

# Mini-open Repair of Achilles Tendon Rupture With the Patient in the Supine Position

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**Summary:** Surgical repair of the Achilles tendon is a common procedure for acute Achilles tendon ruptures. Variations in surgical technique and patient positioning exist, with the ultimate goal of achieving a durable repair while minimizing complications. Recently the use of a mini-open approach has been demonstrated to provide a durable repair that is comparable to using a larger traditional open approach. In this paper we describe a mini-open approach for surgical repair of the Achilles tendon while the patient is in the supine position.

**Key Words:** achilles tendon repair—achilles rupture—supine mini-open technique.

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Surgical repair of the Achilles tendon is a common procedure for acute Achilles tendon ruptures. Various surgical techniques exist with the ultimate goal of achieving a durable repair, while minimizing complications such as wound breakdown and sural nerve injury.<sup>1</sup> Recent studies have shown that a mini-open approach will produce a repair that is comparable to a traditional open approach, while also minimizing complications.<sup>2</sup> This approach is typically performed with the patient in the prone position, which requires certain preoperative considerations involving appropriate padding and airway management.

Performing an Achilles repair with the patient in the supine position has been described previously; however, the larger traditional open approaches with larger incisions were used.<sup>3</sup> The purpose of this paper is to describe a mini-open approach for surgical repair of the Achilles tendon while the patient is in the supine position.

## TECHNIQUE

### Patient Positioning

The patient is positioned supine. A bump is placed underneath the operative ankle to allow for increased external rotation. Another bump is placed underneath the contralateral hip to allow for even further external rotation and improved visualization of the incision site. A pneumatic tourniquet is placed on the thigh of the affected side, as well as a safety belt across the waist to secure patient positioning. The nonoperative limb is secured to the bed with foam padding and tape.

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The authors declare that they have nothing to disclose.

**For reprint requests, or additional information and guidance on the techniques described in the article, please contact Ashish Shah MD, at ashishshah@uabmc.edu or by mail at 1313, 13th Avenue South, Suite 207, Birmingham, AL 35205. You may inquire whether the author(s) will agree to phone conferences and/or visits regarding these techniques.**

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### Surgical Technique

The site of tendon rupture is palpated and a 3 to 4 cm incision is made just medial to the tendon. Scissors are used to release the paratenon covering the Achilles tendon without undermining the incision. Next, the rupture site is cleared of any hematoma formation and the damaged tendon is debrided.

Attention is first directed to the distal end of the ruptured tendon. Plantar flexion of the ankle readily delivers the distal segment through the incision site (Fig. 1). At this point, either a classic Krackow stitch using a 1-0 FiberWire (Arthrex; Naples, FL) or a 4-stranded double Krackow locking stitch using two 1-0 FiberWires is applied. The classic Krackow stitch involves a row of  $\geq 3$  locking loops placed on each side of the tendon (Fig. 2A). The 4-stranded double Krackow locking stitch uses 1 FiberWire to form 2 rows of locking stitches on the medial half of the tendon and a second FiberWire to form 2 rows of locking stitches on the lateral half (Fig. 2B). This results in 4 free suture ends on the distal tendon (Fig. 3). Our preference is the 4-stranded double Krackow locking stitch only for peace of mind in our given patient population.

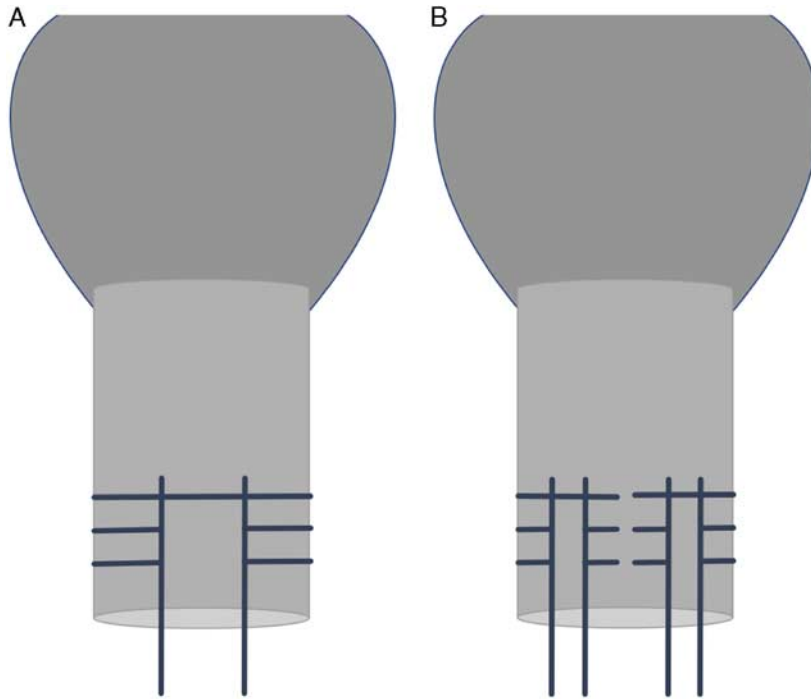
Next, attention is directed towards the proximal tendon. Scissors may be used to release additional paratenon for further exposure. The same steps as described above are performed, again resulting in 4 free suture ends from the proximal tendon rupture site. The free suture ends are then knotted resulting in approximation of the ruptured tendon ends. It is important to apply enough tension to bring the ankle to resting plantar flexion (usually 5 degrees of plantar flexion) to match the contralateral side. A running epitendinous suture using 0-Vicryl (Ethicon; Somerville, NJ) is added to provide additional reinforcement.

In summary, this technique offers adequate visualization of both tendon ends with excellent cosmesis (See video, Supplemental Digital Content 1, <http://links.lww.com/TIO/A10>, which demonstrates the senior surgeon's surgical technique).



**FIGURE 1.** Intraoperative image depicting delivery of the distal tendon through the incision site with plantar flexion of the ankle.

full color  
online



**FIGURE 2.** Schematic example of the classic Krackow locking technique (A), versus the 4 strand double Krackow locking technique (B). [full color online](#)

**Postoperative Care**

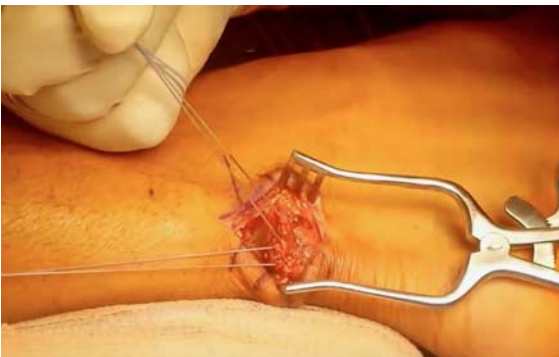
The affected leg is placed in a below the knee splint with the ankle in slight plantar flexion for 2 weeks. The splint is then removed and patient is placed in a walking boot with 2 heel lifts (total height 0.75 to 1 inch) and made partial weight bearing for an additional 2 weeks. At the 4-week postop visit, 1 heel lift is removed and physical therapy with active range of motion exercise is initiated. At the 6 to 8 week postoperative visit, strengthening exercises are introduced. Dorsiflexion to neutral is anticipated at this time. By 3 months postoperatively, gradual reintroduction of sport activities is permitted.

**RESULTS/DISCUSSION**

At our large academic institution, 8 patients (1 female, 7 males) have had an Achilles tendon repair using the described technique for an isolated acute tendon rupture. All procedures

were performed by a single fellowship trained foot and ankle surgeon. The mean age of the patients was 29.75 years and average follow-up was 13.7 months. There were no complications (rerupture, wound dehiscence, infection, sural neuritis) experienced amongst the patient group.

Previous studies have demonstrated that acute repair of Achilles tendon ruptures results in a significantly reduced risk of rerupture; however, surgery comes with certain risks such as infection and sural nerve injury.<sup>4</sup> Support for the mini-open approach has gained favor recently. Assal et al used the mini-open approach with the assistance of the Achillon device (NewDeal, Lyon, France) on 82 patients, and reported complete return to sport in all elite athletes, with no associated infections



**FIGURE 3.** Intraoperative image demonstrating the 4 free suture ends after the double Krackow locking suture is applied to the distal tendon. [full color online](#)



**FIGURE 4.** Intraoperative image of the approximation of the ruptured tendon edges after pairing and knotting the free suture ends. [full color online](#)



**FIGURE 5.** Intraoperative image depicting the incision site measuring 3.5 cm after closure.

or sural nerve injury.<sup>5</sup> Taşatan et al<sup>2</sup> prospectively evaluated the mini incision technique for repair of acute Achilles tendon ruptures in 20 patients. After a 5-year follow-up period, none of the patients experienced rerupture, sural nerve injury, surgical site infections, or any other complications. An assistive surgical device was also used for repair at their institution. In both studies, the repair was completed with the patient in the prone position, which differs from our technique.

Gluck and colleagues described performing tendon repair with the patient in the supine position in 2008, but they used a standard open technique. They noted decreased time for

surgeon/anesthesia preparation and no difficulties with surgical site access over the 2-year period after it was introduced at their institution.

In our technique, we combine the mini-open approach while the patient is in the supine position. This approach allows direct visualization of the tendon, as well as the benefits of decreased turnover time, minimizing wound complications (scar formation, adhesions), and decreasing the risk of anesthesia-related complications associated with the prone position.

Our technique is not particularly useful for chronic ruptures, as larger incisions will be required to address more severe tendinosis. Also, ruptures close to the insertion site present difficulty mobilizing the distal tendon and may require additional incisions. We recommend performing the described technique on acute ruptures (within 10 d) that are 2 to 8 cm from the insertion site (Figs. 4, 5).<sup>1</sup>

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