

Current Trends in Achilles Rupture Management

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Today's Discussion

- | Achilles Pathology
 - | Non-Insertional Rupture
 - | My experience with mini-open repair
 - | Insertional Rupture/Symptomatic Tendinosis

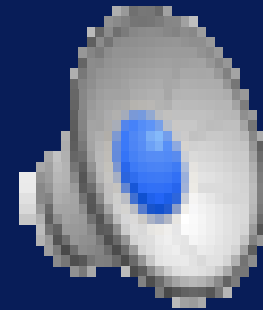


Achilles Rupture

Background

Op vs Non-Op Treatment

- Historically, operative favored in healthy patients due to increased risk of re-rupture with non-op
 - Cetti et al – AJSM 1993 (5.4% vs 14.6%)
 - Moller et al – JBJS(Br) 2001 (1.7% vs 20.8%)



Achilles Repair

Background



Operative vs Non-Operative Treatment

- | Cochrane Review – Khan et al 2010
 - | 12 RCTs
 - | 844 patients
 - | Open surgical vs Non-Op (536 patients – 6 studies)
 - | Cetti 1993; Nistor 1981; Moller 2001; Twaddle 2007; Metz 2008; Schroeder 1997
 - | Open vs Percutaneous (180 patients – 4 studies)
 - | Aktas 2009; Assal 2002; Gigante 2008; Lim 2001
 - | CONCLUSIONS:
 - | Open operative repair significantly reduces risk of re-rupture compared to non-op
 - | Significantly higher rate of complications including infection with operative
 - | Complications may be reduced by percutaneous repair – further studies needed



Achilles Rupture Background



n Recent studies promoting non-operative tx

- Willits et al – JBJS 2010

- 144 pts – RCT: Operative (Traditional Open) vs Non-Op (Functional)
- Similar re-rupture rates (Operative: 3.7% vs Non-Op: 1.6% (p=0.14))
- Small sample size, underpowered to detect true differences
- Differences in strength ratio at 1 and 2 years of unknown significance
- High rate of operative complications

- Soroceanu et al – JBJS 2012

- Meta-Analysis of Operative vs Non-Op (Functional)
- Equal re-rupture rates with functional rehab
- HOWEVER Surgical patients RW sooner
- “Randomized trials are needed to compare percutaneous vs non-operative functional rehab

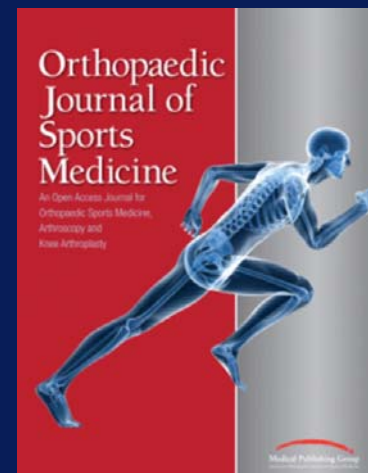
UNDERPOWERED

FASTER RETURN

Is Operative Treatment of Achilles Tendon Ruptures Superior to Nonoperative Treatment?

A Systematic Review of Overlapping Meta-analyses

Brandon J. Erickson,^{*†} MD, Randy Mascarenhas,[†] MD, FRCSC, Bryan M. Saltzman,[†] MD, David Walton,[†] MD, Simon Lee,[†] MD, Brian J. Cole,[†] MD, and Bernard R. Bach Jr,[†] MD
Investigation performed at Rush University Medical Center, Chicago, Illinois, USA



- n Erickson et al. – Ortho J Sports Med - 2015 Apr
 - 2016 OJSM Best Review Paper Award Recipient
 - Systematic review of existing meta-analyses (9)
 - **FASTER RETURN**
“Operative treatment decreases re-rupture rates but increases minor complication rates compared to non-op”
 - “Surgery may allow earlier return to work”

A Prospective Randomized Trial Comparing Surgical and Nonsurgical Treatments of Acute Achilles Tendon Ruptures

Ilkka Lantto,* MD, Juuso Heikkinen,* MD, Tapio Flinkkila,* MD, PhD, Pasi Ohtonen,* MSc, Pertti Siira,† PT, Vesa Laine,† MSc, and Juhana Leppilahti,** MD, PhD
Investigation performed at Oulu University Hospital, Oulu, Finland



- n Lantto et al. – AJSM – 2016 Jun (epub)
 - RCT 60 patients: open surgery versus functional rehab
 - Complications:
 - Re-ruptures: 4 non-op; 1 operative
 - 1 deep wound infection (operative)
 - “Surgery restored calf muscle strength earlier over the entire ROM of ankle”
 - Up to 24% strength difference at 6 months
 - 10-18% strength difference at 18 months
 - “Surgery may also results in better HRQoL in domains of physical functioning and bodily pain”

MORE POWER

Phillies' Howard treated for infection

Philadelphia Phillies first baseman Ryan Howard's recovery from offseason Achilles surgery hit a bump in the road, the team announced Wednesday.

FoxSports

Feb 29, 2012 at 12:00a ET

Philadelphia Phillies first baseman Ryan Howard's recovery from offseason Achilles surgery hit a bump in the road, the team announced Wednesday.

The 32-year-old slugger was forced to undergo a second procedure Monday to have an infection cleaned out from his surgically repaired left tendon.

Phillies athletic trainer Scott Sheridan told reporters Howard underwent "a small procedure to basically clean out his sutures and clean out [the initial surgical] wound."

Sheridan would not say when Howard would be able to resume participating in spring training drills, but added he would not classify the procedure as a "setback."

sacks in 2013 -- won't play until Indianapolis home opener Sept. 21 against the [New York Jets](#). He is officially inactive for the Colts' opener Sunday against the [Buffalo Bills](#).

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Achilles Repair

Background

- Is Percutaneous/Mini-Open the Answer?
 - Mini-Open vs Extensile Open
 - Strong enough to safely perform aggressive early functional rehab?
 - Mini-Open vs Non-Operative
 - Are complications (wound, sural nerve injury) low?
 - Reliably recreate and maintain muscle-tendon unit integrity

Percutaneous and open surgical repairs of Achilles tendon ruptures

A comparative study*

JAMES P. BRADLEY,† MD, AND JAMES E. TIBONE, MD

From the Kerlan-Jobe Orthopedic Clinic, Centinela Hospital Medical Center, Inglewood, California

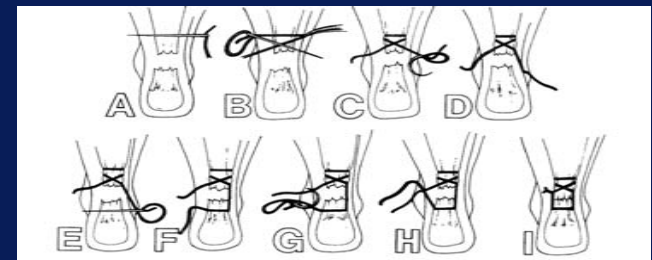
- AJSM 1990 – Case series study
- 27 pts with acute rupture
 - 15 with open repair with gastrocsoleus fascial turn-down graft
 - 12 with percutaneous (Ma and Griffith) repair

Results

- No difference in strength
- Percutaneous more symmetric tendon size to non-op limb
- Two re-ruptures in perc group; 0 in open

Conclusion:

- “Open repair recommended for all high-caliber athletes who cannot afford any chance of re-rupture”



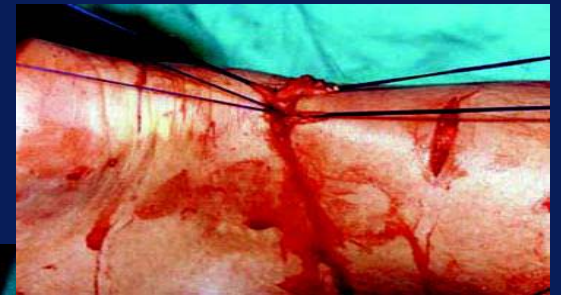
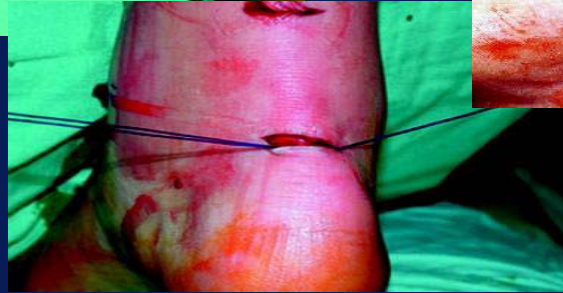
Achilles Repair

Background

- | Percutaneous
 - | Ma and Griffith – 1977
 - | First to describe percutaneous technique
 - | No re-ruptures
 - | 2 minor complications
 - | Mixed results since this study demonstrating higher re-rupture rates and sural nerve complications

Achilles Repair

Background



**Percutaneous vs. Open Repair of the Ruptured Achilles Tendon—
A Prospective Randomized Controlled Study**

Justin Lim, M.R.C.S.; Rakesh Dalal, F.R.C.S. (Orth.); Mohammed Waseem, F.R.C.S.
NE Thames and Oxford, UK

- | FAI 2001 - Prospective RCT
- | 66 pts (33 randomized to each group)
- | Open repair
 - | 7 wound infections, 2 adhesions, 2 re-ruptures
- | Perc repair (modified Ma and Griffith)
 - | 3 wound puckering, 1 re-rupture, 1 persistent sural nerve paresthesia
- | Percutaneous repair advocated for low rate of complications and better cosmesis

Achilles Repair

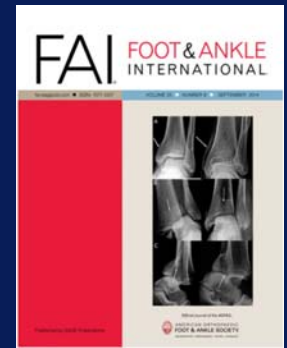
Achillon

- | First percutaneous “system” in U.S.
- | 3 single-plane transverse suture passes to create 3 non-locking loops
- | Concerns
 - | Disposable (expensive)
 - | U.S. version – FLIMSY
 - | Single plane, transverse sutures often “miss” tendon



Open Versus Minimal Invasive Repair With Achillon Device

Seref Aktas, MD and Baris Kocaoglu, MD
Istanbul, Turkey



- | FAI 2009 - Level I, PRCT
- | 46 patients (Achillon vs Open Krakow)
- | No significant difference in AOFAS outcome scores
- | Complications
 - | 5% Achillon vs 35% open

Achilles Repair

PARS

- | Improved, more “anatomic” jig
- | Reusable, stiff construct
- | Provides locked fixation
- | Colored suture and more rigid passing needles provided in one kit
- | Potential concerns:
 - | Suture management
 - | Delayed presentation rupture (i.e., > 3 weeks)
 - | Can progressive functional rehab protocols be used without risk of construct elongation?



Limited-Open Achilles Tendon Repair Using Locking Sutures Versus Nonlocking Sutures: An In Vitro Model

Constantine A. Demetracopoulos, MD¹, Susannah L. Gilbert, MS²,
Elizabeth Young, BS¹, Josh R. Baxter, PhD², and Jonathan T. Deland, MD¹

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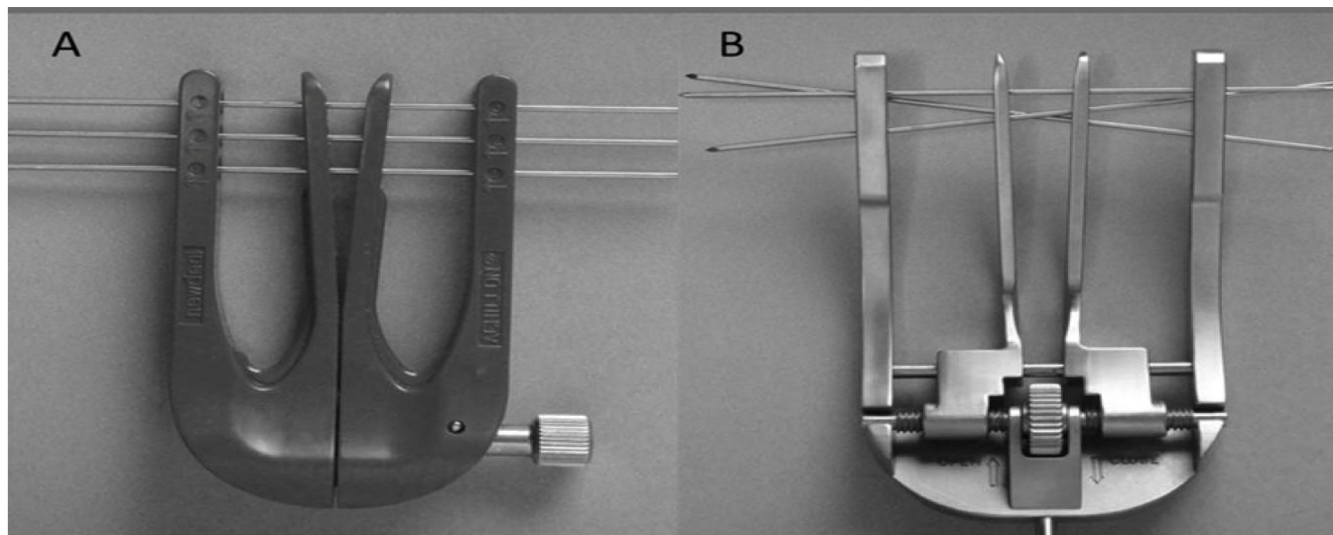
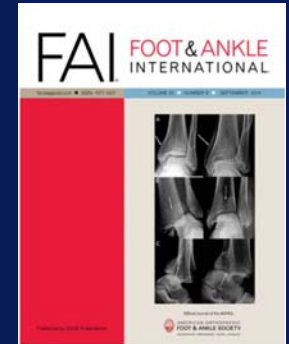


Figure 1. Images of the Achillon (A) and PARS (B) devices and their needle paths. Note the transverse needle paths of the Achillon device and the crossing needle paths of the PARS device.

Limited-Open Achilles Tendon Repair Using Locking Sutures Versus Nonlocking Sutures: An In Vitro Model

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Constantine A. Demetracopoulos, MD¹, Susannah L. Gilbert, MS²,
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- | FAI – 2014
- | Cadaveric biomechanical study
- | PARS (locking) vs Achillon (non-locking)
- | PARS
 - | Greater load to failure compared to non-locking
 - | More resistance to 2-mm gapping (higher # cycles)
- | PARS locking construct able to resist forces simulating early rehab compared with non-locking



Mini-Open Repair of Achilles Rupture in the National Football League

Kirk A. McCullough, MD¹; Christopher M. Shaw, MD¹; and Robert B. Anderson, MD²

JSOA - Dec 2014

Consecutive series of 9 NFL athletes (2012-13) with mid-substance achilles rupture

All returned to football

- Avg. return to GAME play (8.9 months)

 - Fastest @ 5.4 months

- No re-ruptures, no sural nerve/wound complications

FURTHER DATA:

- Olympic Gymnast, Olympic Long Jumper, NBA, MLB, NFL

Achilles Repair

Mini-Open vs Open Repair

- Recent Studies
 - Hsu et al – FAI 2015 Nov
 - Retrospective Review 270 patients @ OrthoCarolina
 - 101 PARS, 169 Open Repair
 - Largest single institution operative Achilles experience in literature
 - PARS
 - Higher return to baseline function @ 5 months ($p = 0.0001$)
 - 98% of PARS patients (82% open)
 - 6% fewer complications
 - 2% re-operation for suture irritation
 - NO sural neuritis
 - NO re-operation for deep infection

Achilles Repair

Mini-Open Options

- PARS All Suture
 - Proximal AND distal stump DIRECT reapproximation
- Mid Substance SpeedBridge
 - Proximal stump PARS
 - Distal SwiveLock Fixation
 - KNOTLESS
 - Stronger construct
- Current Options
 - Suture tape utilization
 - No outer coating (compared to FiberWire)
 - Stronger pull-out compared to FiberWire



PARS Case Examples

Defying the Odds

Terrell Suggs Injury: Torn Achilles' Tendon, According To Reports

Bad news for Baltimore: Ravens LB Terrell Suggs tore his Achilles' playing a game of basketball.

By [Joel Thorman](#) | [@JoelThorman](#) | May 3, 2012, 9:52am EDT

Bad news out of Baltimore: Ravens LB Terrell Suggs has torn his Achilles' tendon, according to multiple reports. The Ravens are reportedly saying that it might not be a complete tear, only a partial tear. No other information is available at this time.

take nine to 12 months from which to recover, so this very well could cost Suggs his entire 2012

The injury may have come during a game of basketball, according to ESPN. An Achilles injury can

take nine to 12 months from which to recover, so this very well could cost Suggs his entire 2012

season long before it starts.

This would be a devastating blow to the Ravens because Suggs is arguably their best player on

Suggs will turn 30 in October. Achilles' injuries often linger and players have a difficult time fully recovering from them.

Suggs will turn 30 in October. Achilles' injuries often linger and players have a difficult time fully recovering from them.



Terrell Suggs' quick recovery from Achilles injury goes against recent history

By **Edward Lee**
The Baltimore Sun

OCTOBER 23, 2012, 7:43 PM

In his first season after tearing his right Achilles tendon in 1993, **Dan Marino** threw for 4,453 yards and 30 touchdowns en route to his eighth **Pro Bowl** invitation and the **NFL** Comeback Player of the Year award.

But even the Hall of Fame former **Miami Dolphins** quarterback was stunned when he saw **Terrell Suggs** play Sunday against the **Houston Texans** — just five months after the **Ravens** outside linebacker underwent surgery on his right Achilles tendon.

"Yeah, I am [surprised] considering that he practiced — for what — three days?" Marino, now an analyst for **CBS**, said in a phone interview Sunday. "For him to have an impact on the game, that's pretty special."

Suggs' accelerated return also shocked his teammates, who were still marveling at his performance two days later.

"To start off, what Terrell Suggs did is amazing," inside linebacker **Jameel McClain** said Tuesday. "It still baffles me to this day, to this moment. I said to him, 'For you to be out here after going through what you went through,' is something that makes you want to fight even more for that respect and for that man."

Suggs, the five-time Pro Bowler and reigning NFL Defensive Player of the Year, finished with four tackles, one sack, two quarterback hits and one batted ball in 44 snaps in the Ravens' 43-13 loss to the Texans. Suggs, who had only been activated from the team's physically-unable-to-perform list on Wednesday, said he was eager to break off the rust that had accumulated over his extended layoff.



Terrell Suggs' Torn Achilles Tendon: How His Latest Injury May Impact His Career

By Bobby Esbrandt | Sep 14, 2015, 8:20am EDT

After tearing his right Achilles tendon thought to be lost for the entire season in October, a mere 5 months and 6 days after a devastating injury to his left Achilles tendon, this article will provide an overview of his career moving forward.

WHAT DOES THE RESEARCH TELL US ABOUT THE OUTLOOK OF SUGGS' CAREER?

A 2010 research article studied 31 Achilles tendon ruptures in NFL athletes between 1997 and 2002. Of these athletes, 64% returned to play in the NFL at an average of 11 months after injury. The remaining 36% never returned to play at the NFL level.

The study also examined the durability and athletic performance of the athletes who were able to come back and play. To measure performance, the authors developed a "power rating" which measured each player's productivity by using statistics gathered during game play.

In the three seasons following their return, the players experienced a significant decrease in productivity compared to the three seasons preceding the injury (41.07% decrease).

his age and the difficulties that come with this kind of injury, it makes you wonder if he can defy the odds yet again.

No one can argue that Terrell Suggs bounced back extremely well after his previous Achilles tear, as he went on to register double-digit sacks in both the 2013 and 2014 seasons. However, given his age and the difficulties that come with this kind of injury, it makes you wonder if he can defy the odds yet again.

