COA- Achilles Tendon Ruptures

Timothy Charlton, M.D.
USC Dept. of Orthopaedic Surgery
Asst. Professor USC Keck School of Medicine
Foot and Ankle Surgery
No Disclosures
“I don’t get nothing from nobody, including my wife.”

-Bill Hamilton
Achilles Rupture
“…this tendon (Achilles), if bruised or cut, causes the most acute fevers, induces choking, deranges the mind and at length brings death.”

-Hippocrates
Achilles Anatomy

- Spirals 90 degrees
- Collagen I and Elastin
- Surrounded by paratenon
Achilles Anatomy
Blood Supply

• Musculotendinous junction
• Bone-Tendon junction
• Paratenon
• Anterior vascular bed
Achilles Anatomy
Blood Supply

• Relative avascular zone between 2cm and 6cm proximal to the tendon insertion
• “Watershed Zone”
Achilles Peak Forces

12.5 X body weight
Length and What Happens

- Physiologic
- Overuse
- Rupture

Strain

Physiologic
Muscle Force / Elasticity Mismatch
Achilles Exam

- Thompson Test
- Palpable Defect
- Contralateral Sag
- STAMP - Stand And Maintain Plantarflexion
Achilles Rupture Treatment Goals

- Normal Resting Length
- Minimal Complications
- Get the Ends to Touch and Stay Touching
- Avoid Re-rupture
- Avoid Infection
Achilles Rupture Treatment Options

- Open Treatment
- Cast / Dynamic Brace
- Percutaneous
- Minimally invasive
Achilles Tendon Infection is a LIFE changing event

Sterile Technique
Similar To Total Joint Arthroplasty
Blick’s Resting Tension Curve

- Too Loose
- Ideal Tension
- Too Tight

Power
Blick’s Resting Tension Curve

Target Operative Tension

0
10
20
30
40
50
60
70
80

Too Loose
Ideal Tension
Too Tight

4 Months

Power
Blick’s Resting Tension Curve
Target Operative Tension
Achilles Rupture Treatment Options

• Open Treatment
• Cast / Dynamic Brace
• Percutaneous
• Minimally invasive
Expectation Management

1 Year

What You Told Them

Praise
Complaints
What You Told Them
How Long It Takes

Smart
Typical
Dumb
Open vs. Closed
Overall Complications

<table>
<thead>
<tr>
<th>Study or subcategory</th>
<th>Open operative n/N</th>
<th>Nonoperative n/N</th>
<th>RR (fixed)</th>
<th>Weight %</th>
<th>RR (fixed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n/N</td>
<td>n/N</td>
<td>95% CI</td>
<td></td>
<td>95% CI</td>
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<tr>
<td>Nistor 1981</td>
<td>31/45</td>
<td>0/60</td>
<td>7.13</td>
<td>100.00</td>
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<td>Cetti 1993</td>
<td>19/56</td>
<td>3/55</td>
<td>5.019</td>
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<td>5.24</td>
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<td>Schroeder 1997</td>
<td>2/13</td>
<td>0/15</td>
<td>7.74</td>
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<td>Moller 2001</td>
<td>10/59</td>
<td>2/53</td>
<td>34.94</td>
<td></td>
<td>4.49</td>
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<tr>
<td>Total n/N (95% CI)</td>
<td>59/173</td>
<td>5/183</td>
<td></td>
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<tr>
<td>Total events: 59 (Open operative), 5 (Nonoperative)</td>
<td></td>
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</tbody>
</table>

Test for heterogeneity: Chi² = 4.99, df = 3 (P = 0.17), I² = 39.9%
Test for overall effect: Z = 5.88 (P < 0.00001)

Favors Open Surgery: Closed
Favors No Surgery: Non Operative
Meta Analysis Achilles Rx
Khan et al, JBJS 2005
Open Vs. Closed Rerupture

Favors Surgery
Open vs. Closed Achilles Rx
Meta-Analysis
Khan et al, JBJS 2005
Open vs. Perc

Reruptures

Favors Percutaneous
Open vs. Percutaneous Achilles Rx

Meta-Analysis
Khan et al, JBJS 2005
Cast vs. Functional Bracing

Favors Bracing
Post-Operative Casting vs. Bracing Achilles Rx Meta-Analysis
Khan et al, JBJS 2005
From: Operative versus Nonoperative Treatment of Acute Achilles Tendon Ruptures: A Multicenter Randomized Trial Using Accelerated Functional Rehabilitation


Open Vs. Closed

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Nonoperative Events</th>
<th>Total</th>
<th>Operative Events</th>
<th>Total</th>
<th>Weight</th>
<th>Odds Ratio</th>
<th>M-H, Random, 95% CI</th>
<th>Year</th>
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<tbody>
<tr>
<td>Thermann</td>
<td>0</td>
<td>28</td>
<td>0</td>
<td>22</td>
<td></td>
<td>Not estimable</td>
<td></td>
<td>1995</td>
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<tr>
<td>Metz</td>
<td>5</td>
<td>41</td>
<td>3</td>
<td>42</td>
<td>59.5%</td>
<td>1.81 [0.40, 8.10]</td>
<td>2008</td>
<td></td>
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<tr>
<td>Present Study</td>
<td>3</td>
<td>72</td>
<td>2</td>
<td>72</td>
<td>40.5%</td>
<td>1.52 [0.25, 9.39]</td>
<td>2010</td>
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<tr>
<td>Total (95% CI)</td>
<td>8</td>
<td>141</td>
<td>5</td>
<td>136</td>
<td>100.0%</td>
<td>1.68 [0.53, 5.36]</td>
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</tr>
</tbody>
</table>

Heterogeneity: Tau² = 0.00; Chi² = 0.02, df = 1 (P = 0.89); I² = 0%
Test for overall effect: Z = 0.88 (P = 0.38)

Favors Operative
Operative versus Nonoperative Treatment of Acute Achilles Tendon Ruptures
A Multicenter Randomized Trial Using Accelerated Functional Rehabilitation

By Kevin Willits, MA, MD, FRCSC, Annunziato Amendola, MD, FRCSC, Dianne Bryant, MSc, PhD, Nicholas G. Mohtadi, MD, MSc, FRCSC, J. Robert Giffin, MD, FRCSC, Peter Fowler, MD, FRCSC, Crystal O. Kean, MSc, PhD, and Alexandra Kirkley, MD, MSc, FRCSC

Investigation performed at the Fowler Kennedy Sport Medicine Clinic, London, Ontario, and the University of Calgary Sport Medicine Centre, Calgary, Alberta, Canada

Affected Side Strength (N/m)

0 10

1°30°/s 1°60°/s 1°240°/s 2°30°/s 2°60°/s 2°240°/s

Time and Speed
• 26,000 surgery in ABOS Oral Exam
• Foot and Ankle Surgery had higher risk of complications vs other body parts
• 8.41% infection rate Achilles tendon
“And the Survey Says?”
Charlton’s Way

- Achillon
- Bilateral drape / prone position
- Cheat 5 to 10 degrees too tight
- Judge at 45 knee flexion
Achilles Rupture
Sign the BACK of the Leg

Put the tourniquet on before you flip
Achilles Rehab

Thordarson Open

• Plantar Flexion Cast
• NWB 2 weeks
• Passive to Neutral on Week #3
• WBAT w/ heel lift in cam walker up to week #6
• Felt heel lift in a shoe on week #6

Charlton Achillon

• Plantar Flexion Cast for 4 weeks
• Cam Walker in Plantar Flexion for 4 Weeks PWB
• WBAT in Cam Walker at Week #8
• Cowboy Boot for 4 weeks until week #12
Achilles “Birthday”

4 Months

Too Loose

Ideal Tension

Too Tight

Power
Oops, Somebody Missed It

1/6th of Achilles Ruptures Are Missed By the 1st Physician Who Exam The Patient
Chronic Rupture

- Small gap: primary repair
- Medium gap: VY lengthening
- Large gap: FHL transfer
From: Management of Chronic Ruptures of the Achilles Tendon
Conclusion

• Surgery vs Non-operative remains controversial
• Balance the tension
• Avoid the big complications—rerupture and infection
• Get the correct diagnosis
Thank you
A 62-year-old tennis player ruptured his Achilles tendon 12 months ago. He initially chose non-operative treatment, but continued to have weakness and difficulty ambulating. During surgery extensive debridement there is a 4cm gap between viable tissue ends. Which of the following surgical techniques most likely will provide the best clinical outcome?

1. Primary repair with the foot in maximal plantarflexion followed by a gradual stretching program
2. Reconstruction with hamstring autograft
3. Achilles repair augmented with transfer of the posterior tibial tendon
4. Achilles repair augmented with transfer of the extensor digitorum longus
5. Achilles repair augmented with transfer of the flexor hallucis longus
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1. Primary repair with the foot in maximal plantarflexion followed by a gradual stretching program 1%
2. Reconstruction with hamstring autograft 6%
3. Achilles repair augmented with transfer of the posterior tibial tendon 4%
4. Achilles repair augmented with transfer of the extensor digitorum longus 3%
5. Achilles repair augmented with transfer of the flexor hallucis longus 86%

- Will RE, Galey SM Outcome of single incision flexor hallucis longus transfer for chronic achilles tendinopathy. . Foot Ankle Int. 2009 Apr;30(4):315-7
What is the biggest advantage of surgical repair of an acute Achilles tendon rupture with early range of motion compared to non-operative treatment with immobilization in a short-leg cast for 6 weeks?

1. Lower rate of infection
2. Lower rate of nerve injury
3. Better skin cosmesis
4. Lower rate of DVT/ VTE
5. Lower rate of re-rupture
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Which factor increases the chance of wound complications after Achilles tendon repair?

1. increased body mass index
2. immediate surgery
3. male gender
4. age over 40 years old
5. tobacco use
Which factor increases the chance of wound complications after Achilles tendon repair?

1. increased body mass index 5%
2. immediate surgery 3%
3. male gender 1%
4. age over 40 years old 1%
5. tobacco use 91%

Which factor increases the chance of DVT/VTE after Achilles tendon repair?

1. Obesity
2. Non operative treatment
3. Previous history of DVT/VTE
4. Age over 40 years old
5. None of the Above
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