



## Evaluation of Results of Minimally Invasive Endoscopic Management of Haglund Syndrome

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### Abstract

**Background:** The purpose of our study is to evaluate endoscopic treatment of Haglund's syndrome in which all patients showed a Haglund projection on radiography and none had a cavo-varus deformity. **Methods:** Our study included n=24 patients (30 heels) with a mean age of 32 years (range 26-44 years). They presented with posterior ankle impingement syndrome with Haglund's deformity on radiography and were resistant to conservative therapy for more than 6 months. They underwent two portal endoscopic surgeries in Prathima Institute 1 of Medical Sciences, Nagunur, Karimnagar between May 2016 and October 2019. **Results:** The mean follow-up was 24 months (range 6-41 months). In 27 heels, postoperatively we achieved negative parallel pitch lines on lateral radiographs. The average AOFAS score improved from 59.3±9.9 points preoperatively to 94.8±9.1 points at final evaluation ( $p<0.01$ ). There were sixteen excellent results, ten good results, two fair results, and two poor results. For the Ogilvie Harris score, there were seventeen excellent, ten good, one fair, and two poor results. The VAS for pain decreased from 6.8 ± 1.4 (range 5-10) preoperatively to 1.8±0.8 (range 0-4) ( $p<0.01$ ) at final evaluation. There were no obvious intra or post-operative complications. All patients were satisfied with the result of the operation. **Conclusion:** Endoscopic calcaneoplasty is a safe and effective minimally invasive treatment option for Haglund disease after failure of conservative treatment for 6 months.

**Keywords:** Haglund Disease, Endoscopic Calcaneoplasty

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### Introduction

Pain in the posterosuperior portion of the calcaneus can be caused by retrocalcaneal bursitis, enlargement of the superior bursal prominence of the calcaneus (Haglund's deformity), Achilles tendonitis or inflammation of an adventitious bursa between the Achilles tendon and the skin<sup>[1-9]</sup>. In 1928 the Swedish orthopaedist Patrick Haglund described a painful hindfoot and prominence in the area of the dorsal Haglund exostosis which was caused in his view by relatively rigid dorsal shoe mounts. Since then the painful bony prominence of the dorsal calcaneus has been described by Haglund deformity<sup>[10]</sup>. Haglund syndrome is

defined as the complex of symptoms involving the superolateral calcaneal prominence, retrocalcaneal bursitis, and superficial adventitious Achilles tendon bursitis<sup>[4-7]</sup>. A variety of procedures for the treatment of Haglund's syndrome including non-operative and operative methods are in use. The conservative therapy of Haglund syndrome includes the administration of NSAIDs, local corticosteroid injections, ultrasound treatments and appropriate shoe straightening<sup>[7]</sup>. Conservative treatment is successful in approximately 85 to 95% of patients<sup>[11, 12]</sup>. When there is the failure of conservative treatment for 6 months operative

therapy is indicated [13]. Operative treatment involves the removal of the posterosuperior prominence of the calcaneus and the inflamed bursa [14]. Many authors have reported good postoperative improvements via open surgical corrections [14-16]. However open surgical treatment is associated with different complications including skin necrosis, Achilles tendon avulsion, altered sensation and stiffness [17, 18]. An alternative to open surgery is a minimally invasive endoscopic procedure. The purpose of the study was to present our technique and our results with endoscopic calcaneoplasty where both retrocalcaneal bursitis and so-called "pump bump" described in a similar technique by van Dijk et al; [19] was addressed.

## **Materials and Methods**

After approved by the Medical Ethics Committee of Prathima Institute of Medical Sciences, Nagunur, Karimnagar, for this study, informed consent was obtained from all the patients who presented with persistent posterior ankle pain due to Haglund deformity after the failure of conservative treatment of 6 months. All patients provided written informed consent before participation.

### ***Inclusion criteria***

We included all patients with PAIS due to Haglund deformity who had -

Unsatisfactory improvement after conservative treatment for  $\geq 6$  months.

Absence of any previous surgical procedure on the same angle.

Patients are willing for surgery.

### ***Patient information***

This prospective study included 30 heels of 24 patients who underwent endoscopic calcaneoplasty after the failure of 6 months conservative treatment trial for Haglund deformity from May 2016 and October 2019 in Prathima Institute of Medical Sciences, Nagunur, Karimnagar. The ages of the patients were between 26-44 years (mean 32 years). There were 14 men and 10 women. The radiological examination before surgery documented in all cases a posterior superior calcaneal exostosis that showed friction to Achilles tendon on endoscopy. All patients included in the study had no clinical varus of the

hind neither foot nor cavus deformities. The average follow up was 30 months (2.5 years). None of the patients were lost to follow-up.

### ***Surgical technique***

We operated with the patient in a prone position. The patient is usually withdrawn downwards such that the foot and ankle are hanging freely over the edge of the operating table so that plantar and dorsiflexion of the ankle can be done freely. The operation is done under regional anesthesia and a thigh tourniquet is used. Dorsiflexion of the foot can be manipulated by the placement of the surgeon's body against the foot thus allowing both hands to freely manipulate the arthroscope and the surgical instruments the opposite leg being strapped to the thigh in the flexion position of the knee.

C arm was kept ready and in position from the start of the procedure. A needle is placed approximately 0.5 cm below the superior aspect of the calcaneus just lateral to the lateral margin of the Achilles tendon and confirms the lateral portal. A small vertical incision is then made through the skin. Separation of the subcutaneous tissue is made down to retrocalcaneal space. This is repeated by a blunt trocar. The 4 mm arthroscope is then introduced through this space. Under direct vision, a needle is next introduced just medial to the medial border of Achilles tendon at the same level as the lateral portal. This confirms the medial portal. The inflamed retrocalcaneal bursa is first visualized and is removed. It is removed by arthroscopic shaver. Then the FHL tendon is visualized on the posteromedial aspect of the ankle joint. The foot is then taken through a range of motion to visualize the exact site of impingement, usually due to a posterosuperior osteophyte. The posterosuperior bone rim of the calcaneus is removed with the help of a 4.5 mm arthroscopic burr. Care should be taken not to go far distally to the insertion of Achilles tendon. Throughout the procedure, the Achilles tendon is protected by keeping the closed end of the resector or the burr against the tendon. The resector is then reintroduced to clean the soft tissue debris and to smoothen off the rough edges. Finally, lateral radiography under the C arm confirms the amount of bone resected. Lastly, the skin is closed and a compression dressing is placed

**Postoperative protocol**

Elevation of foot done immediately the patients are encouraged to perform a range of motion exercises from 1<sup>st</sup> postop day. Partial weight-bearing was started on the second day. Full weight-bearing was allowed at the second postoperative week. Regular shoes were allowed after 3 weeks postoperatively. Returning to sporting activities was not allowed until 6 weeks.

**Statistical Analysis**

All quantitative variables are presented as the mean ± standard deviation. Comparisons between paired data such as the preoperative and postoperative VAS score, AOFAS scale score and the Ogilvie Harris score were performed using the Student t-test. The significance level was defined as p < 0.01. Data analysis was performed using SPSS software, version 17.0 (SPSS, Chicago, IL) and Microsoft excel. Based on the postoperative AOFAS score - excellent outcome (90-100), good (80-89), fair (70-79), poor (<70).

**Results**

The commonly involved age group was 31 - 40 years with n=16 (66.67%) male to female ratio was 1.4:1. A total of n=24 patients and 30 heels

of patients were included in the study. The mean age of the patients at the final follow-up visit was 32.0 ± 8.0 years range 26 – 44 years shown in table 1.

**Table 1:** Profile of patients age-wise and sex-wise

| Age     | Male | Female | Total (%) |
|---------|------|--------|-----------|
| 26 – 30 | 3    | 1      | 3(12.5%)  |
| 31 – 35 | 4    | 3      | 7(29.17%) |
| 36 – 40 | 5    | 4      | 9 (37.5%) |
| 41 – 45 | 2    | 2      | 4(16.67%) |
| Total   | 14   | 10     | 24(100%)  |

Average [AOFAS] Ankle hind foot score increased from mean values of 58.44 ± 2.34 (range 52-63) pre-operatively to 90.74 ± 2.9 post-operatively at the final follow-up. According to AOFAS, we had eighteen excellent results, four good results, one fair results, and one poor result. The mean increase in pain scores by values of > 15 points indicates a significant improvement in patients after the operative procedures. Similarly, the activity limitations scores increased by twice and Gait abnormality was also improved to a great extent in patients after the operation. Ankle-hind foot stability (anteroposterior, varus-valgus) corrections were also shown to improve after the operative procedures shown in table 2.

**Table 2:** Pre-operative and Post-operative scores based on AOFAS Ankle-Hind foot Score

| AOFAS Ankle-Hind foot Score                               | Preoperative Mean Scores ± SD | Postoperative Mean Scores ± SD |
|---|-------------------------------|--------------------------------|
| Pain  | 21.50 ± 5.56                  | 37.12 ± 3.35                   |
| Activity limitations, support requirements                | 4.63 ± 2.11                   | 8.14 ± 2.36                    |
| Maximum walking distance, blocks                          | 4.12 ± 1.1                    | 4.56 ± 0.8                     |
| Walking surfaces  | 3.98 ± 0.62                   | 4.31 ± 0.74                    |
| Gait abnormality  | 4.78 ± 1.97                   | 7.67 ± 1.69                    |
| Sagittal motion (flexion plus extension)                  | 5.52 ± 2.9                    | 7.57 ± 2.1                     |
| Hindfoot motion (inversion plus eversion)                 | 3.11 ± 0.87                   | 5.71 ± 0.33                    |
| Ankle-hind foot stability (anteroposterior, varus-valgus) | 4.5 ± 2.4                     | 7.01 ± 1.98                    |
| Alignment   | 6.3 ± 3.6                     | 8.65 ± 1.69                    |
| Total Scores  | 58.44 ± 2.34                  | 90.74 ± 2.9                    |

For the Ogilvie Harris score, there were seventeen excellent, ten good, one fair, and two poor results (table 3). VAS for pain decreased from 6.8 ± 1.4 (range 5-10) pre-operatively to 1.8± 0.8 (range 0 - 4) post-operatively. The mean duration of surgery was 40 ± 3.8 minutes (range 30-45). None of the patients was converted to open surgery. The average postoperative follow-up duration was 24 ± 8.6 months (range 6–41 months). Postoperative

lateral radiographs in 27 heels showed the achievement of adequate bony removal and negative parallel pitch lines. The mean time to resumption of professional activities was 6 weeks (range 4 - 8 weeks). On physical examination, no patients showed any signs of local tenderness & the forced dorsiflexion test findings were negative. No intra-operative & post-operative complications were noted overall patient satisfaction was high.

**Table 3:** Ogilvie Harris scores pre-operative and post-operative scores

| Ogilvie Harris score | Preoperative Mean Scores $\pm$ SD | Postoperative Mean Scores $\pm$ SD |
|----------------------|-----------------------------------|------------------------------------|
| Pain                 | 1.25 $\pm$ 1.68                   | 3.5 $\pm$ 0.74                     |
| Swelling             | 2.19 $\pm$ 0.94                   | 4.01 $\pm$ 0.98                    |
| Stiffness            | 3.78 $\pm$ 0.67                   | 4.25 $\pm$ 0.66                    |
| Activity limits      | 2.50 $\pm$ 0.93                   | 3.98 $\pm$ 0.77                    |
| Total Scores         | 9.72 $\pm$ 1.05                   | 15.74 $\pm$ 0.78                   |

## Discussion

Initial management of heel pain in patients with diagnosed Haglund deformity includes NSAID, padding, and avoidance of tight shoes, stretching and strengthening of the gastrocnemius-soleus complex, activity modification [19]. A single infiltration in the retrocalcaneal bursa with corticosteroids is another modality of treatment after the above-mentioned treatments have failed. But repeated infiltration has a potential risk for rupture of the Achilles tendon [17]. Literature shows a mixed result on the success rate of conservative treatment. According to the study of Myerson and Clement 85-95% of patients improved with conservative treatment [11, 12]. On the other hand Sammarco and Taylor reported a failure rate of 65% with conservative treatment for an average of 62 weeks [20]. The operative treatment of posterior ankle impingement syndrome due to Haglund deformity after the failure of conservative measures aims at the prevention of impingement of the retrocalcaneal bursa between the Achilles tendon and the os calcis. This can be accomplished by the removal of the inflamed retrocalcaneal bursa followed by resection of the super posterior calcaneal prominence. Superoposterior calcaneal resection can be performed by open surgical procedure through the posterolateral incision, a posteromedial incision, or both. Several complications, such as weakening of the bone after removal of a large part of the posterosuperior calcaneus, recurrent pain, unpleasant scars or tenderness around the scars, Achilles tendon avulsion, stiffness of the Achilles tendon, and altered sensation around the heel have also been reported following open Procedure [18-23]. Angermann et al; [22] operated on 40 heels in 37 patients with Haglund deformity using a posterolateral incision and

allowed immediate weight-bearing. Complications included one case of superficial heel infection, one case of a hematoma, and two cases of delayed skin healing. At an average follow-up of 6 years, 50% of the patients were cured, 20% were improved, 20% were unchanged, and 10% were worse. Huber and Waldis [13] found a considerable amount of residual complaints in 32 patients who were examined clinically and radiologically at a mean follow-up of 18.6 years after being treated for Haglund's exostoses by resection of the posterosuperior calcaneal prominence. Fourteen of the 32 patients had soft tissue problems, including excessive scar formation and persistent swelling. Not enough bone was removed in 8 patients and 2 patients had new bone formation; both caused persistent painful swelling. In 8 patients a disturbance in Achilles tendon function was noted. Thus the open operative treatment of symptomatic Haglund deformity requires good exposure to remove an adequate amount of bone. Conversely, a large exposure is accompanied by a significant percentage of wound soft tissue problems.

Endoscopic calcaneo-plasty offers a good alternative to open resection. Van Dijk et al. described the use of retrocalcaneal endoscopy for the treatment of Haglund disease and retrocalcaneal bursitis in 2000 [14]. Jerosch and Nasef [24] reported 7 excellent and 3 good Ogilvie-Harris scores after a mean follow-up period of 5.2 months in their study on 10 patients undergoing endoscopic calcaneoplasty. There were no intra- or postoperative complications. Leitze et al; [25] compared the results of 33 endoscopic decompressions of the retrocalcaneal space with 17 open surgeries. Both groups had improvements in AOFAS scores although the difference was not significant (p=0.115). Complication rates were slightly different (infection: 3% and 12%; altered sensation: 10% and 18% scar tenderness: 7% and 18%). In our study of 24 patients (30 heels) of Haglund syndrome undergoing endoscopic treatment, we got 16 excellent, 10 good, 2 fair & 2 poor results according to AOFAS scoring at a mean follow up of 24 months. There were no intraoperative & postoperative complications. Overall patient satisfaction was high. Arthroscopic surgery

allows for excellent medial and lateral visualization. Thus, the Achilles tendon and its insertion and the calcaneus can be inspected and treated. This minimizes the chance of removing and disturbing the Achilles tendon attachment. Other advantages of the endoscopic technique are those complications, such as wound dehiscence, painful or unsightly scars, and nerve entrapment within the scar can be avoided.

## Conclusion

Whether the operation is performed by endoscopic or open technique, enough bone has to be removed to prevent impingement of the retrocalcaneal bursa between the calcaneus and Achilles tendon. The endoscopic calcaneoplasty has several advantages, including low morbidity, functional after treatment, outpatient treatment, excellent scar healing, a short recovery time, and quick sports resumption, in comparison with the open technique.

**Conflict of Interest:** None declared

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