



Endoscopic calcaneoplasty: five-year results

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Objective: The aim of this study was to evaluate the results of the endoscopic calcaneoplasty technique for the treatment of retrocalcaneal bursitis and Haglund's disease.

Methods: This study included 30 feet of 28 patients who underwent endoscopic surgery for Haglund's disease between 2003 and 2011. The inflamed bursa and posterosuperior surface of the calcaneus were removed with a shaver and bone resection performed until there was no friction on the Achilles tendon with the ankle in dorsiflexion. All patients were discharged on the same day and allowed full weight-bearing at the second postoperative week. American Orthopedic Foot and Ankle Society (AOFAS) scores and patient satisfaction were recorded.

Results: Average follow-up was 58.4 months. AOFAS scores significantly improved from a postoperative average of 52.6 points to 98.6 points at the final evaluation ($p<0.005$). All patients were satisfied with the result of the operation.

Conclusion: Endoscopic calcaneoplasty with the patient in the prone or supine position appears to be a safe and effective surgical procedure for the treatment of retrocalcaneal bursitis and Haglund's disease.

Key words: Calcaneoplasty; Haglund's disease; retrocalcaneal bursitis.

Haglund's disease is one of the most common causes of posterior heel pain. First described by Haglund in 1928, the disease is caused by mechanical induced inflammation of the retrocalcaneal or supracalcaneal bursa and superolateral calcaneal prominence.^[1] Haglund's disease, syndrome, or deformity, also referred to as 'pump bump', is defined as the complex of symptoms involving the superolateral calcaneal prominence, retrocalcaneal bursitis, and Achilles tendinitis.^[2] In Haglund's syndrome, pain is typically felt when the patient begins to walk after a period of rest. Pain also can be reproduced by squeezing the thickened bursa in a mediolateral direction, just anterior to the Achilles tendon.

Conservative treatment, such as avoidance of tight shoes, activity modification, non-steroidal anti-inflammatory medication, the use of padding, physical therapy, and local corticosteroid injections into the retrocalcaneal space are commonly recommended as the first step of treatment.^[3] Conservative treatment has been found to be successful in approximately 85 to 95% of patients.^[4,5] Operative treatment is recommended upon failure of conservative treatment.^[6] Two different operative techniques for Haglund's disease have been described; the open and endoscopic approaches. Resection of the posterosuperior part of the calcaneus and inflamed bursa with posterolateral and posterome-

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dial approaches are indications for the open technique. Wedge osteotomy of the calcaneus has also been suggested by other authors.^[7-9] However, due to the high complication rates and delay of return to preoperative activity level following open surgery, the endoscopic method has gained popularity.^[10]

The aim of this study was to provide five-year follow-up results and evaluate the reliability of the endoscopic technique for the treatment of retrocalcaneal bursitis and Haglund's disease.

Patients and methods

This study included 30 feet of 28 patients (18 male, 10 female; average age: 37 years, range: 19 to 64 years) operated by the same author between 2003 and 2011. Both feet of the two bilateral cases were operated in the same session. Five patients were professional athletes. Indication for surgery was retrocalcaneal pain due to bursitis and or Haglund's deformity, resistant to conservative therapy.

All patients had soft tissue swelling at the lateral and/or medial side of the Achilles tendon and painful stretching of the tendon. Palpation was painful on the posterosuperior calcaneus at the lateral and/or medial side. Diagnosis was confirmed by examination of magnetic resonance imaging (MRI) and radiographs (Figs. 1 and 2). All the patients were treated conservatively (orthotics use, heel lift or cup use, open-back shoe wear, non-steroidal anti-inflammatory agents, rest, ice, activity modification and stretching exercises) for a minimum of 6 months. Five patients had received prior steroid injections in different centers. Local steroid injections were not performed in our practice due to tendon rupture risk. Additionally, 4 of the 5 professional athletes had received prior platelet-rich plasma (PRP) injections in other places.

Both patients who underwent bilateral operations were males with seronegative arthropathies (one with ankylosing spondylitis and the other with psoriatic arthritis). The other patients had no accompanying rheumatologic diseases.

Under general anesthesia, 1 gram of intravenous cefazolin sodium was administered for prophylaxis. The patient was positioned in a prone (22 feet) or supine (8 feet) position to allow the foot and ankle to hang over the edge of the table (Fig. 3). The ankle was supported with a small bolster. A thigh tourniquet was inflated following exsanguination of the leg using a rubber bandage. First, the lateral portal was established just above the superior aspect of the calcaneus lateral to the Achilles tendon. With the direct visualization of the medial side,

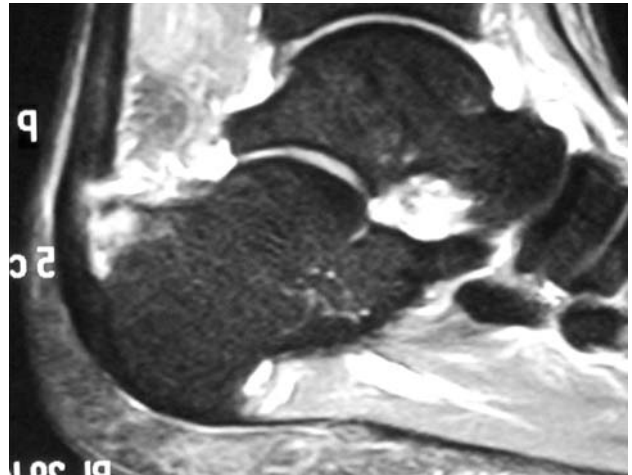


Fig. 1. Preoperative MR image.



Fig. 2. Lateral radiography of the calcaneus before the surgery.

a spinal needle was introduced to the superior aspect of the calcaneus and the medial portal was created. A resector was introduced from the medial portal to remove the inflamed bursa and superior surface of the calcaneus (Fig. 4). Bone resection was performed until there was no friction to the Achilles tendon with the ankle in dorsiflexion. The Achilles tendon is protected by keeping the cutter surfaces of shavers and burrs away from the tendon. If required, fluoroscopic evaluation can be used to evaluate the amount of bone removed. No drains were used. Wounds were closed and compressive dress-



Fig. 3. The patient in the prone position.



Fig. 4. The 4-mm full-radius resector in use for resection of the retrocalcaneal bursa.

ing applied. Mean tourniquet time was 38 (range: 20 to 90) minutes. For hematoma control, compressive ice was applied for 72 hours.

All patients were discharged on the day of the operation. Patients were allowed to perform range of motion exercises on the first postoperative day and weight-bearing as tolerated on crutches after evaluation on the third postoperative day. Full weight-bearing was allowed at the second postoperative week.

Patients were re-examined after an average follow-up period of 58.4 (range: 24 to 75) months. The American Orthopedic Foot and Ankle Society (AOFAS) ankle-hind foot scores, a 100-point scale evaluating pain, activity limitations, walking distance, stability, alignment and range of motion, were calculated pre- and postoperatively.^[11] Satisfaction from the surgery and incisions also questioned at the final follow-up visit. Nonparametric data were analyzed using the Mann-Whitney U test and *p* values less than 0.005 were considered statistically significant.

Results

Average follow-up was 58.4 (range: 24 to 75) months. Average preoperative AOFAS scores were 52.6 (range: 24 to 75) points, and 98.6 (range: 90 to 100) points at the final evaluation. This improvement was statistically significant ($p < 0.005$). All patients were satisfied with the result of the operation and stated that, under similar circumstances, they would undergo the surgery again. Team training was allowed at the 6th week and full return to sports allowed at the 3rd month for the five professional athletes. All patients were also pleased with the small incisions inherent to the endoscopic surgery. There were no intraoperative or postoperative complications (Fig. 5).

Discussion

Conservative treatment, including NSAID use, use of padding, stretching and strengthening of the gastrocnemius-soleus complex, activity modification and avoidance of tight shoes, is first recommended for the treatment of Haglund's disease.^[12] Most cases of posterior heel pain can be treated effectively with conservative methods. Steroid injection can be used when conservative treatments fail, although repeated applications may cause Achilles tendon rupture.^[13] For this reason, no steroid injections were applied to any of our patients. Myerson and Clement reported success rates of 85% to 95% with conservative treatment.^[4,5] Leitze et al. reported that approximately 10% of their patients remained symptomatic following a period of conservative treatment and sought operative treatment.^[8] Conversely, Sammarco and Taylor reported a failure rate of 65% (39 heels in 65 cases) with conservative treatment for an average of 62 (range: 4 to 260) weeks.^[9]

Patients who are unresponsive to conservative treatment are candidates for operative treatment. The literature mainly reports the results of open surgery, including calcaneal osteotomy and retrocalcaneal bursa excision. Previous authors have reported successful

outcomes in 50 to 100% of patients treated with open calcaneal osteotomy or resection.^[8,9] 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 procedures.^[9,14-17]

In a study by Angermann^[16] on 40 patients (40 heels) who underwent resection of the posterosuperior aspect of the calcaneus using posterolateral incision and allowed immediate weight-bearing for 37 patients, 50% of the heels were cured, 20% were improved and 10% were worse after an average of 6 (range: 1 to 12) years. Complications included one case of superficial heel infection, one case of hematoma, and two cases of delayed skin healing. Similarly, Huber and Waldis^[6] reported the results of 32 patients treated with the resection of the posterosuperior calcaneal prominence. Soft tissue problems including excessive scar formation and persistent swelling were present in 14 cases. Seventy-three percent of patients had good results and 20% acceptable after a mean follow-up of 18.6 years.

Van Dijk et al. described the use of retrocalcaneal endoscopy for the treatment of Haglund's disease and retrocalcaneal bursitis in 2000.^[10] Few other articles on this topic have been reported in the literature.^[17,18]

Today, endoscopic surgery appears to be an alternative to open surgery. Jerosch and Nasef^[9] 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.^[8] compared the results of 33 endoscopic decompressions of the retrocalcaneal space with 17 open surgeries. Both groups had improvements in AOFAS scores (range: 61.8 to 87.5, $p < 0.001$ for endoscopic group; range: 58.1 to 79.3, $p = 0.006$ for open surgery group) 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%). One procedure was converted from endoscopic to open surgery due to equipment failure.

Similarly, in a study on 39 feet undergoing endoscopic calcaneoplasty with a follow-up of 4.5 years, Scholten and van Dijk^[17] reported 2 patients who were unresponsive to treatment and 30 with excellent to good results according to the Ogilvie-Harris score. One patient had a small hypoesthetic area over the heel; there were no other operative complications or postoperative infection



Fig. 5. Lateral radiography of the calcaneus after the surgery.

or unsightly scars. Jerosch et al.^[18] performed endoscopic calcaneoplasty on 81 patients in between 1999 and 2005. Mean follow-up period was 35.3 (range: 12 to 72) months. Thirty-four patients presented good, 41 excellent, 3 fair and 3 poor results.

The time to return to sports is important for professional athletes and has been reported as up to 9 months for open procedures and an average of 12 (range: 6 to 24) weeks with endoscopic surgery.^[12] In our series, training with the team was allowed at the 6th week and full return to sports was allowed at the 3rd postoperative month for the 5 professional athletes.

Surgery can be performed in the supine or prone position. Prior to the study, the prone position was preferred for endoscopic calcaneoplasty. Two patients were operated in the supine position due to comorbidities like obesity and cardiovascular problems and it was noted that surgery in the supine position is as easy for the surgeon as the prone position and more comfortable for the patients. Consequently, the supine position became the position of preference. When using the supine position, it is important to place a support under the knee to ensure that the scope and shaver do not touch the edge of the operating table.

Operating time can also be a concern. Leitze and Jerosch stated that while endoscopic procedure has a steep learning curve, surgery time declined to 35 from

an average of 46 minutes in Jerosch's series and Leitz reported a decline from two hours to an average of 30 minutes with experience.^[8,19] We also found that operating times started at approximately 90 minutes and declined to 20 to 30 minutes at the end. This is consistent with other findings, confirming that when performed by experienced surgeons, endoscopic calcaneoplasty is not time consuming and can be much faster than traditional open procedures.^[12] Marking the superior aspect of the calcaneus under fluoroscopic control with a marker pen may be useful for surgeons who are new to this endoscopic technique.

In conclusion, retrocalcaneal endoscopy may be the procedure of choice in the treatment of Haglund's disease considering its advantages of direct visualization of the Achilles tendon, removal of the symptomatic retrocalcaneal bursa under direct vision, optimum amount of bone removal and improved functional rehabilitation. It is especially important for professional athletes as endoscopic treatment leads to an earlier return to sport. The steep learning curve and risk of damage to the Achilles tendon are the disadvantages of the endoscopic procedure.

Conflicts of Interest: No conflicts declared.

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