Achilles Tendon Rupture: Getting the Athlete Back on the Field (an algorithm for success)

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Disclosures
Royalties
Arthrex
Wright Medical
DJO
Consultant
Wright Medical
Arthrex
Amniox

Achilles Repairs do Poorly in Athletes?

- Parekh et al, FAS '09: Epidemiology and outcomes of Achilles tendon ruptures in the NFL
- 32% did not return to play
- Power rankings significantly reduced in all positions over 3 yrs
  - Avg >50%, LB worst

How do we change this?

Successful Treatment

- Restoration of muscle–tendon integrity
- Avoid complications
- Rehab to normal strength
- Return to full activity
Successful Treatment

• Restoration of muscle –tendon integrity
• Avoid complications
• Rehab to normal strength
• Return to full activity asap

Successful Treatment

• Athlete = Fix it!
  – Decrease re-rupture rate
  – Increase strength of repaired tendon
  – Easier rehab

Operative vs. Nonoperative

• Operative:
  – Re-rupture rate
  – 1.5 vs 20 % with nonop
  – Accelerated recovery
  – ↑ Plantarflexion strength
  – Restore resting tension
• Non-operative
  – Avoids
  – Wound complications
  – Infection
  – Nerve injury

Operative versus Nonoperative Treatment of Acute Achilles Tendon Ruptures

A Randomized Study Using Sciconian Functional Rehabilitation

Acute repair of tendo Achilles

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Achilles rupture avg separation = 2.7cm

Cetti, Clin Orthop, 1994

50% defects not compensated by plantar flexion

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How to Fix - Cochrane Recommendations

- Open operative repair significantly reduces risk of re-rupture
- Significantly higher complications including infection though
- Complications may be reduced by percutaneous repair

FAI ’15, Nov; 36 (11): 1279-86

Clinical Outcomes and Complications of Percutaneous Achilles Repair System (PARS) Versus Open Technique for Acute Achilles Tendon Ruptures

Andrew R. Hsu, MD, Carroll P. Jones, MD, Bruce E. Cohen, MD, W. Hodges Davis, MD, J. Kent Ellington, MD, and Robert B. Anderson, MD
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Six randomized controlled trials of 277 Achilles repairs were eligible for review
- 136 minimally invasive repairs
- 141 conventional open repairs

- No significant difference in re-rupture rate, sural nerve injury, deep infection
- MIS had a significantly reduced risk of superficial wound infection, with three times greater patient satisfaction

*PARS had higher return to baseline by 5 mo (p = .0001) and 6% fewer total complications

- Ave f/u = 36 ± 47 wks
- No re-ruptures overall
- No DVTs

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>PARS (n = 101)</th>
<th>Open Repair (n = 169)</th>
<th>Overall (n = 270)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return to baseline activity by 5 mo</td>
<td>99%*</td>
<td>85%</td>
<td>88%</td>
</tr>
<tr>
<td>Sural neuritis</td>
<td>0%</td>
<td>3%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Superficial wound dehiscence</td>
<td>3%</td>
<td>4.1%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Superficial infection</td>
<td>0%</td>
<td>1.6%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Re-rupture</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Re-operation for suture irritation</td>
<td>2%</td>
<td>0%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Re-operation for deep infection</td>
<td>0%</td>
<td>1.6%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Total complications</td>
<td>9%</td>
<td>16.7%</td>
<td>8.4%</td>
</tr>
</tbody>
</table>
Multiple stab incisions
“Minimize open repair complications”
Restore tendon length and continuity
2 minor complications
No infections
Subsequent studies with higher complication rate

Early Perc Achilles Repair

Assal et al – JBJS 2002

Results
– No infections or wound complications
– Postop AOFAS score avg of 96 (range 85-100)
– No nerve issues
– 3 early re-ruptures
  • 2 noncompliant
  • 1 fall
### Next Generation Jigs

**Advantages**
- Anatomically improved jig
  - Non-disposable
- Divergent, locked fixation
- Colored suture

### Mini-Open Repair

**Contraindication**
- Very proximal or insertional ruptures
- Avulsions
- Subacute/Chronic
  - 3 weeks

### Mini-Open

**Incision**
- Transverse or longitudinal incision at level of rupture
  - I prefer transverse
- Identify and preserve pseudo-sheath (*the key*)

### Mini-Open

**Incision**
- Suture management
Mini-Open

- Secure sutures in maximum plantar flexion

Mini-Open

- Excellent healing with good tendon contour
  - Only one “transient” sural nerve problems in our first 100+ cases
  - No re-ruptures

Mini-Open

- Allows for more rapid recovery
  - Example: 9 weeks postop

Rehabilitation

- Week 1-2: NWB, gentle AROM when wound sealed
  - ASA 325mg for first 2 weeks

- Week 2-3: Hinged orthosis, start TDWB, continue ROM & strength (cycle & pool)

- Week 4-6: Hinged orthosis or boot, FWB, heel lift, increased intensity of exercise

- Week 6-12: Continue exercise with increased intensity, run in pool, stair climber

- Week 12+: Jogging increases, functional exercises
Rehabilitation

- Week 16+
  - Resistance training
  - Running
    - Pool
    - Alter-G
  - Plyometrics
    - Jump training
    - Sled

- Avoid excessive DF – do not let it stretch out – protect for 12 weeks
  - Lose push-off strength (explosion)
  - Difficult to salvage

Mini-open in the Elite Athlete: RBA Pilot

- 13 cases in elite athletes (2011-13)
  - 2 Olympians (gymnast, long jump)
  - 9 NFL (LB, TE, RB)
  - 2 NBA
- 2 locked sutures used on each end
- Avg return to full athletic activity was 6.1 months (range 5.3 – 7.2 months)

NFL Experience

- JSOA, Dec 2014
- 9 NFL players – single surgeon (RBA)
- Avg RTP 8.9 months (one at 5.4 months)
- No re-ruptures, no wound or sural nerve issues
NFL Experience

- 2014 season: 10 more with mini-open PARS — 9 this NFL season
- No wound or sural nerve issues
- Average RTP 7 months

Achilles Ruptures/Repair

- I now use *Mini-open* for all acute mid-substance ruptures, regardless of size of individual or sport
- Has all of the advantages of operative intervention while decreasing risks of open repair
- Additional advantage of an accelerated healing time and rehab program

Achilles Ruptures

- Can be devastating injuries in the elite athlete and frustrating in everyone else
- Be aggressive with treatment yet conservative with recovery
- Season-ending but does not have to be career-ending

Thank You!