

Acute Achilles Tendon Rupture



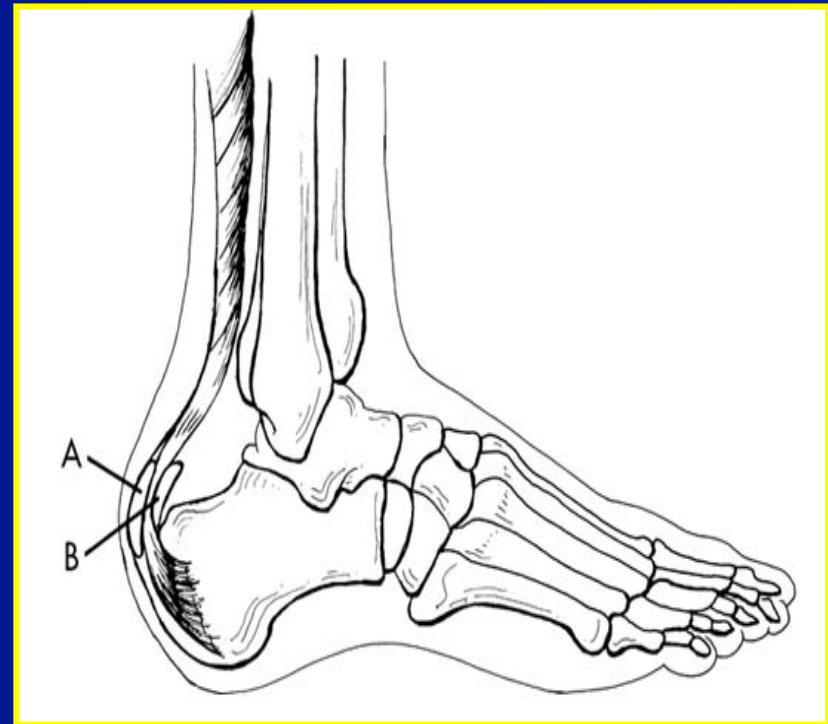
Achilles: History

- Greek warrior in Trojan war
- Mother dipped in river Styx to make immortal
- Invulnerable except heel
- Killed by Paris



Anatomic Considerations

- Achilles tendon
- Paratenon
- Retro Achilles bursa (a)
- Retro Calcaneal bursa (b)
- Posterior Calcaneal process
- Blood Supply



Achilles Tendon Pathology

- Achilles Tendinopathy
 - Peritendinitis
 - Tendinosis
 - Insertional vs. Non-insertional
- Chronic rupture
- Acute rupture

Pathogenesis

■ Intrinsic Factors

– General

- Decreased perfusion
- Systemic diseases
- Gender/age/weight

– Local

- Valgus/Planus
- Limb length

■ Extrinsic Factors

– General

- Corticosteroids
- Fluroquinolone
- Drugs/narcotics

– Sports

- Training errors
- Excessive loads
- Environment

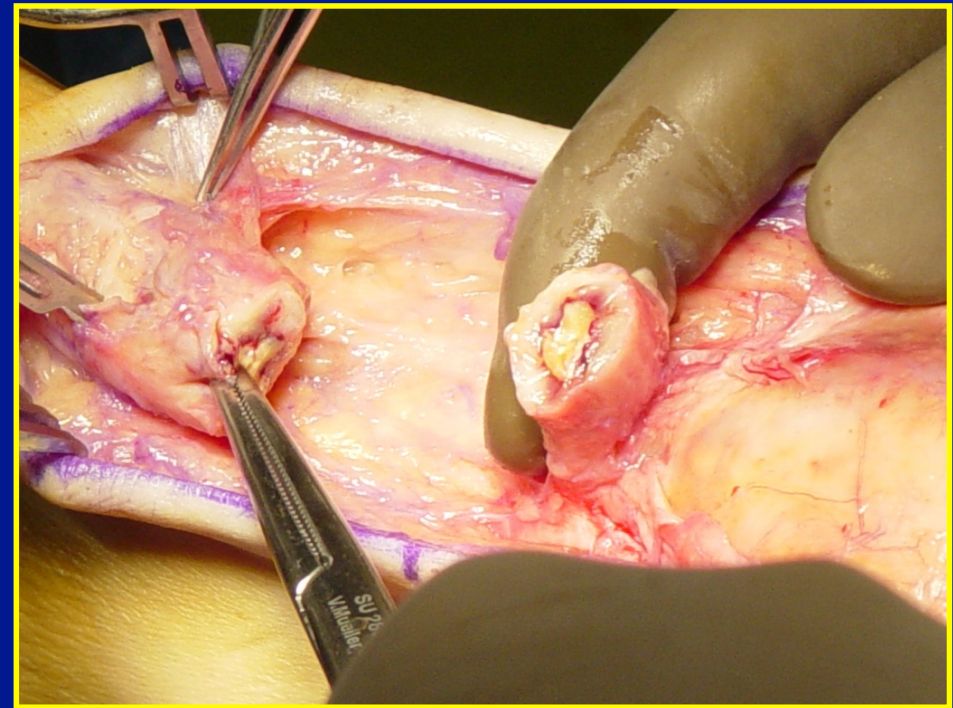
Epidemiology: Acute

- Gender
 - Males 2:1 over females
 - Carden '87
- Age
 - 30-45 and 70's
 - Pillet '72
- Industrialized countries
- Left > Right



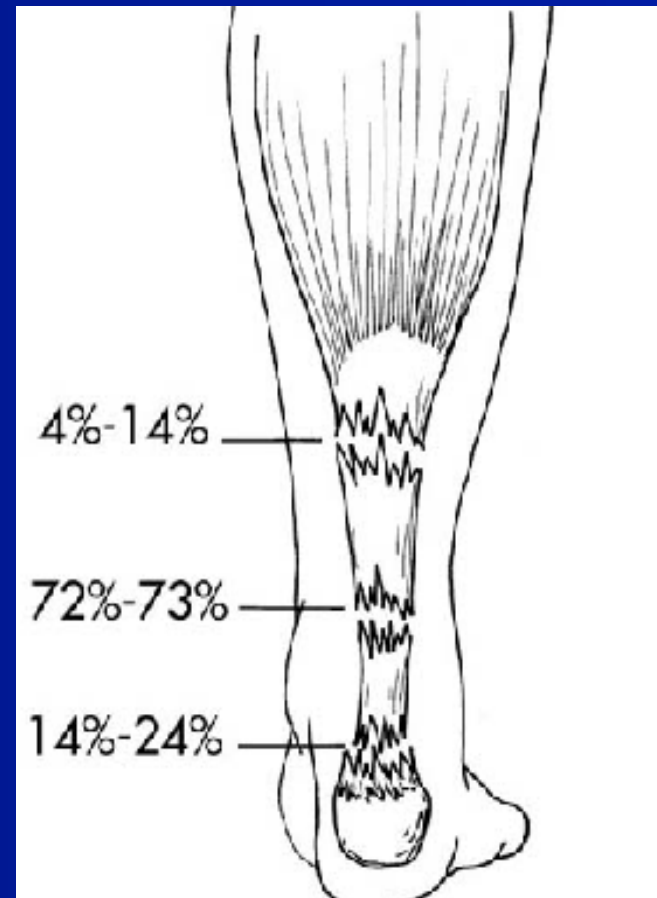
Acute Rupture

- Intrinsic factors
- Extrinsic factors
- Spontaneous
 - Degeneration
 - Mechanical



Site of Rupture

- Myotendinous Jxn
- Midsubstance
2-6 cm proximal to
insertion
- Avulsion



Rupture Mechanism

- Direct trauma
- Pushing off with foot in PF, knee extended (concentric)
- Unexpected DF
 - At 8% tendon will fail



Diagnosis

■ History

- Male between 30 and 50 years
- Sedentary job but in athletic activity
 - Weekend Warrior
- Pop, “hit” in the back of the leg
- Pain posteriorly in calf
- Bruising
- Pain is variable

Diagnosis

- Physical Exam
 - Palpable defect
 - Thompson Test
 - Tip-toe test
 - Bruising/Swelling
 - Weakness



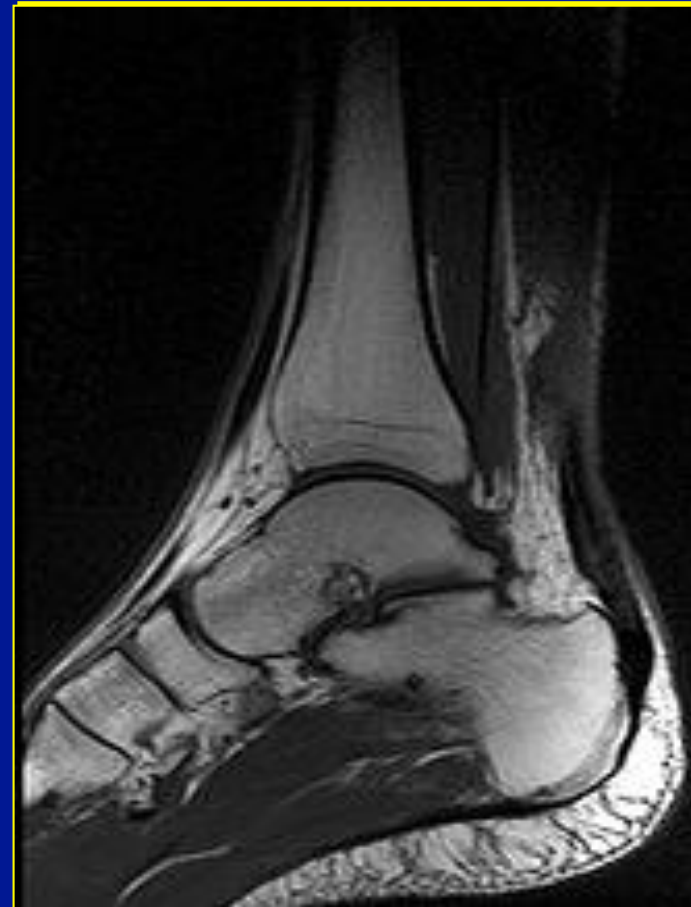
Thompson Test



Positive Test: No PF

Diagnosis

- Diagnostic Tests
 - Xrays
 - Avulsion suspected
 - Ultrasound
 - Eval approximation
 - MRI
 - Complete rupture
 - Tendinosis



Goals of Treatment

- Define functional and athletic goals
- Prevent complications
- Optimize rapid return to full function
- Minimize morbidity

Treatment Options

Nonsurgical

?

Surgical



- Cast Immobilization

?

- Functional Bracing

- Percutaneous

?

- Open

	Surgical	Casts
Morbidity	-	+
Hospital Costs	-	+
Wound Problems	-	+
Strength and Endurance	+	-
Re-rupture Rate	+(2%)	-(18%)

Nonsurgical: Cast

- Start early
- Equinus Casts
 - 4 weeks
- Bring to neutral
 - 4 to 6 weeks
- Heel lift
- Physical therapy

Nonsurgical: Functional Bracing

- Immobilization
 - 1 to 3 weeks
- Brace/Splint
 - Prevent dorsiflexion
 - Keep at 20° PF
 - coapt ends
 - Full weightbearing



Cast vs. Functional

- Higher re-rupture with casts

Lee and Smith (1994)

General Consensus: Cast

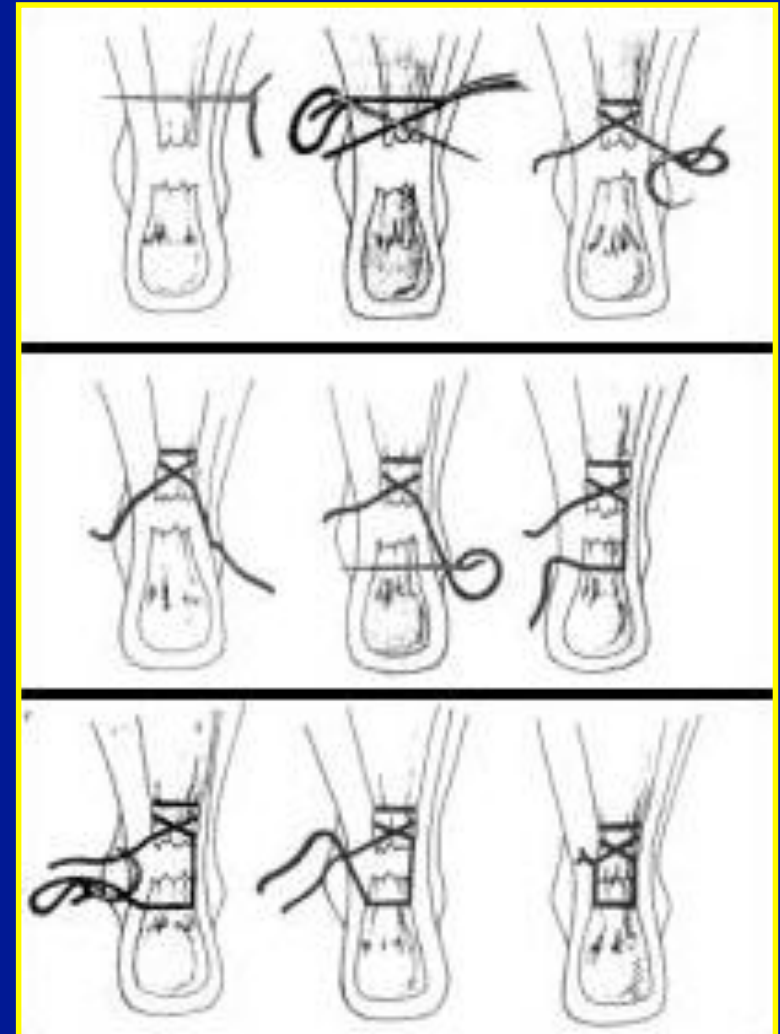
- * Decreased calf circumference
- * Less plantarflexion power
- * Higher re-rupture rate

- Peterson et al.

- 50 patients randomized into cast or CAM
- Re-rupture 17% in cast

Surgical: Percutaneous

- Ma and Griffith
 - 6 stab incisions
 - Less wound complications
 - Injury to sural nerve
 - Not anatomic
 - Tension hard to establish
- Guided instruments



Surgical: Open

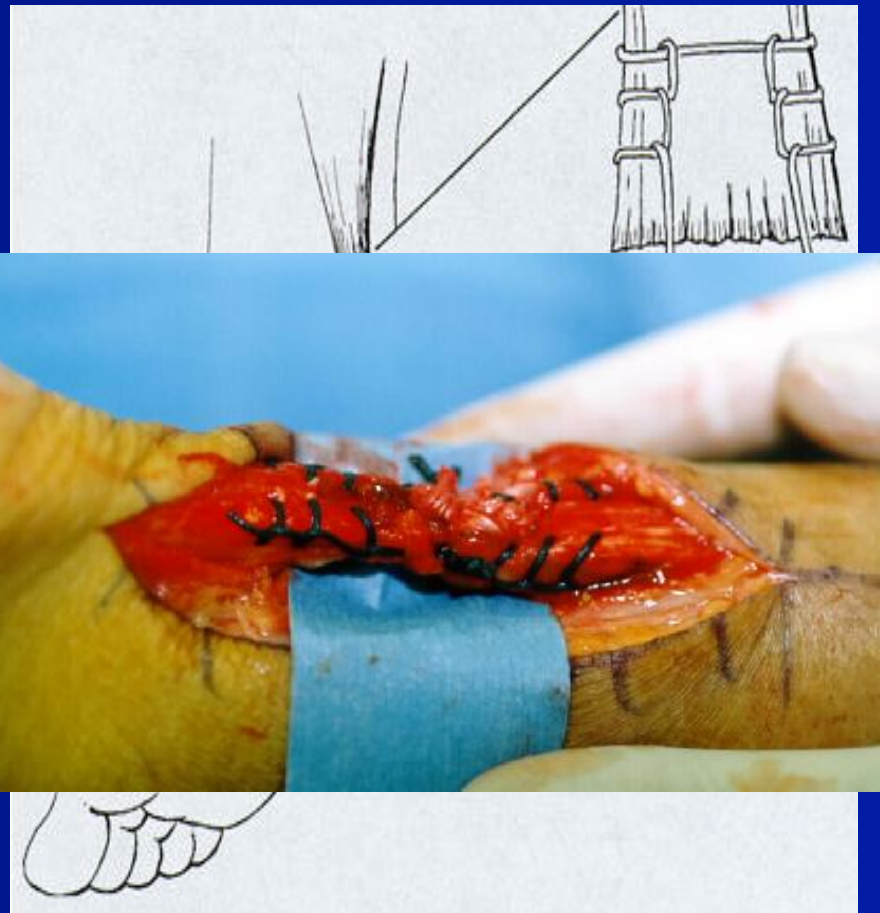
- 10 to 14 days
 - Decreased swelling
 - Organization of mop ends

- *Anatomic repair
- *Correct tension



Open Technique

- Central Incision
- Debride mop ends
- Direct suture repair
 - Krackow
 - Nonabsorbable
- Repair paratenon
- Augmentation
 - Turn down flap
 - FHL transfer
 - Plantaris
 - Synthetic material



Rehab

- Immobilization for 5 - 6 weeks
 - Equinus 4 weeks; Neutral 2 weeks
- Functional treatment
 - PT
 - Heel lifts
- Early WB
 - Maffulli Am J S Med 2003
 - Not detrimental to repair
 - No differ in strength
 - Less adhesions
 - Earlier time to work

Percutaneous vs. Open

- Less wound complications
 - Lim et al.
 - 33 patients
 - 7 infections
- Higher re-rupture rate
 - Wong et al.
 - 367 repairs
 - 12% re-rupture
 - Bradley
 - 12% perc vs. 0% open
- Greater Strength
 - Cetti
 - 111 patients

General Consensus: Perc

Less wound complications
Better cosmesis

General Consensus: Open

Return to preinjury level
Decreased calf atrophy
Better motion
Less re-rupture

End to End Repair vs. Augmentation

- Strength of repair = suture technique
- Unwarranted
- Indications:
 - Late presenting rupture
 - Neglected ruptures
 - Re-ruptures

Surgical vs. Nonsurgical

Review articles that compared surgical and nonsurgical treatment of Achilles tendon rupture

Author and year of publication	Number of articles included (number of Achilles tendon ruptures)	Nonsurgical complication rate	Nonsurgical rerupture rate	Surgical complication rate	Surgical rerupture rate
Wills et al, 1986 [4]	20 (1003)	2/20 (10%)	40/226 (17.7%)	155/777 (19.9%)	12/777 (1.5%)
Cetti et al, 1993 [5]	66 (4597)	24/514 (4.7%)	69/514 (13.4%)	425/4083 (10.4%)	58/4083 (1.4%)
Lo et al, 1997 [6]	19 (990)	10/248 (4%)	29/248 (11.7%)	196/742 (26.4%)	21/742 (2.8%)
Popovic & Lemaire, 1999 [7]	16 (5046)	27/569 (4.7%)	76/569 (13.3%)	492/4477 (11.0%)	69/4477 (1.5%)
Wong et al, 2002 [3]	125 (5056)	62/645 (9.6%)	63/645 (9.8%)	976/4411 (22.1%)	103/4411 (2.3%)
Bhandari et al, 2002 [8]	6 (448)	0/210 (0%) ^a	29/233 (12.4%)	10/211 (4.7%)	7/225 (3.1%)
Kocher et al, 2002 [9]	32 (1893)	12/365 (3.3%)	29/347 (8.4%)	306/1487 (20.6%)	32/1437 (2.2%)
Khan et al, 2004 [10]	4 (356)	5/183 (2.7%)	23/183 (12.6%)	59/173 (34.1%)	6/173 (3.5%)

Conclusion

- Individualize patients
- Determine patient goals
- Promising percutaneous repair
- Conservative
 - Functional bracing
- Augmentation really not needed

Thank You