



DEGENERATIVE TENDO-ACHILLES RUPTURE MANAGED WITH GASTROC- SOLEUS RECESSION AND FHL TENDON REPAIR

Orthopaedics

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ABSTRACT

Background: Chronic degenerative Achilles tendon ruptures are difficult to manage due to tendon retraction and poor tissue quality. Flexor Hallucis Longus (FHL) tendon transfer with gastroc-soleus recession offers a reliable reconstructive solution. **Methods:** Fifteen patients with chronic full-thickness Achilles tendon ruptures (>4–6 weeks) were treated using FHL tendon transfer and proximal gastroc-soleus recession. Functional outcomes were assessed using the AOFAS ankle-hindfoot score. **Results:** The mean AOFAS score improved from 58 pre-operatively to 96 post-operatively. All patients achieved tip-toe stance with minimal functional loss of the hallux. Minor complications included one wound dehiscence and two superficial infections. **Conclusion:** FHL transfer with gastroc-soleus recession is a safe and effective technique for reconstructing chronic degenerative Achilles ruptures, offering excellent functional outcomes and early mobilization.

KEYWORDS

Degenerative Achilles tendon rupture, Flexor hallucis longus transfer, Gastroc- soleus recession.

INTRODUCTION

The Achilles tendon is the largest and strongest tendon in the human body, playing a crucial role in gait and lower limb propulsion. Despite its strength, it is vulnerable to degeneration and rupture, particularly in middle-aged individuals who are physically active. Degenerative Achilles tendon ruptures are often silent and progressive, typically caused by repetitive microtrauma, poor vascularity in the watershed zone (2–6 cm above the calcaneal insertion), and predisposing systemic factors such as diabetes mellitus, obesity, rheumatologic conditions, and use of fluoroquinolones or corticosteroids [1,2].

When a rupture remains untreated for more than 4–6 weeks, it is considered chronic, often presenting with tendon retraction, muscle atrophy, and scar formation [3]. These changes render direct end-to-end repair difficult, especially in cases with tendon gaps exceeding 2–3 cm. Therefore, tendon transfer, grafting, or lengthening techniques are commonly used to bridge the defect and restore function [4,5].

Among various tendon transfers, the Flexor Hallucis Longus (FHL) is most preferred due to its proximity, strong plantarflexion power, and parallel line of pull relative to the Achilles tendon [6]. FHL also retains a robust blood supply and shares a common synovial sheath with the Achilles, making it biologically suitable for integration [7].

Additionally, proximal gastrocnemius-soleus recession can provide extra length and reduce repair site tension in chronic ruptures. However, this must be performed cautiously to avoid weakening the triceps surae complex [8]. Combining FHL transfer with proximal recession offers the dual advantage of mechanical strength and improved biological healing, especially in neglected degenerative ruptures.

This study evaluates the clinical and functional outcomes of treating chronic degenerative Achilles tendon ruptures using a combination of FHL tendon transfer and gastroc-soleus recession, and reviews associated complications and recovery over a two-year follow-up period.

MATERIALS AND METHODS

This prospective study including 15 patients was conducted at our tertiary care centre to evaluate the clinical and functional outcomes of patients with chronic degenerative Tendo-Achilles ruptures with emphasis on the surgical technique, using a combination of Flexor Hallucis Longus (FHL) tendon transfer and proximal gastroc-soleus recession.

Surgical Technique

Patients were positioned prone under spinal anesthesia, with a pneumatic tourniquet. A posterior longitudinal midline incision was

used to expose the tendon. Key surgical steps included:

- Debridement of unhealthy tendon stump, calcifications or bony avulsion if present
- Harvesting an adequate length of the FHL tendon
- Proximal Gastroc-soleus recession
- Calcaneoplasty and Haglund deformity excision if necessary
- FHL tendon transfer to the calcaneum using interference screw
- Tendo-Achilles reconstruction with knotless lateral suture anchors
- Layered closure followed by immobilization in plantar flexion using a below-knee slab.



Figure 1: a) Proximal stump debridement b) Recession of proximal Gastroc-soleus fibres

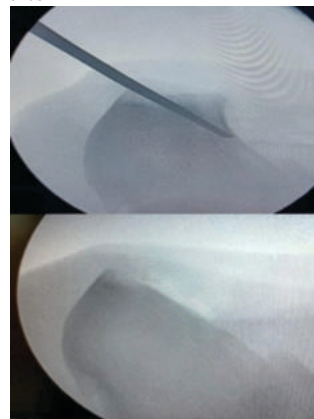


Figure 2: C- arm images of calcaneoplasty and Haglund deformity excision

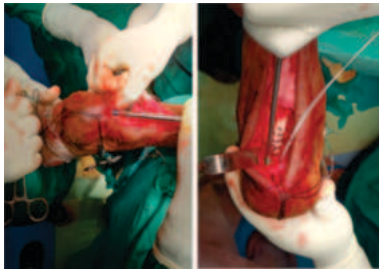


Figure 3: a) FHL transfer using interference screw b) Tendo-Achilles reconstruction with suture anchors

RESULTS

Fifteen patients (11 males, 4 females; mean age 46 years) with chronic degenerative Achilles tendon ruptures underwent FHL transfer with gastroc-soleus recession. The mean AOFAS score improved from 58 pre-operatively to 96 post-operatively. All patients achieved tip-toe stance and independent ambulation.

Average return to work was 5–8 months and no patients reported functional limitation despite loss of active hallux interphalangeal joint motion. Complications included one case of deep wound infection and two superficial skin infections. No re-ruptures were noted over a mean follow-up of 2 years.

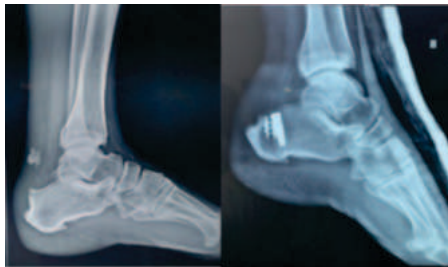


Figure 4: Pre-operative and post-operative x-ray images



Figure 5: Follow up clinical images of standing on toes and squatting

DISCUSSION

Chronic Achilles tendon ruptures pose a unique challenge due to the loss of tendon substance, fibrosis, and retraction of fibres leading to shortening. In such cases, primary repair alone is often insufficient, and tendon augmentation techniques are necessary to achieve a tension-free and durable reconstruction [3,4].

The FHL tendon offers significant advantages in chronic rupture scenarios. Its anatomical proximity, ease of harvest, and strong contribution to plantar flexion make it an ideal substitute. Studies have shown that patients experience minimal functional compromise of the hallux following FHL transfer, with no significant impact on activities of daily living [6,9]. In our series, although patients experienced loss of active IP joint flexion, none reported difficulty during gait, stair climbing, or tip-toe activities—findings consistent with Coull et al. and Wegrzyn et al. [6,9].

Gastroc-soleus recession is another valuable adjunct in cases where

tension-free repair cannot be achieved. However, as noted by Elgohary et al., excessive lengthening (>3–5 cm) may lead to muscle weakness and compromise overall limb strength [8]. In our patients, an approach to recession combined with FHL transfer provided satisfactory length and strength without residual weakness. The mean AOFAS score improvement from 58 pre-operatively to 96 post-operatively, along with complete tip-toe stance recovery, demonstrates the functional success of this combined method.

Complication rates in this study were low. Only one patient required surgical debridement for a deep wound infection which healed by secondary intention, while two others developed minor superficial skin infections—well within the expected range for soft-tissue surgeries in this anatomical zone [2,10]. Importantly, no re-ruptures were observed during the two-year follow-up, underscoring the durability of the construct.

Our findings support previous literature, including that of Raghunandan et al., who advocated FHL transfer as a primary solution for neglected Achilles ruptures, and Feng et al., who recommended biologic augmentation in chronic cases to optimize healing and restore performance [5,10].

Overall, the combination of FHL tendon transfer with proximal Gastroc-soleus recession proves to be an effective, safe, and reproducible technique for managing chronic degenerative Achilles tendon ruptures with large tendon gaps.

CONCLUSION

Flexor Hallucis Longus (FHL) tendon transfer combined with proximal Gastroc-soleus recession is a safe, effective, and biologically sound technique for reconstructing chronic degenerative Achilles tendon ruptures. This method provides a strong and tension-free repair, facilitates early mobilization, and results in excellent functional recovery with minimal donor site morbidity. Our findings support its role as a reliable surgical option, especially in cases with significant tendon gaps and poor-quality tissue.

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