

Acute proximal hamstring tendon tear controversies from imaging to management:

Does it need surgery or do we operate because we can?

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Disclosures

- ❖ Personal Bias:
- ❖ I am a primary care sports med physician.
- ❖ None of the faculty for this educational activity have relevant financial relationships with ineligible companies to disclose.

Intro

- ❖ Etiology
- ❖ Historical perspective
- ❖ Dilemmas with data
- ❖ MRI data
- ❖ US data
- ❖ Proposed Treatment Protocol

Etiology

- ❖ 4 main patterns of injury:
 - ❖ Water skiing
 - ❖ Snow Skiing
 - ❖ Fall, splits
 - ❖ Sprinting
 - ❖ Roller derby, squat or lunge with heavy weight
- ❖ Average 40-50 years of age

Background

- ❖ Early in my career, managed non-surgically.
 - ❖ A few case studies of surgical repair in water skiing.
- ❖ Around 6-8 years ago, guidelines recommend if complete tear of 2 or 3 tendons and > 2.5 cm defect
 - ❖ Repair
- ❖ Studies showed
 - ❖ Repair: 85% strength vs no surgery: 65%
 - ❖ Patient satisfaction appeared better if repaired

Background

- ❖ Surgical
 - ❖ 23% complication rate
 - ❖ Sciatic nerve in area of surgery
 - ❖ 6-12 months full recovery
 - ❖ If longer than 4-6 weeks to surgery then surgery takes longer due to fibrotic tissue.
 - ❖ ? if as good of outcomes

AJSM 2018;46(11):2798-2808
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BMJ Open Sp Ex Med 2025;11:e002468.
doi:10.1136/bmjsem-2025-002468

Background

- ❖ Non-surgical
 - ❖ >50% heal reattached to ischial tuberosity
 - ❖ Others scar to the other tendon
 - ❖ Ave. 3 months full recovery
 - ❖ About 3% scarring around sciatic nerve
 - ❖ Studies have few non-surgical cases
 - ❖ 14 cases in one meta-analysis
 - ❖ Hence can the studies really compare them?

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Other Dilemmas

- ❖ Accurate imaging
 - ❖ For proximal tendon tears, MRI hip and NOT hamstring
- ❖ Surgeons found measurements may not be accurate in op
- ❖ Discovered in op that some tendons had healed
- ❖ Surgeons' hesitancy with surgery near sciatic nerve and technique
- ❖ Pooled cases showed patients did well without surgery

Questions

- ❖ Do patients with proximal hamstring tendon tears 2-3 tendons really need surgery?
- ❖ What is clinically significant for the patient?
- ❖ What is data for MRI and US diagnosis?
- ❖ What should treatment protocol be?

MRI Prevalence Study

- ❖ 253 consecutive patients with proximal hamstring on MRI
- ❖ 506 proximal hamstrings >18 yo
- ❖ **Only 35% normal**
- ❖ 13 % unilateral pathology tear to tendinosis
- ❖ 52% bilateral pathology partial tear to tendinosis
- ❖ 2% bilateral complete ruptures
- ❖ 2% complete tear one side and partial tear other side
- ❖ Many hamstrings on MRI have pathology

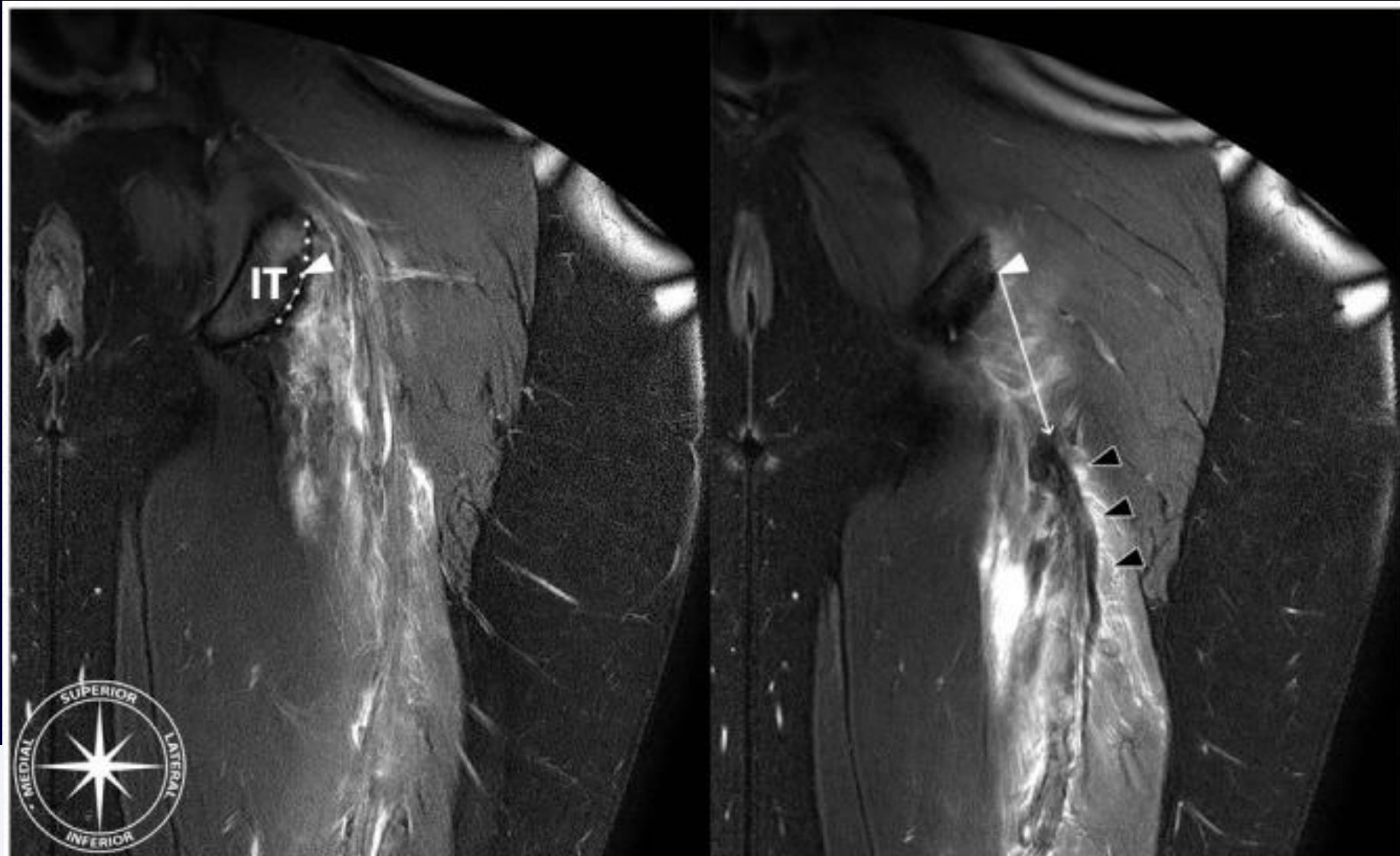
Reliability of MRI

- ❖ Study in Amsterdam
 - ❖ Part of ongoing prospective study of outcome of operative vs nonoperative
 - ❖ 40 MRI
 - ❖ 3 different MSK radiologist
 - ❖ 5-29 yrs experience
 - ❖ Good interrater agreement for proximal tendon tear and amount of retraction

Dropped ice cream cone sign



Amount of retraction



Reliability of MRI

- ❖ Good for tendon avulsion/discontinuity
- ❖ Intra and inter-rater reliability **not good** for:
 - ❖ Measurement of tendon retraction
 - ❖ Sacrotuberous ligament-conjoined tendon continuity

Data with US

- ❖ Retrospective hamstring MRI in 170 pts
 - ❖ Mostly male, mean age 28 yo
- ❖ 16/16 proximal tendon avulsions with MRI
 - ❖ Surgical confirmation of all
- ❖ Only 7 seen with US
 - ❖ Confusing torn hamstring with hemorrhage
- ❖ 5 - fluid filled cleavage planes disrupting normal signal biceps femoris on MRI and US showed fiber continuity – partial tear

Can be useful

Data with US

- ❖ Professional Australian football players
- ❖ Prospective
- ❖ US and MRI within 3 days of injury
 - ❖ Repeated 2 and 6 weeks
 - ❖ 60 patients
- ❖ 3 proximal tendon tears on MRI
 - ❖ Only 1 of them with US

Treatment Protocol

- ❖ Older and not athletic, not active
 - ❖ Non-surgical
- ❖ < 40 and not very active
 - ❖ Discuss in detail surgery vs non-surgery and likely non-op
- ❖ >40-50 yo and active or athletic
 - ❖ Discuss in detail surgery vs non-surgery
 - ❖ Reassess in 2-3 weeks and if improving and strength improving then non-surgical
 - ❖ If not improving then surgery

Treatment Protocol

- ❖ <40 and athlete
 - ❖ Surgery
- ❖ < 40 and athlete
 - ❖ Wants to be better quicker than 6 months
 - ❖ Non-surgery

Conclusion

- ❖ Order hip MRI if concerned for proximal hamstring tendon tear
- ❖ MRI gold standard but has variability
- ❖ Do we operate because we can or do patients not need surgery?
- ❖ Use joint decision making

Limitations with US

- ❖ Body habitus
 - ❖ Large buttock
 - ❖ Decubitus position with flexed hip helps
- ❖ Thick hamstring muscle
 - ❖ Not as good with deep muscle tears
- ❖ Type of US unit
 - ❖ Variable resolution
- ❖ How much you do it

My experience with US

- ❖ 1/3rd I can see tendon tear/avulsion acutely or fibers intact
- ❖ 1/3rd Can't tell if muscle tendon junction or tendon due to hematoma
 - ❖ Sometimes hyperechoic area in hematoma
- ❖ 1/3rd can't tell if anisotropy or tear given curve of tendon
- ❖ Semimembranosus is trickier
- ❖ Takes a lot of time
 - ❖ To learn
 - ❖ To do in clinic

My Experience with US

- ❖ On patient's other side or those with tendinopathy
- ❖ Find variation in tendons
 - ❖ 50-60% as described
 - ❖ Others all 3 tendons attach to ischial tuberosity
 - ❖ Some join single tendon and fan out
 - ❖ Variation where biceps femoris tendon joins
- ❖ Could that be due to previous study on MRI findings of pathology or true anatomy?
- ❖ Or my learning curve?

Treatment Experience

- ❖ In my 14 years of practice
 - ❖ 4 to surgery
 - ❖ Rest non surgery
- ❖ Early in practice, no surgeon who would do surgery

Treatment Experience

- ❖ First to surgery around 15 years ago
 - ❖ Snow bird man in 50's skiing avulsed all 3,
 - ❖ Went to Steadman Hawkin's
- ❖ Same time: late 40's playing throw knife by foot game
 - ❖ avulsed all 3 with >4cm retraction
 - ❖ Non-surgical
 - ❖ Back to normal strength in 3 weeks
 - ❖ In 4 weeks backpacking

Treatment Experience

- ❖ 3 to surgery in last 7 years with 2-3 tendon avulsion
 - ❖ 2 water skiing, 1 male, 1 female
 - ❖ In 50's
 - ❖ Around 5-6cm retraction
 - ❖ After long discussion, they wanted surgery
 - ❖ 1 around 28 yo playing basketball
 - ❖ >6cm retraction
 - ❖ At 4 weeks strength good but he decided to do surgery

Treatment Experience

- ❖ All others treated nonsurgical, better when seen quickly
- ❖ Over age of 40
- ❖ Followed for at least 6 months
- ❖ 3 felt like loss of strength and running
 - ❖ None did crutches and noncompliant with PT
 - ❖ Were happy with their function
- ❖ Rest were back to normal
 - ❖ Most return to normal 3 months
 - ❖ Range 1-5 months

Treatment Experience

- ❖ 76 yo water skier
 - ❖ All 3 tendons
 - ❖ 8cm retraction
- ❖ He and daughter wanted surgery
 - ❖ Surgeon said not needed as well
 - ❖ Back to doing things in 6 weeks with normal strength
 - ❖ Only did a few visits of PT

Management

- ❖ Joint decision making
- ❖ Controversial
- ❖ I discuss pros and cons of surgery and non-surgery
- ❖ Using data just described and data in literature
- ❖ Patient's activity level and desires
- ❖ Recovery times
 - ❖ With surgery my patients and those I know took 6-12 months to be normal
- ❖ What does patient want?

My Management

- ❖ I like seeing them right away
- ❖ Compression sleeve
- ❖ Ice
- ❖ Massage
- ❖ Modalities
- ❖ Avoid stretching
 - ❖ Don't flex hip more than sitting down position
- ❖ Sit on extra cushions/pillows
 - ❖ Most frequent complaint is pain with sitting
- ❖ Try to avoid NSAIDs, most don't need pain control with above and crutches

Crutches

- ❖ I was taught 6 weeks NWB
 - ❖ Most patients wouldn't do it
 - ❖ Those that used short term recovered quicker
 - ❖ ? Worse injury or more pain so used crutches
 - ❖ Or off crutches sooner helped get strength back quicker
- ❖ Use crutches until can walk without pain and limp

How I like Physical Therapy

- ❖ Modalities
 - ❖ Graston/ASTYM
 - ❖ Massage
 - ❖ Game Ready
 - ❖ Dry needling
- ❖ Start with isometrics as soon as can
 - ❖ Helps pain
 - ❖ Reduces muscle atrophy
- ❖ Biking as tolerated

How I like Physical Therapy

- ❖ When tolerated, seems to be doing better:
 - ❖ Start eccentrics
- ❖ As strength getting better and pain better:
 - ❖ Dynamic exercises
 - ❖ Lunges
 - ❖ Plyometrics
- ❖ When strength 80-85%
 - ❖ Running

Other management

- ❖ Later in course >3-6 months
 - ❖ Steroid injection if only has pain sitting down
 - ❖ PRP if not happy
 - ❖ But I don't use it acutely especially if has hematoma
 - ❖ Most of my patients don't want PRP when discuss it and choose steroid
 - ❖ I couldn't find any data on PRP and proximal tendon tears
 - ❖ Use is for partial tears, tendinosis
 - ❖ Hydrodissection of sciatic nerve if issues
 - ❖ I've not had to do it.