difficult to treat by non-operative measures alone. Various surgical methods are available for effective treatment of refractory Haglund's deformity. This study is to evaluate whether adequate resection of Haglund deformity by a lateral approach and reattachment of the Achilles tendon using bone anchor, provides good to excellent results. During the period from 2021 to 2022, 30 patients with had undergone resection of Haglund deformity using lateral approach and the outcome was analysed using AOFAS Ankle-Hind Foot Scale. 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). The mean AOFAS score at the follow up was 90/100, with the majority of patients reporting alleviation of pain at one year follow up. The medial approach to calcaneal osteotomy can be an effective treatment for those suffering from refractory Haglund deformity. However, the patient must be made aware of the duration of recovery being long. Complications included one recurrence of painful prominence, one wound infection, and one incisional neuroma. Surgical management consisted of excision of the posterior calcaneal tuberosity through a lateral longitudinal incision with debridement, reattachment of the Achilles tendon using bone anchors, and 4 weeks of postoperative immobilization. The outcome of these cases demonstrated that in those patients who fail nonoperative treatment, surgical treatment of Haglund's deformity produces a predictably good surgical result when performed using the technique described.

**KEYWORDS :** Haglund's deformity, Modified Allgower-Donati suture technique, EXCALIBUR SUTURE ANCHOR TI 2 mm With Needles

### INTRODUCTION

Posterior heel pain is a common complaint in both the athlete and the nonathlete. Haglund's deformity is an important cause of posterior heel pain and consists, radiologically, of prominence of the posterior superior calcaneal tuberosity or calcaneal bursal projection in association, clinically, with painful swelling of the overlying soft tissues in the area of insertion of the Achilles tendon.<sup>5,17,19</sup>

It has been referred to under many names including "pump-bump," in reference to a firm counter on women's dress shoes, i.e, pumps. "Winter heel" is also used, indicating the more common usage of closed shoes in winter, as distinct from backless slip-on-type shoes (or wedgies) worn in summer.<sup>21</sup>

Knobby heels, calcaneus altus, high prow heels, and cucumber heels are a few other names used. The condition seems to be more common in women, although it is not exclusive to them.

Review of medical literature indicates that initial treatment has generally been nonoperative.<sup>4,5,9,21</sup> Raising the heel of the shoe externally or internally or adding a heel cup or felt pad to raise the foot out of the shoe shifts the contact of the heel and decreases pressure from the counter. Removing or softening the counter also has the same effect. If the patient is a runner, decreasing weekly mileage and reducing workouts on hills has been advised. Nonsteroidal anti-inflammatory drugs have been useful in acute or early cases. If bursitis is associated with the condition, an injection of corticosteroid into the retrocalcaneal bursa has also been suggested.

Operative treatment is reserved for patients with recalcitrant

symptoms.<sup>1,2,7,11,14,16,20</sup> The purpose of this prospective study is to determine whether surgical treatment, including resection of a significant portion of the calcaneal tuberosity with debridement and reattachment of the Achilles tendon, is an appropriate treatment for recalcitrant Haglund's deformity. The results of surgical treatment and patient satisfaction were examined with respect to demographics, surgical technique, x-ray evaluation, and results, along with recommendations for management.

### MATERIALS AND METHODS

30 patients with 34 feet, including 4 patients with bilateral disease were treated for Haglund's deformity during a 2-year period (jan 2021- dec 2022) under Department of Orthopaedics, SRG Hospital and Medical College, Jhalawar who fulfilled the inclusion criteria operated for Haglund deformity by excision of the posterior calcaneal tuberosity through a medial longitudinal incision with debridement, reattachment of the Achilles tendon using bone anchors. These patients presented with symptoms of pain and a bony prominence in the heel at the insertion of the Achilles tendon. All patients had associated shoe wear restrictions. X-rays demonstrated a prominence of the posterior superior calcaneal tuberosity with or without a soft tissue prominence.<sup>13</sup> There were occasionally associated erosive changes in the calcaneus, as well as calcification at the insertion of the Achilles tendon and within the Achilles tendon itself.

Most of patients were initially treated nonoperatively. The average duration of nonoperative treatment was 24 weeks. This treatment included nonsteroidal anti-inflammatory drugs, local cortisone injection (1 mL of betamethasone 5 mg/1mL with 1mL of 1% lidocaine) into the retrocalcaneal

bursa, orthoses, heel lifts, posterior calcaneal donuts, horseshoe-shaped pads, shoe inserts with elevated heel, physiotherapy including flexibility and stretching exercises, shoe wear alterations, and casting or cast bracing.

The operations were performed by surgeons under Department of Orthopaedics, SRG Hospital and Medical College, Jhalawar. The patient was given a spinal anaesthesia and was positioned prone on the operative table with a thigh tourniquet applied. After Betadine prep and aseptic draping, a 4-cm linear skin incision was made 1 cm anterior and parallel to the medial border of the Achilles tendon, extending distally onto the calcaneus. This incision was carried down to the deep fascia. Hemostasis was achieved, and the medial border of the Achilles tendon was identified after retracting the arborizing branches of the lateral calcaneal nerve. The retrocalcaneal bursa was exposed, and if inflamed, it was excised. Subperiosteal dissection was then made at the insertion of the Achilles tendon onto the calcaneus, and 50% to 70% of the tendon insertion was elevated from medial to lateral at its attachment. Excision of the calcaneal prominence was accomplished with a osteotome as used by Keck and Kelly<sup>12</sup> under c-arm guidance. The size of the fragment measured 3 cm wide, 3 cm long, and 6 mm thick, and it included the posterior-superior prominence of the calcaneal tuberosity. Calcium deposits within the tendon were also excised if they were present. The Achilles tendon was reattached, using EXCALIBUR SUTURE ANCHOR TI 2 mm With Needles. This was done to insure that avulsion of the tendon would not occur during the healing period. The wound was irrigated with saline and antibiotic solution (1 g vancomycin). The wound was closed in Modified Allgower-Donati suture technique using 2-0 Vicryl. A anteroposterior GT slab applied with the ankle placed in 15° of plantarflexion.

Postoperative treatment included dressing of the wound at 3 days. At 4 weeks after surgery, the anteroposterior slab was removed and walking resumed. Physiotherapy was prescribed at this time.



Figure 1 preoperative x ray



Figure 2 medial longitudinal incision



Figure 3 intraoperative c-arm



Figure 4 closing wound by Donati suture

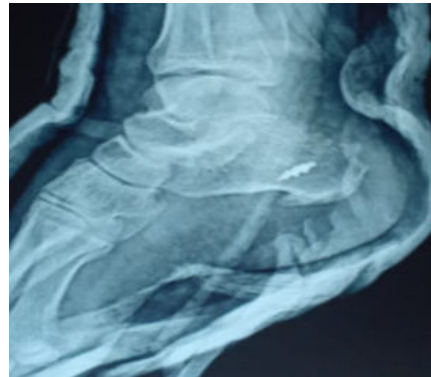


Figure 5 postoperative x ray



Figure 6 Anteroposterior GT slab

**RESULTS**

The mean AOFAS score at the follow-up was 85/100 (range: 60 to 97), an improvement of 51 points from the mean preoperative score. The majority of patients reported alleviation of pain at six month of follow-up.

The results presented are similar to outcomes previously reported by Brunner *et al*<sup>8</sup> and Sella *et al*<sup>22</sup> using AOFAS score.

In the operated group there were two complications that occurred during the period of the study. Three patients had superficial wound infection that promptly responded to antibiotic therapy and dressing. One patient developed an incisional neuroma. The wound was reexplored, and the neuroma was excised. At the time of our evaluation, the assessment of the heel was good. No one complained recurrence of symptoms.

**DISCUSSION**

Haglund's deformity is characterized by a painful prominence, and is often associated with thickening and tenderness of the overlying soft tissue at insertion of Achilles tendon.<sup>3-6,18</sup> Haglund's disease (or symptomatic pump-bump) is caused by pressure between the heel and the counter of the shoe.<sup>19</sup> Inflammation and thickening of the superficial Achilles bursa can also occur in systemic articular disorders as well as enthesopathies and should be borne in mind when investigating this condition. Operations that have been used to treat this condition have included simple excision of the superficial Achilles tendon bursa alone. When this was found to be inadequate, calcaneal osteotomy such as used by Keck and Kelly was added<sup>12</sup>. The previous authors also described resection of the superior prominence of the calcaneus and removal of the retrocalcaneal bursa. The surgical approach

used for excision of the posterior superior portion of the calcaneal tuberosity has also come under contention. Some authors prefer to use a lateral approach, and some use both a medial and lateral approach to insure adequate resection. Others use a posterior, either vertical or horizontal, approach. Reports of treatment results have been variable.<sup>1,2,7,10-12,14-16,21</sup>

We choose to use a medial approach because it lies away from the area of increased pressure from the shoe counter. If keloid occurs, it is not exposed to external pressure of the shoe. A single medial incision is adequate to access the entire posterior calcaneus and is also cosmetic in appearance. In addition, the single medial incision avoids surgery directly over the Achilles tendon and posterior calcaneus with the risk of wound-edge necrosis and wound dehiscence. This study was undertaken to examine the results of operative treatment in patients within the general population who were not high performance athletes, who had significant deformity, and who failed nonoperative (and in some cases failed operative) treatment. There was one patient who had severe symptoms of acute inflammation and in whom nonoperative management completely failed to relieve symptoms. In these patient, excision of the posterior superior calcaneal tuberosity effected an immediate and lasting relief of pain with an excellent result.

The results of our study suggest that calcaneal osteotomy produces outcome that justify surgical intervention in cases of Haglund deformity not responding for conservative treatment. Mean AOFAS scores for patients in this study were 86/100 and 80% of the patients responded that they would recommend the procedure to others suffering from Haglund deformity.

Adequate resection of the bone is required to produce a good clinical outcome. Sella et al highlighted the importance of enough bone being resected to allow decompression of the tendon and the retrocalcaneal bursa<sup>22</sup>.

Adequate resection of the periosteum on the medial side is difficult through lateral approach. Anderson *et al* suggested that tendon splitting approach allows adequate resection of periosteum on the medial side<sup>23</sup>.

The time needed by patients for return to normal activity after surgery for Haglund deformity has been reported. In our study, patients returned to normal function by 6 months following calcaneal osteotomy through lateral approach. Our results are similar to study reported by Saxena et al<sup>24</sup>.

Where the mean return to activity was 15 weeks and Anderson et al reported that patients return to normal activity by 6 months following surgery.

We recommend that a 3 cm x 3 cm portion of the posterior calcaneal tuberosity be excised. It should be 5-10 mm thick. Debridement of the Achilles tendon reduces the amount of bulk in the heel and minimizes the risk of recurrence.

Although we used EXCALIBUR SUTURE ANCHOR TI 2 mm With Needles. Because Excalibur Suture Screw Anchor Titanium is reliable and simple. Great pullout strength with UHMWPE Fiber Sutures which are preloaded and combined with needles. The design of the handle improves grip on handling. And the sutures are ready to use inside the handle. We think that this reduces the risk of bulky operative scar and foreign body reaction returning about the tendon insertion.

Our method mobilized at least 50% of the Achilles tendon attachment subperiosteally and then securely reattached it after excision of the prominence, using bone anchors. A recent study has shown that up to 75% of the Achilles tendon may be cut without losing strength or causing rupture.<sup>13</sup> This finding supports our clinical experience. We also immobilized the foot

and ankle for 4 weeks postoperatively. We had no ruptures or avulsions of the Achilles tendon noted, and no weakness of the gastrosoleus muscle was present on follow-up manual motor strength testing. This would be expected because the length of the gastrosoleus muscle unit was unchanged by the surgery. Excision of the posterior superior tuberosity of the calcaneus with reattachment of the Achilles tendon by suture anchors in patients who have Haglund's deformity provides an appropriate solution and produces a predictably good result in those who have failed nonoperative treatment.

## CONCLUSION

Our study suggests that, medial approach to calcaneal osteotomy can be an effective treatment for those suffering from refractory Haglund deformity. However the recovery period to obtain a maximum benefit following surgery is longer (6 months). We choose to use a medial approach because it lies away from the area of increased pressure from the shoe counter. If keloid occurs, it is not exposed to external pressure of the shoe. A single medial incision is adequate to access the entire posterior calcaneus and is also cosmetic in appearance. In addition, the single medial incision avoids surgery directly over the Achilles tendon and posterior calcaneus with the risk of wound-edge necrosis and wound dehiscence.

## ACKNOWLEDGMENT

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