

**Original Article**  
**Orthopaedics**

# A PROSPECTIVE STUDY OF SURGICAL MANAGEMENT OF CHRONIC NEGLECTED TENDOACHILLES RUPTURE USING PERONEUS BREVIS TENDON

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**Abstract**

Objective of the study is to find out functional outcome and complications associated with surgical reconstruction of chronic degenerative tendoachilles rupture using peroneus brevis tendon and role of local steroid injection in chronic rupture of tendon. We studied 10 cases with chronic degenerative Achilles tendon rupture who were treated with peroneus brevis tendon augmentation procedure. In 8 cases rupture of tendon was secondary to local corticosteroid injection given for retro calcaneal bursitis. Patients came to hospital with pain over the Achilles tendon and difficulty in walking, climbing stairs, diagnosed of Achilles tendon rupture through physical examination and subjected to USG for confirmation. Patients have undergone operative treatment in the form end to end suturing of ruptured tendon using Krakow technique and augmentation of tendon using peroneus brevis tendon as explained by Teuffer. Post operatively patient immobilized in above knee cast with foot in 15-20 plantar flexion and 45 degree of knee flexion. Suture removal done after 14 days of surgery. After 4 weeks cast converted to short leg cast. Mobilization started after 6 weeks on the cast. Cast discontinued after 8 weeks and full weight bearing started at 8-12 weeks. Follow up done for 18 months. Of 10 patients 7 patients were male and 3 were female. Age range was 30-60 years with mean age of 45 years. 7 patients had right tendon rupture, 3 had left tendon rupture. 8 patients

gave previous history of corticosteroid injection given for retro calcaneal bursitis. Postoperatively 2 patients had skin necrosis which healed by secondary intention and scar. According to AOFAS scoring system for functional outcome of patients increased from preoperatively 65 to postoperatively 95(range 90-100). There is increased risk of Achilles tendon rupture after local steroid injection for inflammatory lesions of tendon or around the tendon, so it's better to avoid giving local steroid injections in or around the Achilles tendon. Peroneus brevis can be easily used for Achilles tendon augmentation with good functional outcome.

**Keywords:** *Achilles tendon rupture, peroneus brevis tendon, corticosteroid, Teuffers technique, AOFAS scoring system.*

## Introduction

Injuries of Achilles tendon are relatively common in middle aged athletes and account for third most common tendon to be ruptured<sup>1</sup>. Chronic Achilles tendon rupture includes rupture diagnosed after 4-6 weeks of injury<sup>1</sup>. The injury mechanism usually involves eccentric loading on a dorsiflexed ankle with the knee extended<sup>2,3</sup>.

Reconstruction of degenerated ruptures of the tendoachilles is a challenge. As degenerative process weakens the tendon and due to fibrotic tissue present in the chronic ruptured site. A number of methods have been described in literature to reconstruct the tendoachilles, but with variable results<sup>4</sup>. Degenerative ruptures of tendoachilles typical in patients after the age of 30 years. The Achilles tendon has no true synovial sheath, it is covered only by a para tenon and exogenous healing (from synovial fluid) is not expected to occur<sup>4</sup>.

In the past, this injury was treated with end to end suturing and a plaster cast, but this was associated with high rates of reruptures and weakened push off. Hence, there is rationale to perform reconstruction using a healthy tendon such as the peroneus brevis/flexor hallucislogus.

Some of the techniques which have been explained for reconstruction of Achilles tendon are V-Y myo tendinous advancement<sup>5</sup>, turn down procedure explained by Bosworth<sup>6</sup>, augmentation of tendon using peroneus brevis, flexor hallucis longus, flexor digitorum longus. Here, we investigated clinical outcome of ten patients treated with reconstruction of Achilles tendon using peroneus brevis.

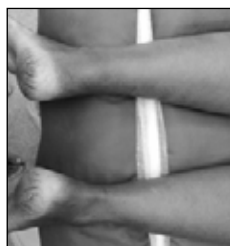
## Materials and methods

Study conducted in 10 patients

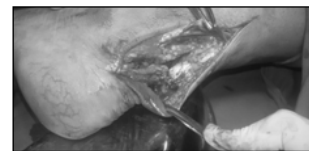
who were diagnosed to have chronic degenerative Achilles tendon rupture between 2014 and 2017. Patients came to hospital with pain over posterior aspect of ankle and difficulty in walking, climbing stairs and previous history of minor trauma to ankle. 8 of patients gave previous history of local steroid injection. On physical examination tenderness and gap noted over Achilles tendon. Tear in tendon confirmed by matles test and Thompson calf squeezing test. For further confirmation patient subjected to USG.

## Procedure

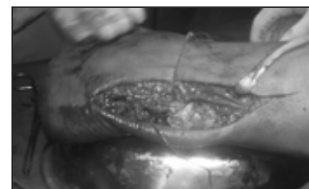
After giving spinal anesthesia patient was put in prone position. Posterolateral longitudinal incision was taken and tendoAchilles is exposed. Sural nerve identified and retracted in the proximal part of the wound. Tear site is cleared of fibrous tissue. Tear ends are approximated and sutured using Krakow method. Peroneus brevis tendon is detached from fifth metatarsal base through small incision. Peroneus brevis tendon is pulled into the first incision. Tuberosity of calcaneum is dissected and drill hole is made for passing peroneus brevis tendon. Loop of peroneus brevis tendon was passed through the drill hole and sutured back to Achilles tendon. Brevis tendon is secured to Achilles tendon with medial and lateral sutures. Wound was closed and patient was put on slab.



**Figure 1: positioning of the patient**



**Figure 2: tear in the tendoachilles exposed**



**Figure 3: end to end suturing of the tendon**



**Figure 4: loop of the peroneus brevis taken through tunnel from calcaneum and sutured back to tendoachilles**



**Figure 5: Reconstructed Tendon**

## Post-operative Protocol

Post operatively patient was immobilized in above knee cast with foot in 15-20 plantar flexion and 45 degree of knee flexion. Suture removal done after 14 days of surgery. After 4 weeks cast converted to short leg cast. Mobilization started after 6 weeks on the cast. Cast discontinued after 8 weeks and full weight bearing started at 8-12 weeks.

## Follow Up

Follow up of the patients done for 2 years. The things noted in follow up are calf atrophy, ankle range of

movements, tip toe stance; push off strength, ankle eversion strength and plantar strength. Points are given according to AOFAS scoring system.

## Discussion

Various causes have been explained for chronic degenerative tendoachilles tear like side effects of gout, hyperparathyroidism, steroids and fluoroquinolones<sup>7</sup>. The role of corticosteroid injection in retrocalcaneal bursitis is controversial. The evidence suggests that they may inhibit collagen synthesis, granulation process and alter tendon biomechanical properties<sup>8-11</sup>. Animal studies have shown that corticosteroid injection for retrocalcaneal bursa may directly impair the biochemical properties of healthy tendon<sup>12,13</sup>. Therefore corticosteroid injection will pose the risk for tendon rupture. In our study 8 patients gave history of corticosteroid injection given locally for retrocalcaneal bursitis.

The tendoachilles region 2-6cm above the calcaneal insertion has the poorest blood supply as noted by Lagergren and Lindholm<sup>14</sup>. Carr and Norris<sup>15</sup> demonstrated that the midsection of the tendon is most prone to rupture as this is the area of the tendon in which there is a reduced percentage and number of blood vessels.

Different techniques have been described for chronic Achilles tendon tear such as bridging approximation procedure, V-Y slide lengthening of tendon, gastrocnemius advancement, fascial turn down flaps, local tendon transfer, free tissue transfer and use of synthetic graft<sup>16-18</sup>. In our study we used local tendon (peroneus brevis tendon) transfer technique.

Advantages of using peroneus brevis is, it is an expandable tendon

with little functional impairment after the transfer as peroneus longus can take care of its function. Teufferet al<sup>19</sup> reported that this is dynamic loop repair technique which is biomechanically sound than static repair. Our study has shown 85% of excellent outcome.

Disadvantage of this study involve sample size. Large sample study is required to see the effect of corticosteroid injection on the Achilles tendon. One more disadvantage is study doesn't consider the outcome of reconstruction in athletic patient as tendoachilles tear are more common in athletic individuals.

## Results

Of 10 patients 7 patients were male and 3 were female. Age range was 30-60 years with mean age of 45 years. 7 patients had right tendon rupture, 3 had left tendon rupture. 8 patients gave previous history of corticosteroid injection given for retro calcaneal bursitis. Postoperatively 2 patients had skin necrosis which healed by secondary intention and scar. According to AOFAS scoring system for functional outcome of patients increased from preoperatively 65 to postoperatively 95 (range 90-100).

Category	Criteria	Points
<b>Pain (40 points)</b>		
	None	40
	Mild, occasional	30
	Moderate, daily	20
	Severe, almost always present	0
<b>Function (50 points)</b>		
Activity limitations, support requirement	No limitations, no support	10
	No limitation of daily activities, limitation of recreational activities, no support	7
	Limited daily and recreational activities, can	4
	Severe limitation of daily and recreational activities, walker, crutches, wheelchair, brace	0
Maximum walking distance, blocks	Greater than 6	5
	4-6	4
	1-3	2
	Less than 1	0
Walking surfaces	No difficulty on any surface	5
	Some difficulty on uneven terrain, stairs, inclines, ladders	3
	Severe difficulty on uneven terrain, stairs, inclines, ladders	0
Gait abnormality	None, slight	8
	Obvious	4
	Marked	0
Sagittal motion (flexion plus extension)	Normal or mild restriction (30° or more)	8
	Moderate restriction (15° - 29°)	4
	Severe restriction (less than 15°)	0
Hindfoot motion (inversion plus eversion)	Normal or mild restriction (75%-100% normal)	6
	Moderate restriction (25-74% normal)	3
	Marked restriction (less than 25% normal)	0
Ankle-hindfoot stability (anteroposterior, varus-valgus)	Stable	8
	Definitely unstable	0

AOFAS Ankle-Hindfoot Scale, Subjective Portion (90 points total)

## Conclusion

- There is increased risk of Achilles tendon rupture after local steroid injection for inflammatory lesions of tendon or around the tendon, so it's better to avoid giving local steroid injections in or around the Achilles tendon.
- Peroneus brevis can be easily used for Achilles tendon augmentation with good functional outcome. Drawback being Care must be taken to prevent wound problems and deep infection that can necessitate more extensive dissection and strength of tendon is less compare to FHL/FDL. Further studies are required to find out efficacy of this procedure in professional athletes.

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