ACUTE ACHILLES RUPTURES IN PRO ATHLETES
Speed return-to-play

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“Mini-open” repair of acute tendo Achilles ruptures—The solution?

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CONTROVERSY IN TA ACUTE RUPTURES

The Influence of Early Weight-Bearing Compared with Non-Weight-Bearing After Surgical Repair of the Achilles Tendon

By Amar A. Suchak, MD, Geoff P. Bostick, PT, Lauren A. Beaupré, PhD, PT, D’Arcy C. Durand, MD, and Nadr M. Jomha, MD, PhD, FRCS(C)

Investigation performed at the University of Alberta, Edmonton, Alberta, Canada
NON-OPERATIVE vs OPERATIVE

NON-OP = SHORT LEG CAST + NWB FOR 4-12 WEEKS (72 HOURS FROM RUPTURE)
Rerupture rate 8-21%

OPERATIVE = OPEN REPAIR + SHORT LEG CAST NWB 4-8 WEEKS
Rerupture rate 2-5%
Infection/wound complications 0-5%

Cetti AJSM 1993, Möller JBJS 2001
EARLY WEIGHTBEARING AND MOBILIZATION

Twaddle AJSM 2007, Suchak JBJS(Am) 2008
HEALING AND REPAIR

Phases: Swelling - repair - remodelling
Fibroblasts: GOLDEN MONTH POSTRUPTURE
2\textsuperscript{nd} a 6\textsuperscript{th} weeks

TENSION, MOVEMENT and WEIGHTBEARING
Investing in "TA healing/repair quality" ...
INITIAL APPROACH?
META-ANALYSES

52 MA PUBLISHED ON ACUTE ACHILLES RUPTURES
9/52 META-ANALYSES MET CRITERIA
RERUPTURE RATES

7/9 STUDIES
SURGERY LESS RERUPTURES
COMPLICATIONS

8/9 STUDIES

SURGERY MORE COMPLICATIONS
OPEN vs MINIINVASIVE APPROACH

NO DIFFERENCES IN:

- RERUPTURES
- TISSUE ADHESION
- DEEP INFECTION
OPEN vs MINIINVASIVE APPROACH

BUT MINIINVASIVE APPROACH:

LESS SUPERFICIAL WOUND INFECTIONS
LESS SKIN COMPLICATIONS
3/9 STUDIES
HIGHEST LEVEL OF EVIDENCE

VS
2/9 STUDIES
HIGHEST LEVEL OF EVIDENCE

SURGERY:

LOWER RERUPTURE RATE

HIGHER RATE MINOR AND MODERATE COMPLICATIONS
1/9 STUDIES
HIGHEST LEVEL OF EVIDENCE

SURGERY:
LOWER RERUPTURE RATE WHEN COMPARED WITH NON-OP NON-FUNCTIONAL REHAB

NO DIFFERENCE vs NON-OP WITH FUNCTIONAL REHAB

Willits JBJS(Am) 2010
NON-OP IS AS EFFECTIVE AND SAFE AS OPERATIVE TREATMENT
Level 1, RCT, Op vs Non-op, 1y f/u

Non-op: WBAT x8 weeks
(no ROM for first 8 weeks)
10% reruptures

Op: WBAT x6 weeks
(ROM at 2 weeks)
0% reruptures, 12% superficial infections
Better function at 12m in the op group

Olsson AJSM 2013
Level 1, RCT, Non-op – WBAT (day #1) vs NWB (6 weeks), 1y f/u

Early ROM both groups at 2 weeks
No differences in outcome

9% reruptures (3/26 WB, 2/25 NWB)

40-50% strength deficit at 1 year

Only 16% returned to pre-injury level

Barfod JBJS (Am) 2014
Level 1, RCT, Non-op – WBAT (day #1) vs NWB (8 weeks), 2y f/u

2 groups, both non-op:

NWB x8 weeks vs early WB

Reruptures: 3% early vs 5% NWB (no diff)

MAYBE RANGE OF MOTION IS NOT THAT IMPORTANT
EVIDENCE IS NOT CLEAR IF IT IS EARLY WB OR EARLY ROM THAT GIVES NON-OP TREATMENT GOOD RESULTS
Immediate FWB = higher pt satisfaction and earlier RTW and RTP

All functional parameters favor FWB but no statistical significance

Brumann Injury 2014
HOW ABOUT THE PATIENT?

RECREATIONAL vs PROS
HOW ABOUT THE PATIENT?
PHYSICALLY ACTIVE PATIENTS

SURGERY LESS RERUPTURES
LESS CHANCE OF ELONGATION
NON PHYSICALLY ACTIVE PATIENTS

NON-OPERATIVE
LESS CHANCE OF COMPLICATIONS OTHER THAN RERUPTURE
FUNCTIONAL REHABILITATION?
PATIENT’S COMPLIANCE?

NON-OPERATIVE ELONGATION?
HOW ABOUT US?

LACK OF DEFINED UNIVERSALLY ACCEPTED OUTCOME MEASUREMENTS

MANY DIFFERENT OPERATIVE TECHNIQUES
MANY DIFFERENT REHAB PROTOCOLS
Conservative treatment for acute Achilles tendon rupture: survey of current practice

Donald Osarumwense, Jonathan Wright, Kikachukwu Gardner, Laurence James
University Hospital Lewisham, London, United Kingdom

were enquired about.

Results. 62 of 86 respondents treated Achilles tendon ruptures conservatively by below-knee casts (n=51), above-knee casts (n=5), or functional braces (n=6). The most common immobilisation regimen (n=7) was to keep the foot in a sequence of an equinus position,
Cirugía percutánea y rehabilitación precoz en las roturas del tendón de Aquiles. Protocolo y estudio prospectivo

Dres. M. Monteagudo de la Rosa\(^{(1,2)}\), M.J. Rodea Butragueño\(^{(1)}\)

\(^{(1)}\) Unidad de Cirugía Ortopédica y Traumatología. Fundación Hospital Alcorcón. Madrid.

HEALING AND REPAIR

- Inflammatory response + mechanical stimuli

- It IS POSSIBLE to accelerate and modulate healing capacity of the Achilles tendon
Intracellular biogenesis of collagen fibrils in ‘activated fibroblasts’ of tendo Achillis

AN ULTRASTRUCTURAL STUDY IN THE NEW ZEALAND RABBIT


From the University of Alcalá de Henares, Madrid, Spain
HEALING AND REPAIR

Phases: Swelling - repair - remodelling
Fibroblasts: GOLDEN MONTH POSTRUPTURE 2\textsuperscript{nd} - a 6\textsuperscript{th} weeks

TENSION, MOVEMENT and WEIGHTBEARING
Investing in "TA healing/repair quality" ...

Intracellular biogenesis of collagen fibrils in ‘activated fibroblasts’ of tendo Achillis

AN ULTRASTRUCTURAL STUDY IN THE NEW ZEALAND RABBIT


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BRAINSTORMING

PROTOCOL - PROSPECTIVE STUDY

EFAS ADVANCED COURSE MUNICH 2011 TA acute ruptures, current techniques – M Monteagudo
BRAINSTORMING:
Preseries of patients - year 2000

• Lower rerupture rates
• Lower complications (sural neuroapraxia 23%)
• Lower cast/non weightbearing period
• Lower time to return to work and return to sport practice
• Lower costs
• For any patient of any age
• Universal, at any region, country, continent
INFORMED CONSENT:
ORTHOPAEDIC vs SURGERY

OUR PROTOCOL:
LOCAL ANAESTHESIA
MINIINVASIVE REPAIR
EARLY FUNCTIONAL REHABILITATION

EFAS ADVANCED COURSE MUNICH 2011 TA acute ruptures, current techniques – M Monteagudo
LOCAL ANAESTHESIA:

1. SURAL NERVE CONTROL
2. PATIENT ACCEPTANCE AND COMFORT

3. INTRAOPERATIVE SUTURE TESTING
4. LESS COMPLICATIONS THAN SPINAL OR GENERAL
5. NO HOSPITAL ADMISSION
6. COST EFFICIENCY
7. EASIER ACCESS TO OPERATING THEATRE

EFAS ADVANCED COURSE MUNICH 2011 TA acute ruptures, current techniques – M Monteagudo
SECURITY AREA FOR SURAL NERVE

40% - PARAESTHESIAS WITH TILTING
SURGICAL TECHNIQUE

5 STAB INCISIONS + MINI OPEN + NO TOURNIQUET
MODIFIED KESSLER TECHNIQUE
SINGLE-STRAND SUTURE – 1 PDS II (Ethicon, Johnson&Johnson)

N°2 POST-MORTEM NEEDLE (Aesculap)
FREE THE TENDON SHEATH FROM OVERLYING SUBCUTANEOUS TISSUE

AVOIDS SKIN PITS AND ADHESIONS
INTRAOPERATIVE TA TENSION TESTING

OVERTIGHTEN SUTURE IF FUNCTIONAL POSTOP
PARATENON REPAIR OVER KNOT (4-0 Vicryl)

SKIN CLOSURE (3-0 Prolene)

BELOW-THE-KNEE POSTERIOR SPLINT IN GRAVITY EQUINUS
POSTOP – OUTPATIENT CLINIC FOLLOW-UP

24-48 h – Wound inspection, gentle mobilization, isometric exercise

1st and 2nd week – Wound inspection, gentle mobilization (10 minutes), sutures out

2nd week – Splint removal and partial weight bearing on a heel supported shoe or orthosis, wound massage to prevent adhesions
2-4th week – Plantigrade weight bearing as tolerated, abandon crutches

4-6 weeks – Swimming and cycling encouraged

7-8 weeks – Initiate heel raise

2 months – Jogging, toe-standing

3-4 months – Jump sports, single-limb hops
GAIT 5 WEEKS POSTOP
GAIT 6 WEEKS POSTOP
OUR SERIES
2000-2010

- 275 acute TA ruptures following protocol
- One single surgeon
- Goals achieved
- Cumulative cost savings in excess of 300,000 €
- Major complications – one rerupture
- Minor complications – 15 cases
COMPLICATIONS
OUR SERIES with 3 year follow-up: Case 152

One rerupture
(at 4 weeks postop, husband of Anaesthesiologist)
OUR SERIES with 3 year follow-up:
Cases 89, 161

2 sural nerve neuroapraxias (one self-resolved in weeks, one needed surgical release)
OUR SERIES with 3 year follow-up:
Case 50

1 wound dehiscence
(outpatient wound care - resolved uneventfully)
OUR SERIES with 3 year follow-up: Case 67

1 deep venous thrombosis DVT
(19 yo patient with LMWH and bleeding disorder previously unknown congenital pathology)
CURRENT CONCEPTS IN MANAGEMENT OF ACUTE ACHILLES TENDON RUPTURES
PROFESSIONAL vs RECREATIONAL ATHLETES

RECREATIONAL vs PROS
RESULTS - EPIDEMIOLOGY

25 recreational – 25 professional

Mean age 27yo (18 – 35)

38 left TAs – 12 right TAs

Mean Follow up 2.1 years (minimum 12 months)

22 ♂ and 3 ♀
SPORT PRACTICE AT INJURY

- Rugby: 3 (12%)
- Basketball: 4 (16%)
- Football: 8 (32%)
- Raquetball (tennis, padeltennis, squash): 10 (40%)
YEAR DISTRIBUTION - Professionals

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<th>Year</th>
<th>Patients</th>
<th>Percentage</th>
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<tr>
<td>2003</td>
<td>4 (16%)</td>
<td></td>
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<tr>
<td>2004</td>
<td>6 (24%)</td>
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<tr>
<td>2005</td>
<td>8 (32%)</td>
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<tr>
<td>2006</td>
<td>7 (28%)</td>
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YEAR DISTRIBUTION - Recreational

Patients

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<th>Year</th>
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<th>Percentage</th>
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</thead>
<tbody>
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<td>2003</td>
<td>2 (8%)</td>
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</tr>
<tr>
<td>2004</td>
<td>8 (32%)</td>
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<td>3 (12%)</td>
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<tr>
<td>2006</td>
<td>12 (48%)</td>
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EFAS ADVANCED COURSE MUNICH 2011 TA acute ruptures, current techniques – M Monteagudo
Peak incidence in August – September

90% patients operated within 48 hours from rupture

Mean procedure time (anaesthesia, surgery, splint): 12 minutes
Full range of movement – 4.45 weeks
No limping gait – 12.45 weeks on average

Calf atrophy – 6 months
Single heel raise – 14.5 weeks (11 weeks in Pros)

One minute unsupported toe-standing test + one minute single-limb hops – 20 weeks (12 weeks in Pros)
AOFAS ankle-hindfoot score:

80 at 6 months (95 in Pros)
98 at 12 months (99 in Pros)

Return to previous sport practice:

22 weeks (5.5 months) recreational vs 16 weeks (4 months) pros
PATIENT SATISFACTION

95% PATIENTS VERY SATISFIED

3 PATIENTS WITH CONTRALATERAL OPEN REPAIR MORE SATISFIED WITH OUR PROTOCOL

100% NO PAIN AT SURGERY
TAKE HOME MESSAGE

INCIDENCE ON THE RISE

MORE DEMANDING PATIENTS

FROM BIOLOGY TO SURGERY
AND POSTOP

GOLDEN MONTH FOR WEIGHTBEARING
TAKE HOME MESSAGE

LOCAL ANAESTHESIA AND LESS INVASIVE TECHNIQUES

OVERTIGHTEN IF FUNCTIONAL

BUT WHATEVER YOU DO …

EARLY MOVEMENT AND WEIGHTBEARING PREVENTS RERUPTURES AND COMPLICATIONS
Manuel Monteagudo

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