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# Chronic Achilles Tendon Avulsion Repair

## Central Third Fascia Slide Technique with Flexor Hallucis Longus Transfer

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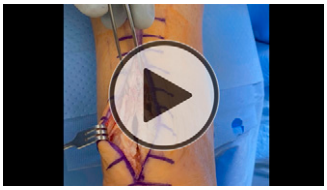
Published outcomes of this procedure can be found at: *Foot Ankle Spec*. 2016 Oct;9(5):400-8, and *Foot Ankle Int*. 2016 Jul;37(7):737-42.

*Investigation performed at The Ohio State University, Columbus, Ohio*





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## Abstract

**Background:** Chronic Achilles tendon defects are commonly associated with substantial impairment in gait and push-off strength, leading to decreased function[1]. These injuries cause a unique surgical dilemma, with no consensus surgical reconstruction technique for >6-cm gaps[3]. There are a multitude of surgical reconstruction techniques that rely on gap size as a determinant for preoperative planning[1,2]. The present article describes a technique for chronic Achilles tendon defects of >6 cm. The central third fascia slide (CTFS) technique with flexor hallucis longus (FHL) transfer provides adequate excursion and strength while avoiding use of allograft.[2].

The CTFS technique is a reconstructive technique that is utilized to treat large chronically gapped Achilles tendon tears, usually larger than 5 to 6 cm; however, recent literature has shown that intermediate gaps can be fixed with use of a combination of tendon transfers. The technique described here is a variation of the V-Y tendinoplasty and fascia turndown method in which the gastrocnemius complex fascia is slid down rather than being "turned down." This reconstructive technique, like its predecessor, restores function in damaged Achilles tendons[3]. Chronic gapping from a chronic Achilles tendon rupture can lead to decreased function and weakness. Patients may also experience fatigue and gait imbalance, leading to the need for surgical reconstruction to help restore functionality.

**Description:** The CTFS technique utilizes a posterior midline incision, maintaining full-thickness flaps. A complete debridement of the degenerative Achilles tendon is performed, and the gap is measured. If the gap is >6 cm, the central third of the remaining Achilles and gastrocnemius fascia are sharply harvested. The FHL is transferred to the proximal Achilles footprint and held with use of an interference screw. The ankle is held in 15° to 25° of plantar flexion while the FHL shuttling suture is pulled plantarly and secured with a bio-interference screw. The fascial graft is then anchored to the calcaneus with use of a double-row knotless technique, maximizing osseous contact potential healing. Soft-tissue clamps are placed on the graft and on the gastrocnemius complex harvest site. The ankle is tensioned in nearly 30° of plantar flexion to

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account for known postoperative elongation. FiberWire (Arthrex) is utilized to secure the tension, then the remaining suture tape from the proximal insertional row is run up each side of the fascial graft in a running locking stitch, continuing proximally to close the harvest site. The use of an anchor-stay stitch helps to prevent elongation and maximizes construct strength.

**Alternatives:** For patients who are poor surgical candidates or those with acceptable function, alternatives include nonoperative treatment and/or the use of a molded ankle foot orthosis. Most chronic Achilles tendon ruptures require surgery. Generally, a gap of <2 cm can be treated through primary repair with use of longitudinal and distally applied traction. For an Achilles gap of >2 cm but <6 cm, a V-Y gastrocnemius-lengthening procedure can utilized. Other methods such as autologous and local tendon transfers, advancement procedures, or a combination of these have been described as ways to treat gaps within this range. For gaps of >6 cm, there is insufficient literature to establish a single gold-standard reconstructive technique. Some surgeons have opted to utilize the turndown flap procedure, the FHL tendon transfer technique, or a combination of both.

**Rationale:** The Achilles turndown flap technique can lead to the formation of scar tissue at the focal point of the turndown, a region also known as the hinge joint, and thus can perpetuate scarring of the repair site. To avoid this scarring, the central third fascia slide technique with FHL transfer is presented as a suitable reconstructive technique for chronic tendon defects of >6 cm.

**Expected Outcomes:** Postoperatively, patients are managed according to a standard protocol. The first 2 weeks are non-weight-bearing with the foot in equinus in an L & U splint. At 2 to 4 weeks postoperatively, a walking boot with a 1.5-cm heel lift is applied, and crutches are utilized as the primary weight-bearing aid. At 4 to 6 weeks, the patient is transitioned to a 1-cm heel lift and may discontinue the use of crutches if they are able to walk without a limp. At 8 weeks, the patient may discontinue the use of the walking boot. At week 6 to 12, no heel lift is required. By approximately 12 weeks postoperatively, the patient should have regained full range of motion and should be able to walk without a limp. The patient should be able to resume activities of daily living by 3 to 4 months, with a gradual return to all physical activities by 4 to 6 months This postoperative protocol has produced favorable results. Ahmad et al. have reported the use of a similar protocol, with patients showing increased Foot and Ankle Ability Measure scores and decreased visual analog scale pain scores compared with the preoperative measurement[2].

**Important Tips:**

- Debride the Achilles until viable tendon is reached, then measure the defect.
- Tension the FHL and the fascia slide with the foot in 15° to 25° of plantar flexion.
- Perform a meticulous layered closure, preserving the paratenon as much as possible.
- Incomplete debridement may result in incompetent tissue.
- Incomplete closure of the fascia harvest site may predispose to seroma or hematoma formation.
- Not splinting for 10 to 14 days potentially predisposes the patient to wound breakdown.

**Acronyms and Abbreviations:**

- CTFS = central third fascia slide
- FHL = flexor hallucis longus
- ATTF = Achilles tendon turndown flap
- HPI = history of present illness
- NWB = non-weight-bearing
- CAM = controlled ankle motion
- DVT = deep vein thrombosis
- MRI = Magnetic resonance imaging

- PMHx = past medical history
- HTN = hypertension
- SHx = social history
- PE = physical examination
- DF = dorsiflexion
- NVI = neurovascularly intact
- ROM = range of motion

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