Managing the failed Achilles Rupture Repair
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- Skin wound Complications
- Deep Infection
- Nerve Injury**
- Overlengthened tendon
- Re-rupture
- DVT / PE **

Skin Incision Breakdown

** not addressed in this talk

Incidence
- 10% wound complication rate
- 3% required additional surgery
  
  Bruggeman et al: CORR 2004

Higher in Obesity / DM
- Odds ratio 2.1 vs non obese
  
  Burrus et al: FA Spec 2015

No difference between open and precut repair
- Wound complications (superfic & deep); infections
  
  Hsu et al: FAI 2015

Prevision better than Cure
- Medial para Achilles approach
- Full thickness initial incision through paratenon
- Minimal retraction incision
- Deep compartment fasciotomy
- Meticulous paratenon repair
- Layered skin closure

Management of superficial wound breakdown

Superficial – no slough
- Mupirocin cream 2% (bactroban)

Superficial – with slough
- Collagenase ointment (Santyl)
- MEDIHONEY

Superficial – with granulation
- Silver Alginate (SilverCel)
Deep Breakdown – AchillesExposed

**Vacuum Assisted Closure (VAC)**

-No Infection
- Protect tendon
  - Adaptic
- Change every 2-3 days

**With infection – I+D**

Mosser et al J Foot Ankle Surg 2015

6 patients
13.6 days +/- 6 days
Then SSG
Hospital stay 31 +/- 16 days

**I+D plus gradual closure**


15 cases
60 days to heal in 13/15
2 took > 1 year
All had signif atrophy and skin adhesions

**Local rotational flaps**

Kumta / Maffuli : Act Ortho Belg 2003

11 patients with 7 results
4 (36%) fair results

Medial plantar flaps
Peroneal reverse flow flaps
Posterior Tibial flaps

Jakubietz et al: J Microsurg 2010
9 patients sched for 180 propeller flaps
2 found not to have adequate perforators at surgery
2/7 (30%) partial flap necrosis -> SSG

**Free Gracillis Flap**


21 cases
20 flaps survived
4 deep infections
2 early / 2 late
Deep Infection
Indolent
Presentation
  Chronic wound drainage
  Often with sinus
  Often > 1 year since repair
  Usually multiple courses PO Abx
  No systemic signs
  Equivocal serology

THESE HAVE DEEP INFECTION
  Local suture infection (deep)
  Deep tendon infection
Localized
  Suture reaction
  Usually infected

Manage with local I+D
Follow sinus tract
Suture removal
As much as can be found
Aggressive Achilles debridement
Post op antibiotics

Extensive Deep Infection
Treatment: Staged Aggressive debridement
  Tendon
  Suture
  Any infected tissue
  PMMA Abx spacer/ IV Abx
  Once clean: 2nd staged Reconstruction
FHL transfer if present
Achilles allograft
  Kane / Raikin FA Spec 2015

Re-Rupture and Large Defects
Consequences
  46% of people have significant dysfunction
  Gait
  Stairs / inclines
  Need brace to function

Goals of treatment
  Restore length
Robust repair
Functional muscle unit

Timing of surgery – If surgery delayed > 6 weeks

*No difference in* Strength or Power
*Difference in* Calf circumference and Endurance

Christensen: Acta Chir Scan 1953
Inglis et al: CORR 1981

Treatment Algorithm
**If Post Debridement Defect / Gap**
- < 3cm
  - DIRECT END-END REAPIR *(OPEN)*
- 3-6cm
  - V-Y GASTROC ADVANCEMENT
- >6cm
  - GASTROC TURNDOWN FLAP

+/- F.H.L. TENDON TRANSFER

**V-Y lengthening** Abraham, Pankovich JBJS 1975
Inverted V 1.5-2 x gap
Up to 6cm defect
Depends on amount of Proximal tendon
End-end repair

Raikin et al: FAI 2007
15 patients
Average gap 5.6cm
Follow up:
- Cybex testing
  - Peak PF torque :91% of unaffected side
  - Self assessed : 60% excellent / 40% good
  - AOFAS-AH : 58 pre op -> 94/100 post op
  - 75% could do >20 SLHR

**Achilles Turndown** Christensen 1931
Ahmad / Raikin : AAOS 2014
24 patients at 74 mnths Follow-up
Ave gap : 7.5cm (min 6cm)
- FAAM-ADL score : 92.2 /100
- VAS pain 0.8/10 (pre op 6.6)
- 22/24 Good / excellent results (91%)
**FHL tendon transfer**  
Attributed to Wapner et.al. FA 1993

Harvest from midfoot
- Looped through drill hole back onto itself
  - **29.5% loss** of Plantarflexion power when used as isolated procedure

**With open approach**
- Harvest same incision
- 3cm shorter than harvest from foot
- Weave into Achilles
- Biotenodeisis into calcaneal bone tunnel

**FHL muscle hypertrophies**
- 17% increase muscle volume  
  Hahn FAI 2008

**No functional deficits**
- Clinically  
  no subjective or objective gait asymmetries.

**Pedobarography**
- Unloading of the first toe with a load transfer to the MT heads  
  Hahn : Clin Biomechanics 2008

“**morbidity from FHL transfer is clinically insignificant.**”
- Coull : FAI 2003

**Peroneus Brevis**  
Maffulli

In Phase tendon but weaker than FHL
- Gaps < 6.5cm

**22 pt @ 15 yr FU**
- 14% decrease peak torque compared to other limb
- 10% decrease calf circumference
- ATRS 89.5/100
- 4 excellent/9 good/3 fair  
  Maffulli JBJS 2012

**15% loss eversion strength**
- Galant Am J Ortho 1995

**Minimally invasive technique**  
Maffulli et al: Int Orthop 2015

Utilizing: **Peroneus Brevis (5)**
- Free Semitendinosus Autograft (16)

39 months
- 17/21 Good / excellent (81%)
- ATRS : ave 86/100
- Improved PF strength and Calf circumference
**Free Allograft**
Mainly case reports - 2 studies (level 4)

1. 14 patients at 16mnt FU (12-27)
   - 7cm defect (4-15cm)
   - 2 with calcaneal bone block
   - All could do SLHR at 27 weeks
     Ofili et.al.: J FA Surg 2016

2. 4 patients
   - Allograft and Xenograft
   - Gap 3.5-6cm
   - All back to pre injury activity at <16 wks
     Hollawell et al: J FA Surg 2015

Conclusion

**Complications of Achilles Rupture repair surgery are rare and can usually be resolved with salvage of limb function**

Wound problems
- Better avoided than managed
- Local care usually sufficient – may need surgical coverage

Deep infections
- Always need surgical debridement

Missed Ruptures / Re-ruptures
- do best with surgical reconstruction according to algorithm