



COMBINATION OF ZADEK OSTEOTOMY AND ACHILLES TENDON RE-ATTACHMENT IN SEVERE HAGLUND DEFORMITY: A CASE REPORT

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ABSTRACT

Haglund deformity refers to a bony exostosis on the posterosuperior aspect of the calcaneus, often causing retrocalcaneal bursitis and Achilles tendinopathy. Conservative treatments, including physiotherapy and medication, may not relieve symptoms in severe cases. Surgical intervention is indicated when non-operative treatments fail. This report highlights a case of severe Haglund deformity managed with Zadek osteotomy and Achilles tendon re-attachment. Case Presentation: A 45-year-old female presented with 2 months of severe right heel pain and a 2-year history of a prominent bump. Physical therapy yielded no improvement. Clinical and radiographic evaluation confirmed Haglund deformity with insertional Achilles tendinopathy. Surgical treatment involved Zadek osteotomy, fixation with screws, and Achilles tendon re-attachment using a suture anchor. The combined approach addressed both the bony deformity and tendon degeneration. Post-operative outcomes showed significant improvement. At the 3-month follow-up, the patients Visual Analog Scale (VAS) pain score decreased from 7/10 to 1/10, and the American Orthopaedic Foot & Ankle Society (AOFAS) Ankle-Hindfoot score improved from 55 to 90. The range of motion was near normal, and functional recovery was excellent. This case demonstrates the effectiveness of combining Zadek osteotomy and Achilles tendon re-attachment for treating severe Haglund deformity. This approach provided significant pain relief and functional recovery, making it a viable option for patients with similar conditions refractory to conservative management.

Keywords: achilles tendon; case report; haglund deformity; zadek osteotomy

How to cite (in APA style)

Kusuman, K., Subawa, I. W., & Ismail, M. D. (2025). Combination of Zadek Osteotomy and Achilles Tendon Re-Attachment in Severe Haglund Deformity: A Case Report. *Indonesian Journal of Global Health Research*, 7(2), 1205-1212. <https://doi.org/10.37287/ijghr.v7i2.5679>.

INTRODUCTION

The term Haglund deformity is often used incorrectly to represent any swelling or enlargement around the insertion of the Achilles, but a true Haglund deformity refers to a large exostosis off the posterosuperior aspect of the calcaneal tuberosity located anterior to the Achilles tendon (Mousa et al., 2023; Zhou et al., 2023). Protecting the tendon from this tuberosity, the retrocalcaneal bursa lies between the tuberosity and the Achilles tendon just anterior and proximal to the Achilles insertional footprint. It is theorized that increased or repetitive abrasion of the tendon against tuberosity creates inflammation of retrocalcaneal bursa (retrocalcaneal bursitis). With prolonged inflammation and worsening symptoms, degenerative changes occur and osteophytes form within the tendon. (Doğan & Uçar, 2023; Fauzi, 2022) In addition to Haglund deformity and its associated retrocalcaneal bursitis, a superficial bursitis may cause symptoms (Choo et al., 2020).

This superficial bursa separates the Achilles tendon from the overlying skin. With insertional thickening from tendinosis and calcification, this peritendinous bursa becomes inflamed by chronic irritation from a shoe heel counter. (Zhou et al., 2023) Depending on the nature of the symptoms (e.g., retrocalcaneal bursitis associated with Haglund deformity versus

peritendinous bursitis associated with chronic tendinosis), effective management strategies for Haglund deformity include both conservative and surgical approaches. Conservative measures such as physical therapy, orthotics, and anti-inflammatory medications aim to alleviate symptoms, though they often provide only temporary relief.(Agostinho et al., 2020; Patch et al., 2023) Surgical intervention, on the other hand, offers a definitive solution by reshaping the bony prominence and relieving the impingement on surrounding soft tissues. Recent advancements in surgical techniques have demonstrated promising outcomes, allowing for more precise correction with minimal disruption to surrounding structures.(Anastasio et al., 2023)Despite these advancements, there remains a lack of consensus on optimal treatment modalities, underscoring the need for further research. This paper explores the current landscape of Haglund deformity management, reviewing both conservative and surgical approaches. By analyzing patient outcomes and discussing the factors that influence treatment efficacy, this study aims to contribute to a deeper understanding of how best to manage this prevalent and often debilitating condition.

METHOD

This report highlights a case of severe Haglund deformity managed with Zadek osteotomy and Achilles tendon re-attachment. Case Presentation: A 45-year-old female presented with 2 months of severe right heel pain and a 2-year history of a prominent bump. Physical therapy yielded no improvement. Clinical and radiographic evaluation confirmed Haglund deformity with insertional Achilles tendinopathy. Surgical treatment involved Zadek osteotomy, fixation with screws, and Achilles tendon re-attachment using a suture anchor.

RESULT

Patient Presentation

A 45-year-old female patient was referred to an orthopedic specialist with complaints of severe pain in the right heel, which had been present for the past 2 months. The pain was sudden in onset and progressively worsened, accompanied by a noticeable bump that had been present for 2 years. The patient had undergone 12 sessions of physical therapy since January without any improvement in her symptoms. On physical examination, swelling and deformity were observed in the right ankle region, with tenderness over the calcaneus. The distal range of motion was active and intact. The diagnosis was confirmed as insertional Achilles tendinitis secondary to Haglund's deformity in the right ankle. The treatment plan includes bone spur debridement, with an additional option for combined Zadek osteotomy and Achilles tendon re-attachment to address the condition.



Figure 1. The obvious of Haglund deformity (red arrow) at the right heel



Figure 2. Plain radiograph AP/Lateral view of right foot and ankle show a bony mass at the right calcaneus bone

Surgical Procedure

The patient was positioned prone on the operating table to allow optimal access to the posterior heel. A posterior approach incision was made over the calcaneus, carefully deepened layer by layer until the bone was identified. Upon exposure, a Haglund deformity was visualized. A Zadek osteotomy was performed on the calcaneus, and temporary fixation was achieved using a wire (Nordio et al., 2019). Intraoperative imaging with a C-arm was utilized to confirm proper reduction and alignment. Once satisfactory, a 6.5 mm half-threaded cancellous screw of 55 mm length and a 4.0 mm half-threaded cancellous screw of 50 mm length, along with a ring washer, were inserted to secure the osteotomy site. Additionally, the Achilles tendon insertion was reattached using a 2.7 mm suture anchor. Stability of the fixation was assessed, and after confirming it was stable, a foreslab was applied to the operated area. The estimated blood loss during the procedure was 50 cc.



Figure 3. Intra operative evaluation using C-arm



Figure 4. (A) Post surgical procedure clinical pictures, (B) Right Ankle plain radiograph AP/Lateral View after surgical procedure

Follow up

At the 3-month post-surgical follow-up, the patient reported significant improvement in pain and function following the combined Zadek osteotomy and Achilles tendon re-attachment procedure. The Visual Analog Scale (VAS) score for pain showed a marked reduction, improving from an initial 7/10 preoperatively to 1/10 during this evaluation, indicating only minimal discomfort with activity. Additionally, Range of motion (ROM) in the right ankle was assessed, showing near-complete restoration. The dorsiflexion and plantarflexion were within functional limits, with mild stiffness noted in extreme ranges. The patient's active ROM improved compared to pre-surgery, where motion was limited due to pain and deformity. The American Orthopaedic Foot & Ankle Society (AOFAS) Ankle-Hindfoot Score, which assesses pain, function, and alignment, demonstrated significant progress. Preoperatively, the patient's score was 55, reflecting major limitations due to pain and deformity. At the 3-month mark, the AOFAS score improved to 90, indicating excellent outcomes in pain reduction, mobility, and overall foot alignment. The patient expressed satisfaction with the procedure, noting substantial relief from the heel pain that had persisted for two years prior to surgery. No complications were observed, and the patient was advised to continue with a gradual return to normal activities, including physical therapy to further enhance mobility and strength.



Figure 5. Clinical picture 3 months following surgery

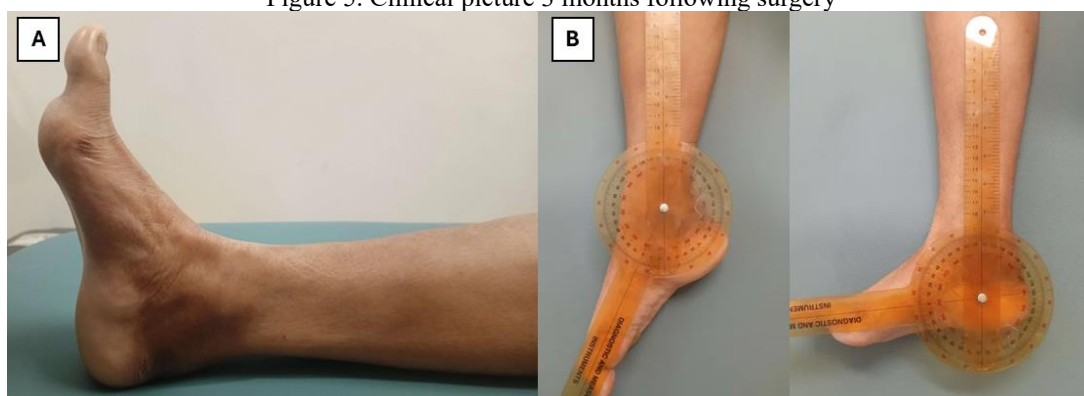


Figure 6. ROM evaluation 3 months after surgery showing a near complete restoration of ROM

DISCUSSION

Haglund deformity, a bony prominence on the posterior aspect of the calcaneus, often presents a significant clinical challenge, especially when associated with chronic Achilles tendinopathy.(Sung et al., 2023; Tang et al., 2022) Patients with severe Haglund deformity frequently experience posterior heel pain, retrocalcaneal bursitis, and Achilles tendon irritation. The management of this condition involves both conservative and surgical approaches, depending on the severity of the symptoms and the failure of non-surgical treatments.(Fauzi, 2022; Shaalan et al., 2022; Usman et al., 2022) The current case report

highlights the use of a combination of Zadek osteotomy and Achilles tendon re-attachment to address a severe Haglund deformity in a patient with chronic Achilles tendinopathy. The underlying pathophysiology of Haglund deformity is linked to an abnormal bony growth on the superior posterior aspect of the calcaneus, which can exert mechanical stress on the overlying soft tissues, particularly the Achilles tendon and retrocalcaneal bursa. This repetitive mechanical irritation often leads to inflammation and degenerative changes in the Achilles tendon. The development of calcific deposits and insertional tendinopathy exacerbates the condition, making conservative treatments like physiotherapy, orthotics, and corticosteroid injections insufficient in severe cases. (Bohdan et al., 2020; Fauzi, 2022)

In cases of severe deformity with significant Achilles tendinopathy, surgical intervention is often warranted (Ebben et al., 2022). The Zadek osteotomy, a dorsal closing wedge osteotomy of the calcaneus, is a proven method to reduce the posterior prominence of the calcaneus and relieve mechanical stress on the Achilles tendon. This technique not only addresses the bony deformity but also improves the biomechanics of the hindfoot by altering the axis of the calcaneus, thus redistributing the load away from the Achilles insertion. (Zheng et al., 2020) The Achilles tendon is a critical structure in the posterior foot and is often compromised in patients with Haglund deformity. In this case, the decision to re-attach the Achilles tendon post-osteotomy was made due to the extensive degeneration and possible partial tearing observed intraoperatively. Re-attaching the tendon ensures restoration of function and reduces the risk of future rupture or further degenerative changes. (Strasser & Farina, 2021) A combination of both procedures Zadek osteotomy and Achilles tendon re-attachment addresses the dual pathology in severe cases: the bony deformity and the compromised tendon. (Akoh & DeOrio, 2021)

The patient in this case had a long history of posterior heel pain that had not responded to conservative measures. Clinical examination revealed a prominent Haglund deformity with associated tenderness along the Achilles tendon and retrocalcaneal bursa. Imaging confirmed the presence of a large posterior calcaneal spur and signs of chronic Achilles tendinopathy. Given the severity of deformity and the extent of tendon involvement, a combined surgical approach was indicated. The Zadek osteotomy was performed to reduce the mechanical impingement caused by the calcaneal prominence, while the Achilles tendon was carefully detached, debrided of degenerative tissue, and re-attached using a suture anchor technique. This combined approach allowed for the correction of the bony deformity and the restoration of Achilles tendon integrity. (Akoh & DeOrio, 2021; Hall et al., 2024) Post-operatively, the patient's recovery was uneventful, and the patient demonstrated significant improvement in both pain and function at three months following surgery. These results are consistent with other studies that have reported favorable outcomes with Zadek osteotomy in combination with Achilles tendon procedures for Haglund deformity. Previous study retrospectively observed 50 patients undergoing Zadek osteotomies for Haglund deformity had a significant improvement of postoperative AOFAS and VISA-A, and VAS score. (Tourne et al., 2022) Additionally, several previous systematic review and meta-analysis demonstrated that both open and endoscopic surgery for Haglund's deformity has shown to achieve good results, significantly improving functional outcome scores such as AOFAS scores and patient satisfaction post operatively. Open surgery for Haglund's deformity is non-inferior to endoscopic surgery. (Bakaes et al., 2024; Yuen et al., 2022)

However, one must consider the potential complications of the combined approach. Risks include sural nerve entrapment, incisional dehiscence, derangement of the achilles tendon repair and development of ectopic bone at the achilles insertion or retrocalcaneal space

become the most common complication after this procedure. The careful handling of soft tissues and meticulous post-operative care are crucial to minimizing these risks.(So et al., 2024; Xu et al., 2023)Rehabilitation following this combined procedure is key to optimizing the outcome.(Zifa et al., 2023) In this case, a staged rehabilitation protocol was implemented. Initially, the patient was placed in a splint and instructed to remain non-weight-bearing for six weeks to allow for proper tendon healing. Gradual weight-bearing was introduced with the use of a walking boot, followed by physical therapy focused on strengthening the calf muscles and improving range of motion in the ankle. Full weight-bearing and return to sport-specific activities were permitted after three months, with ongoing monitoring for signs of recurrence or complications.

The early postoperative results appear promising, however, complications such as recurrence, sural nerve entrapment, and ectopic bone formation could develop over a longer timeframe. Additionally, the short follow-up does not allow for an assessment of the long-term functional outcomes and durability of the surgical intervention, nor does it capture potential changes in the patient's quality of life and activity levels over time. Extended follow-up would be valuable to assess whether the initial improvements in pain and function are sustained and to provide a more thorough evaluation of the procedure's long-term success.

CONCLUSION

This case illustrates the successful management of a severe Haglund deformity using a combination of Zadek osteotomy and Achilles tendon re-attachment. The surgical approach effectively addressed both the bony deformity and the degenerative Achilles tendon, resulting in significant pain relief and functional improvement. This combined approach is a viable option for patients with severe Haglund deformity and Achilles tendinopathy, particularly when conservative treatments have failed. The favorable outcome in this case is consistent with current literature and emphasizes the importance of a comprehensive surgical strategy in complex cases of posterior heel pain.

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