

(RESEARCH ARTICLE)



Flexor hallucis longus tendon transfer for Tendo Achilles reconstruction

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Abstract

Background: Tendo Achilles injuries are common in orthopaedic practice. Degenerative, Chronic and failed repairs requires some form of soft tissue sleeve augmentation like Flexor Hallucis longus (FHL), Peroneus Brevis (PB), Plantaris etc.. are used along with proximal Tendo Achilles advancement procedures like V-Y plasty, musculo tendinous Recession or Turn Down Procedures. These advancement procedure leads to weakening of already compromised Tendon. So, wanted to evaluate functional outcome of FHL tendon Trans Tendinous Transfer without any Advancement procedures.

Methods: 20 patients satisfying inclusion criteria underwent FHL Trans tendinous Transfer to Tendo Achilles which is secured with Interference screw into the prepared bone bed of calcaneum. Initially anterior slab in planter flexion was applied later converted to cast in neutral position which is removed at the end of 6 weeks and joint mobilization started.

Results: Out of 20 patients, 11 were male patients and 9 were females. Average age ranged from 22 to 65 years. 9 were chronic Tears, 9 were Degenerative Tears and 2 were failed Repairs. Wound healing complications were seen in 4 cases, 1 with chronic tear, 1 with Degenerative Tear and Both Failed repairs, all of them healed eventually. ALL patients were assessed for AOFAS at 6th and 12th month. The mean AOFAS of each subgroup improved significantly from months 3 to 12 (Table). At the one-year follow-up, all patients achieved good functional outcome in terms of the AOFAS scoring system.

Conclusions: Tendo Achilles is the common tendon injured in ankle region due to repetitive stress and degeneration. Degenerative, Chronic and failed repair injuries of Tendo Achilles requires some form of soft tissue augmentation for healing. Trans-Tendinous FHL tendon transfer for Tendo Achilles Reconstruction shows good results with minimal complications in these scenarios in non-Athletic Population.

Keywords: Tendo Achilles injury; FHL tendon transfer; Degenerative Tendo Achilles Tear' Chronic Tendo Achilles injury; Tendon Augmentation.

1. Introduction

Achilles Tendon (TA) injuries are common in orthopaedic practice with incidence of 18/100000 (1). Aetiology ranges from acute trauma events of sports to degenerative ruptures seen in inflammatory and elderly patients (2). Proper healing of TA is very critical for normal gait and functioning of foot, particularly for running, jumping & sports activities. Treatment varies from conservative for closed acute rupture & primary end to end repair of acute open injuries to Reconstruction of Tendon in degenerative ruptures. Surgical treatment with repair or reconstruction is considered superior to non-surgical treatment to restore normal function and to prevent re-rupture rates which are higher with conservative treatment (10,11,20,24). Various reconstructive procedure procedures are described in literature with

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variable results (3,4,5). We want to study outcomes with Flexor hallucis longus tendon (FHL) as tendon graft for TA Reconstruction, considering its length, location, orientation of muscle pull and least morbidity to Donor site.

2. Methods

After institutional Ethical committee approval, prospective study of Flexor Hallucis Longus Tendon Transfer for Tendo Achilles Reconstruction initiated on August 2021 and completed August 2022. This study was conducted at Department of Orthopaedics, Dr Chandramma Dayananda Sagar institute of Medical Education & Research (CDSIMER), Deverakagalahalli, Kanakapura Road, Ramanagara Dt, Karnataka, INDIA. All patients getting admitted in orthopaedic department with Tendo Achilles Injury are include in the study when they satisfied our inclusion criteria like, 1. Chronic Traumatic Tear more than 4 weeks. 2. Degenerative Tears and 3. Failed Tendon repairs with atrophic changes. Exclusion Criteria Includes Acute Traumatic Tears or Tear Less than 4 weeks.

After informed Consent, patients are clinically evaluated and AOFAS Ankle-Hindfoot Rating Score documented. After anaesthesia assessment patients was taken up for surgery under Regional anaesthesia with Tourniquet control in prone position. Posteromedial skin incision was made and full thickness skin flap raised, unhealthy, Atrophic and Degenerative part of Tendo Achilles removed from both proximal and distal stumps along with Haglund bumps (fig 4). FHL tendon was identified in deep fascia along with its muscle belly and Tenotomised at the level of sinus Tarsi after protecting tibial nerve and artery (fig 5). No 5 Ethibond used to whipstitch the free end, which usually will provide 5cm of Tendon length and Approximately 4mm of thickness. A vertical slit is made in healthy proximal stump of remaining TA, whip stitched FHL was Transferred through this slit in Anterior to posterior direction after applying a suture in distal part of TA stump to prevent cut-out. Recipient Bone bed Prepared Just in front of Tendo Achilles Insertion with appropriate reamer (6-7mm) through which FHL tendon was transferred and secured with appropriate interference screw with Ankle in Resting equines on comparison with normal side (fig 6&7). Haemostasis achieved and wound closed in layers over drain and Anterior Below knee slab in equines applied for 2weeks and later converted to cast in neutral position after suture removal which is continued for 4 weeks. At sixth week Cast removed and Foot and ankle exercise started. Patients were evaluated at months 3, 6, 9, and 12, using the AOFAS Ankle & Hindfoot Rating System Score, which consisted of 3 subscales: pain (40), function (50 points) and alignment (10 points). It incorporates both subjective and objective information. Patients report their pain, and physicians assess alignment. The patient and physician work together to complete the functional portion. Scores range from 0 to 100, with healthy ankles receiving 100 points.

The data regarding demographic details, clinical features and AOAFS score was recorded in a semi structured pro forma. The data was entered in an MS Excel Spreadsheet. The statistical Analysis was performed using SPSSv21

3. Results

20 patients who satisfied our inclusion criteria were included in the study. 11 male patients and 9 females. Mean age of the study population was 47.5 years +/- 13.98 years, and it was found to be 50.91 +/- 14.22 in males and 46.54 +/- 12.18 years in females; this difference was not statistically significant. (P value 0.061)

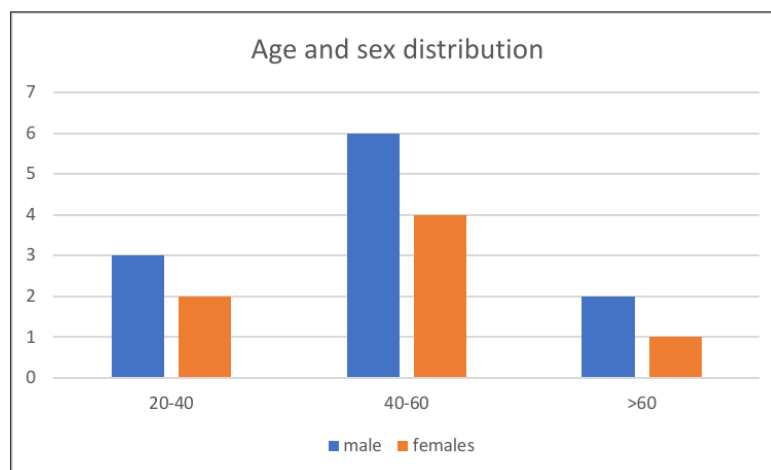


Figure 1 Demographic data indicating slight male predominance of injury across age group

Of the patients studied, 9 were chronic, 9 were Degenerative in nature and 2 were secondary to failed repairs. Wound healing complications were seen in 4 cases, 1 with chronic tear, 1 with Degenerative Tear and in both patients with failed repairs, all of which healed by secondary intention.

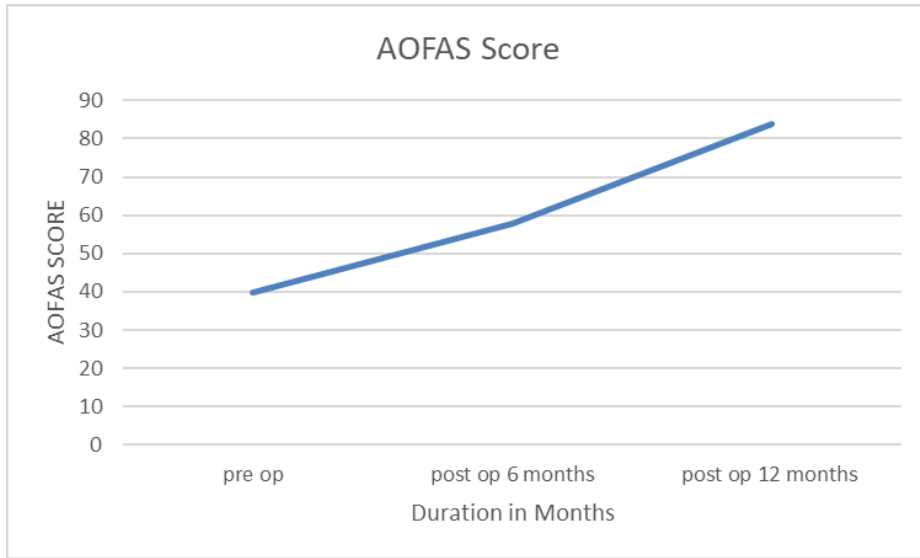


Figure 2 Comparison of pre-operative, 6 months & 12 months post-operative AOFAS (American orthopedic Foot and ankle society) Score. Indicating progressive improvement in functional recovery noted in this study.

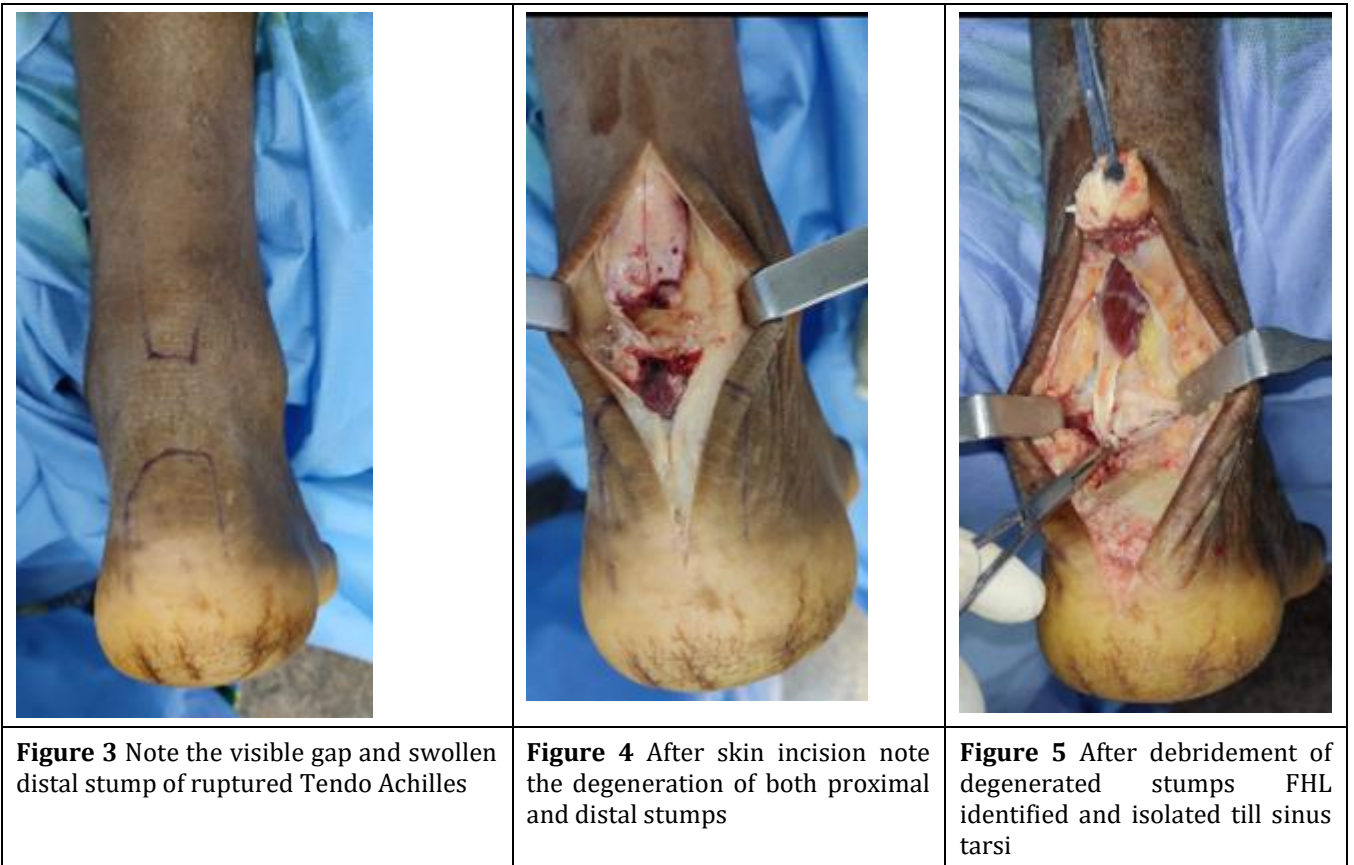




Figure 6 FHL tendon is passed through the proximal stump of debrided TA and fixed just anterior to the native TA attachment using interference screw.



Figure 7 Post op x-ray showing interference screw

All patients were assessed for AOFAS Ankle-hindfoot scores at the 6th and 12th months. The mean AOAFS of each subgroup improved significantly from months 6 to 12 (83.75 +/- 3.55 at 12 months). At the one-year follow-up, all patients achieved good functional outcomes in terms of the AOFAS scoring system with P value <0.0001, hence the improvement in the AOAFS score with FHL transfer is found to be statistically significant.

When we correlated the age with the AOAFS score, we found that the correlation was statistically significant (p <.05). Hence, younger patients fair better after surgery, and have better functional outcome.

4. Discussion

Achilles Tendon Tears are common (1,2).primary repair is difficult in chronic and degenerative tears since the tendon ends are retracted and atrophied (3), In Such situation End-to-end tendon repair is difficult and prone to failure along with wound healing problems (7). To overcome this,Various grafts like FHL, Peroneus brevis,Plantaris or Reshaping of TA itself by V-Y plasty or Turn down are been used for reconstruction of TA (3,4,5,6). FHL and Peroneus brevis have comparable mechanical properties (8).

FHL harvested from 2 incisions provide long tendon compared to short FHL from single incision (25).Short FHL tendon has several advantages compared to other grafts like, 1.synergistic action with TA since line of pull is similar and stronger compared to all other alternatives (12,19),2. Avoids additional incision for harvesting compared to double incision FHL and PB hence avoiding extra time, donor site morbidity and complications (16,17,18), 3. easy to harvest in same incision (19), 4.limited donor site morbidity due to maintained grate toe function with Flexor Hallucis brevis (FHB) & no long term deficiency in grate toe function (9,24,25) and 5. hypertrophy of FHL up to 52% noted on follow-up MRI studies (23). So, in our study for all cases we used only single incision FHL.

Any Facial advancement of TA in the form of V-Y plasty, turn down or proximal recession at musculotendinous junction will weaken the already injured muscle (20,21,22). So, in our study we have not done any advancement procedure they're by maintaining its strength and augmenting its power with FHL Trans tendon Transfer Technique.

Major complications like Rerupture, deep infection and DVT (23) are not noted in our study and Minor complications like wound gaping,serous discharge and superficial wound infection (24) are also minimal compared to other reported studies Due to single incision, no TA advancement, shorter surgical time.

5. Conclusion

Tendo Achilles is the common tendon injured in ankle region due to repetitive stress and degeneration. Degenerative, Chronic and failed repair injuries of Tendo Achilles requires some form of soft tissue augmentation for healing. Trans-Tendinous FHL tendon transfer for Tendo Achilles Reconstruction shows good results with minimal complications in these scenarios in non-Athletic Population.

Limitation of our study is small cohort and short term follow-up.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

Ethical approval Obtained from IEC- Institutional Ethics Committee.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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