

Rehabilitation Perspectives of Lower Extremity Tendinopathy and Tears

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Objectives

- Recognize common LE tendinopathies/tears and their etiology
- Recognize components of Physical Therapy as an evidence-based intervention to improve patient function and pain management

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LE Tendinopathies and Tears

Common Lower Extremity Tendinopathies / Tears

- Gluteal Tendinopathy/ Greater Trochanteric Pain
- Proximal Hamstring Tendinopathy
- Quadriceps Tendinopathy

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Tendinopathies vs. Tears

Tendinopathy

- Non-rupture injury of the tendon exacerbated by mechanical loading
- Inflammation and overuse
- Aching pain, activity dependent

Tears

- Partial – more frequent
 - Sharp/stabbing pain at time of injury
- Complete
 - LE- often visible large defect

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Considerations

Things to consider:

- Tendon has low vascularization and low elasticity²
- Tendon pain can cause widespread motor inhibition and faulty movements
 - Reduction in force^{2,3}
- Tendinopathies account for more than 30% of sports injuries⁴
- Consider increasing age of population / improving recognition of injuries¹
 - Likely result in more patients requiring care for these injuries

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Physical Therapy Examination and Interventions

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Extrinsic and Intrinsic Factors

Extrinsic Factors	Intrinsic Factors ^{2,3}
<ul style="list-style-type: none"> • Training errors • Abrupt change in type of load • Higher demand than tendon can tolerate • Over training • Improper equipment (footwear, seat height, etc...) • Work tasks with repetitive movements 	<ul style="list-style-type: none"> • Malalignment • Joint laxity • Muscle imbalance/ weakness • Increasing age • Adiposity/ elevated BMI • Metabolic conditions – DM

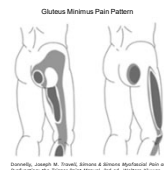
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PT Exam

Focus on individual rehab needs and return to sport

- Patient history
- Posture and alignment
- Gait
- ROM – also at joints above and below
- MMT – guide practice/ interventions
- Palpation for tenderness
- Effusion
- Balance
- Functional tests- Squat, SLR, step downs
- Special tests – Meniscus, ligament stability, neural tension etc...
- Differential Diagnosis



Gluteus Minimus Pain Pattern

Barcelo, Joseph M. "Gluteus Minimus & Piriformis Myofascial Pain and Dysfunction: The Upper Limb Release." 2nd ed. Philadelphia: Elsevier Health, 2019.

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PT Interventions

EXERCISE	+	EDUCATION
<ul style="list-style-type: none"> • Produces mechanical stimulus that provokes biochemical and mechanical responses⁴ <ul style="list-style-type: none"> • Remodel and repair • Limited adverse effects • Address strength imbalances and impaired flexibility • Normalizing movement patterns 		<ul style="list-style-type: none"> • Rest, pain management, activity modification • Temporary use of AD if necessary • Prevent re-injury

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PT Interventions

Stages of Rehab⁵

- Stage I – Acute- Pain modulation and pain management
 - Isometrics – Pain reduction for up to 45 mins
 - Active Rest
- Stage II – Subacute – Strengthening exercise and load progression
 - Heavy/slow resistance, eccentrics
 - Gradual progression to single limb
- Stage III – Functional Strength and return to sport
 - Focus on movement patterns and kinetic chain deficits
 - High load / plyometrics – sport specific
 - Monitor training- prevent re-injury

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Gluteal Tendinopathy

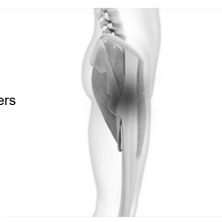
Greater Trochanteric Pain Syndrome

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Gluteal Tendinopathy

- Gluteus Medius / Minimus
 - Stabilize hip/pelvis in weight bearing / gait
 - Femur Abduction / IR
- Symptoms
 - Lateral hip pain with walking, stair navigation, sitting, transfers
 - Ascending generally more painful than descending
 - Difficulty laying on either side
 - Mean duration of symptoms- 26.2 months⁶



Barotopgaiter.com

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Gluteal Tendinopathy

- Who gets it?
 - F > M²
 - >40 y.o. (typically in 4-6th decades)¹
 - Tennis/pickleball, aerobics classes
 - Up to 40% unrelated to sporting event or specific activity/work¹
 - Occurs in people with lower physical activity levels

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Gluteal Tendinopathy

PT Findings

- Lateral hip pain with tenderness at greater trochanter
- Pain with resisted hip ABD/IR/ER
- + Hip Flex/Abd/ER testing
- + Ober's
- + Trendelenburg
 - Trunk lean during gait – toward involved side during stance

*Differential Diagnosis: OA, FAI, Lumbar spine



Essentials of Orthopedics 2010

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PT Interventions

Exercise

- Strengthening of gluteals – Med/Max
 - NWB - Side lying/ prone / supine
 - Progressing to WB for improved gluteus medius activation
 - Double limb progressing to single limb
 - Core strength/ stability
- Address muscle length – often HS/ Piriformis stretching

Education!

- Avoiding hip ADD positions – sitting, standing
- Night postures
 - Pillow under/between knees
 - Eggshell mattress cover
- Recreation – usually can be maintained
 - Minimize hills/ stairs
 - Titrate walking distance
 - Alternative activities- cycling, pool,



Gonzalez et al, 2015

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Gluteal Tears

Tears

- Address muscle impairments
 - Focus on compensation with intact muscles
 - Eccentric exercises progressed more slowly, pain guiding interventions
- Assistive device if indicated

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Hamstring Tendinopathy

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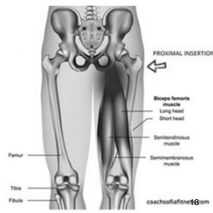
Hamstring Tendinopathy

Hamstrings

- 3 muscles – semimembranosus, semitendinosus, biceps femoris
 - Together extend the hip, flex knee and IR tibia
- Active in gait cycle
 - Eccentric in terminal swing to slow knee ext
 - Initiate hip ext

Symptoms

- Stiff leg gait
- Pain with hip flex and knee ext - swing phase of gait
- Pain with prolonged sitting
- Occasionally with sciatic nerve irritation due to proximity



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Hamstring Tendinopathy

Who gets it?

- 12-29% athletes¹⁹
 - Sprinting athletes
 - Soccer, baseball/softball, indoor track
 - Waterskiing
- M > F
- Reinjury as high as 22-34%⁴



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Hamstring Tendinopathy

PT Findings

- Strength deficits- HS, Gluteals, Core
- HS tightness
- Hip/ Knee/ Ankle ROM limitations
- Poor lumbar posture
- Posterior thigh ecchymosis, possible mass or retracted muscle – tear
- Pain and tenderness to palpation at posterior hip/ buttock/ ischial tuberosity
 - Palpation of pain closer to ischial tuberosity associated with increased duration of rehab¹⁹

* Differential Diagnosis: Lumbar Radiculopathy/ SIJ dysfunction

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PT Interventions

Exercise

- Strengthen HS, and gluteals tool
- Trunk/ core stabilization exercises
- Address hip flex/ knee ext ROM limitations
- Knee / ankle ROM in addition to hip mobility
- Eccentric exercise to prepare for demands of high-speed running
- Running technique drills

Education

- Sitting positions
- Avoid overstretching



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PT Interventions

Running Readiness Scale¹⁹

- Wall jumps – Energy Return
- Single leg squat – Eccentric Loading
- Step ups- Concentric propulsive (6-8")
- Plank and Wall Sit - Isometric

Progressive running after able to walk with minimal pain¹⁹:

- Slow jog (25% velocity)
- Moderate speed run (50% max velocity)
- High speed run (80% max velocity)

*all without pain before return to sprinting in short increments

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Hamstring Tears

Tears

- Address strength impairments
 - Remaining muscle
 - Surrounding muscle groups – gluteals/PF

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Quadriceps Tendinopathy

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Quad Tendinopathy

Quadriceps muscle

- Extend the knee and flex the hip
- Knee ext in stance phase of gait
- Jumping, running, kicking

Symptoms

- Pain / swelling at distal quad
- Pain during/ after activity
- Difficulty descending ramps/stairs/hills



<https://photos.state.na.us/>


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Quad Tendinopathy

Who gets it?

- Jumping athletes^{3,12} – volleyball, basketball
- Hard courts/ synthetic turf – more common³



Getty.com

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Quad Tendinopathy

PT findings

- ROM – Hip IR/ER limitations, DF limitations, midfoot pronation
- Strength deficits- quads, gluteals, core
- Functional impairments- squats, stairs
- Muscle tightness- quads / HS
- Tenderness to palpation

*Differential Diagnosis: PFPS, Lumbar radiculopathy, referral pattern from hip

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PT Interventions

Exercise

- Normalize ROM – Hip, Knee, Ankle
- Address muscle tightness – Quads/ HS
- Isometric -> Isotonic -> Eccentrics -> Explosive
 - Leg press iso-> Leg press -> eccentric squats/lunge -> squat jumps
- Strengthen core and gluteals too! – gluteus med/min for pelvic stability in WB

Education

- Active rest, ice, elevation early
- Activity modification, stair training



Medbridge.com

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Quad Tears

Tears

- Focus on strengthening
 - Remaining quad
 - Surrounding muscle groups for compensation
 - Eccentrics, functional movements
- Assistive Device
- Brace

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Summary

LE Tendinopathies / Tears

- Sports related injuries, or not...
- Consider increasing age of population / improving recognition of injuries

Role of PT in tendinopathy and tendon tears


- Address identified muscle/joint impairments
- Address function – including muscle compensation as needed
- Education!

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