Achilles' Heel: Controversies in the Management of Achilles Tendon Ruptures

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Achilles tendon rupture is a common sports injury in adults, especially in older age or those involved in high-intensity sports (i.e., professional athletes). Several factors must be considered when deciding on the proper course of action for a given individual presenting with this injury. Currently, some of the biggest questions on this topic are:

- - Operative or non-operative management?
- - Early or delayed mobilization?

In terms of primary treatment options, operative treatment of an Achilles tendon rupture involves tendon repair via sutures, which may or may not be done with an augmentation procedure. Non-operative management involves the use of one of many orthotic devices (e.g. plaster cast, brace, boot with wedges, etc.).

Regardless of the choice of primary treatment, a second debate is whether or not the patient should undergo an early or delayed mobilization rehabilitation protocol. There is no single, widely accepted definition for either "early" or "delayed" mobilization, but, generally speaking, differences between these two forms of rehabilitation are seen with respect to the timing of weightbearing activities or range of motion exercises; the literature seems to suggest that "early" mobilization is the initiation of weightbearing and/or ankle motion within 2 weeks.

Lastly, another major factor to consider relates to the patient - are they a sedentary or athletic individual? An athlete may have different preferences for certain outcomes or weigh the risk-benefit trade-off associated with a particular treatment differently than a sedentary person. This is important to consider given the downstream consequences of this injury in terms of healthcare costs, the ability to return to work or sport (especially in the case of a professional athlete), and associated complications.

We'll take a look at what the OE Community has to say first and then highlight the findings of some studies conducted on this topic.

OE Poll Results

To date, we've conducted three separate polls on this topic. In the first poll, we asked "if your patient is a professional athlete with an acute Achilles tendon rupture, what would be your preferred treatment option?". Here are the results:

Preferred treatment option for a professional athlete	% of respondents (n = 191)
Operative repair	84%
Non-operative treatment	13%
Undecided	3%

Next, we asked "alternatively, if your patient is sedentary and obtains an acute Achilles tendon rupture, what would your preferred treatment option be?":

Preferred treatment option for a sedentary individual	% of respondents (n = 171)
Operative repair	26%
Non-operative treatment	63%
Undecided	11%

It appears that the type of patient (i.e., athlete or sedentary) presenting with this injury likely influences treatment decisions, with OE Community members favouring operative repair for an athlete but non-operative management for a sedentary individual.

Then, last week, we asked "following surgical repair of an Achilles tendon rupture in an athlete, would you recommend early mobilization?". Among 100 respondents, there was a greater preference for early rehabilitation protocols in this case.

Early mobilization following surgical repair in an athlete	% of respondents (n = 100)
Yes	76%
No	24%

The Evidence

Operative vs. non-operative management

The results of some randomized controlled trials (RCTs) examining this research question are summarized below:

Study	Rehabilitation protocol	Findings	ACE Report link
Twaddle & Poon, 2007[1]	Early mobilization - range of motion (ROM) exercises initiated after 10 days & weightbearing after 6 weeks.	-No statistically significant differences in ROM or function at any visit (8 and 12 weeks, 6 months, and 1 year) -No difference in complications or re-ruptures.	https://myorthoevidence.com/AceReports/Report/84
Willits et al., 2010[2]	Early weightbearing & ROM started after 2 weeks.	-No significant difference in re-ruptures -Lack of	https://myorthoevidence.com/AceReports/Report/67

		clinically important differences between groups, but a greater likelihood of soft-tissue complications with surgery, support nonoperative treatment with early mobilization.	
Keating & Will, 2011[3]	Cast immobilization with weightbearing introduced at 6 weeks in the surgical group & at 8 weeks in the non-operative group.	-At 1-year, no significant differences in re-ruptures, returning to prior levels of sport, time to returning to work/sport, pain and function, or ROM -Significant differences favouring surgery at 12 weeks in peak torque of plantar flexion compared to the uninjured side and function	https://myorthoevidence.com/AceReports/Report/498

In addition to these primary studies, Ochen et al. published a systematic review and meta-analysis in 2019 comparing operative vs. non-operative therapy (https://myorthoevidence.com/AceReports/Report/11229).[4] They included a total of 29 studies (10 RCTs and 19 observational studies), and performed additional analyses to account for differences in study designs and early mobilization protocols. The results are summarized below:

Meta-analysis details	Outcome	Results
Operative vs. non-operative (all studies)	Re-rupture	• RR = 0.43, in favour of operative intervention • 95%CI 0.31 to 0.60 • p < 0.001 • Results were similar when examining RCTs and observational studies separately.
	Complications	• RR = 2.76, in favour of non-operative intervention • 95%CI 1.84 to 4.13 • p < 0.001 • Deemed attributable to a higher risk of infection with surgery, according to the authors
	Return to work	• MD = -1.47 weeks, in favour of operative intervention • 95%CI -11.33 to 8.38 • p = 0.77
Operative vs. non-operative (studies with early weightbearing protocol)	Re-rupture	• RR = 0.49, in favour of operative intervention • 95% CI 0.26 to 0.93 • p = 0.03
Operative vs. non-operative (studies with late weightbearing protocol)	Re-rupture	• RR = 0.33, in favour of operative intervention • 95% CI 0.21 to 0.50 • p < 0.00001
Operative vs. non-operative (studies with early range of motion protocol)	Re-rupture	• RR = 0.60, in favour of operative intervention • 95% CI 0.26 to 1.37 • p = 0.23

CI, confidence interval; MD, mean difference; RR, risk ratio

Lastly, in terms of surgical approach, there is uncertainty as to whether or not the tendon repair would benefit from augmentation. In a meta-analysis of 4 RCTs by Zhang et al. (2018) (https://myorthoevidence.com/AceReports/Report/10328),[5] the authors found no significant differences in patient satisfaction, re-ruptures, infections, or complications between augmented and non-augmented repair.

None of these studies focussed solely on or compared sedentary individuals and athletes.

Early vs. delayed mobilization

Some RCTs that have compared early versus delayed mobilization protocols are summarized below:

Study	Primary treatment & rehabilitation protocol	Findings	ACE Report link
Suchak et al., 2008[6]	Early weightbearing (i.e., after 2 weeks) following surgical repair	-Earlier weightbearing following surgical repair resulted in significantly better quality of life scores and less limitations of daily activities than the standard weightbearing group at	https://myorthoevidence.com/AceReports/Report/2774

		6 weeks -No differences in outcomes at 6 months -No re-ruptures occured in either group	
Kastoft et al., 2019[7]	Non-operative treatment followed by early (starting from day 1) or standard weightbearing (after 6 weeks)	-No differences in function, heel raise height, return to work/sport, or re-rupture between groups at 4.5 years -Statistically significant effect in favour of early weightbearing in the heel raise test at 6 months	https://myorthoevidence.com/AceReports/Report/12056
Aufwerber et al, 2020[8]	Immediate post-operative weightbearing and motion compared to non-weightbearing plaster cast immobilization for 2	-No significant difference in the primary outcome, deep vein thrombosis (DVT) -Significantly	https://myorthoevidence.com/AceReports/Report/12161

	weeks.	higher pain scores in the early mobilization group after 1 week. -Adverse events, including re-rupture and infection, were limited in both groups	

Lu et al. (2019) (https://myorthoevidence.com/AceReports/Report/12169) evaluated this comparison in a recent meta-analysis,[9] accounting for the primary treatment performed (i.e., operative or non-operative) in the included studies when there was sufficient data. There were no significant differences in outcomes, except for time to return to work. The results are provided below:

Meta-analysis details	Outcome	Results
Early vs. delayed mobilization (all studies)	Re-rupture	• RR = 0.95, in favour of early mobilization • 95%CI 0.51 to 1.80 • p = 0.88
	DVT	• RR = 0.28, in favour of early mobilization • 95%CI 0.05 to 1.68 • p = 0.16
	Return to work	Time to return: • MD = -1.56 weeks, in favour of early mobilization • 95%CI -3.09 to -0.04 • p = 0.04

		Incidence of return: • RR = 1.1, in favour of early mobilization • 95%CI 0.91 to 1.34 • p = 0.33
	Return to sports	Time to return: • MD = -2.48 weeks, in favour of early mobilization • 95%CI -5.58 to 0.63 • p = 0.12 Incidence of return: • RR = 1.12, in favour of early mobilization • 95%CI 0.96 to 1.31 • p = 0.15
	Satisfaction	• RR = 1.06, in favour of early mobilization • 95%CI 0.99 to 1.13 • p = 0.11
Early vs. delayed mobilization (studies with operative repair as primary treatment)	Infection	• RR = 0.43, in favour of early mobilization • 95%CI 0.13 to 1.42 • p = 0.17

CI, confidence interval; MD, mean difference; RR, risk ratio

Again, none of these studies focussed solely on or compared sedentary individuals and athletes.

Final thoughts

The evidence on the management of Achilles tendon ruptures requires a thorough assessment, as a straightforward comparison between operative repair and non-operative care can be complicated by variability in rehabilitation protocols across trials and, for this same reason, an accurate evaluation of early versus delayed mobilization may be challenging. Perhaps the next big study on this topic should be a factorial design where patients are randomized to either surgery or non-operative therapy AND to early or delayed mobilization.

Some of study findings summarized above may still provide some useful insights, namely a potentially higher risk of soft-tissue complications and infection, but also, possibly, an earlier return of peak plantar flexion torque, function, and, when trials were pooled, a lower risk of re-rupture with surgery. Such findings highlight a situation where patients and their providers must weigh the trade-off of choosing one intervention over another. Since none of these studies compared or specifically examined sedentary versus athletic individuals, there may be concerns about the generalizability of these results, but, perhaps, a professional athlete may be willing to accept the risks associated with surgery given its potential benefits. In terms of early versus delayed mobilization, one RCT found significantly more favourable outcomes with early mobilization in terms of quality of life and physical performance measures at earlier visits and a recent meta-analysis showed a significantly earlier return to work; however, another trial suggested that patients may experience more pain early on with early mobilization. If early mobilization does indeed result in earlier improvement, an individual might be willing to accept the potential increase in pain. In addition, there needs to be some degree of standardization across these early rehabilitation protocols, with regards to the initiation of ankle motion and weightbearing, in order to have a clearer view on this issue.

Considering all of the above may explain the results of our recent polls, which demonstrated a greater preference for surgery and early mobilization following surgery in athletes who sustain an acute Achilles tendon rupture, suggesting that athletes and/or their clinicians do indeed favour the potential for an earlier return of their function and physical performance.