GREATER TROCHANTERIC PAIN SYNDROME CLINICAL PRACTICE GUIDELINE

Disclaimer

This guideline is intended as an aid for clinicians treating patients diagnosed with greater trochanteric pain syndrome, utilizing an evidence-based load management treatment strategy. Progression is time and criterion-based, dependent on soft tissue healing, patient demographics and clinician evaluation. Contact Ohio State Sports Medicine at 614-293-2385 if questions arise.

Background

Greater trochanteric pain syndrome (GTPS) has been defined as lateral hip pain to palpation of the peritrochanteric region. The pain can radiate down the thigh and into the posterior hip, but rarely distal to the knee. Previously, the cause of pain has been attributed solely to trochanteric bursitis. However, the origin of pain can include the trochanteric bursa, gluteus medius and minimus tendons, and iliotibial band. MRI examination in studies involving GTPS show trochanteric bursitis was an uncommon finding and was not found in isolation; when found, bursal distension coexisted with gluteal pathology.[15] Recent studies have shown gluteal tendinopathy to be the primary cause of lateral hip pain.[1] The greatest incidence of GTPS often occurs between the fourth and sixth decades of life with a female to male ratio of 4:1.[15]

Recent studies of gluteal tendinopathy demonstrate the deep undersurface fibers of the gluteal tendons preferentially develop pathology and tears and yet are relatively stress-shielded from tensile load in the lower ranges of hip abduction.[1] They are exposed to high compressive loads in the ranges of hip adduction against the bony insertion.[1] Normal daily function of the hip is in the low ranges of abduction or slight hip adduction.[1] These compressed sides of the tendons adapt to form somewhat of a cartilaginous or atrophic area in response to a lack of tensile load.[15] This makes the tendon vulnerable to becoming symptomatic even with small changes in activity. For this reason, tendinopathy can occur in the absence of a traditional overuse injury model and explains how tendinopathy is more common in the older patients.[15] Because the turnover rate of collagen decreases with advancing age, it may take longer for older athletes to recover from tendinopathy.[10] Compressive forces (not solely tensile loads) may be at fault and need correction for treatment of GTPS.

A key determinant in rehabilitation progression of tendinopathy is whether or not a tendon reacts, or develops an increase in pain that does not return to baseline pain level within 24 hours.[5] Load management and prescribing effective loading variables (duration, frequency, nature, magnitude, direction, and intensity is important in guiding the rehabilitation process. Monitoring changes in pain and immediate adjustment of load is essential. The pain-monitoring model includes use of an objective measure to assess pain intensity 0-10/10 to monitor exercise progression. It is recommended to assess at the same time every day at home.

Progressive mechanical loading has been found to be an effective management strategy. Different modes of strength training, including isometric, isotonic, isolated eccentric, and isokinetic can be used to control pain, improve motor control, and enhance function in pathological tissue. Although traditional rehabilitation approaches have focused on isolated eccentric tissue loading, recent literature suggests that isolated eccentric exercise may not be a superior choice compared with other types of loading, particularly heavy-slow resistance (HSR) loading (resistance performed up to an individual's 6RM).[4] In fact, eccentric-based exercise may contribute to worse outcomes for an in-season athlete or be too high load for the tendon to tolerate to begin treatment.[5] HSR loading also has been found to promote better collagen turnover than isolated eccentric loading.[4] Important throughout rehabilitation, isometrics have been found to reduce pain while reducing cortical inhibition of muscles. Emerging research is indicating the presence of changes in central pain processing, such as central sensitization, in some cases of tendinopathy. Generally clinical management of tendinopathy should include aspects of load management and education, progressive mechanical loading, treatment of kinetic chain deficits, and a graded return to activity.

Definitions

- *Strong level evidence*: supported by systematic review, meta-analysis, or >5 RCT
- *Moderate level evidence*: supported by 3-4 RCT
- *Low level evidence*: supported in 1-2 RCT or clinical case series
- *Expert opinion*: supported by case studies, expert opinions or opinions of the authors

Summary of Recommendations

Risk factors	• Sudden increase in activity • Repetitive compressive/tensile loads • Lumbopelvic and LE mechanics • Female>40 years
Differential Diagnosis	• Gluteal tendon tear • Ischiofemoral impingement, quadratus femoris tear, piriformis syndrome • Intra-articular hip pathology (hip OA, AVN, FAI/labral tear, SCFE) • Stress fracture • Lumbar/SI pathology • Systemic disease (CA, RA)
Examination	• Gait, posture (lumbopelvic), kinetic chain, functional movement assessment • Lumbar/SI screen • Special tests: 30 second SLS, resisted external derotation test, TTP over • Greater trochanter, painful hip abductor MMT • Outcome tools: VISA-G, HOOS, HOS • Pain Reduction and Load Management (isometric loading and avoiding positions of compression)- refer to appendix • Isotonic Loading (Heavy-slow resistance through concentric-eccentric phases) • Energy-Storage Loading (plyometric loading) • Return to Activity/Sport
Phases of Progression Interventions	• Patient education regarding load management (Lateral hip precautions) • Gluteal isometric contractions with tendon in shortened positions • Progressive muscle-tendon loading program • Correction of kinetic chain deficits (emphasis on mechanics during gait and ADLs)
Criteria for Discharge	• Full ROM/strength/power • Pain-free resistance test, high load, in compressed positions • Achieved patient goal(s) • Proper long-term maintenance program implemented for self-management of symptoms • RTS activity without reactive pain

Examination

Subjective	Symptoms commonly attributed to GTPS include pain/difficulty with: • lying on the ipsilateral side • prolonged standing or walking • climbing up or down stairs • sit to stand transfers • walking up/down hills or inclines • sitting
Objective	• MMT hip abduction/dynamometry • Hip ROM • Lumbar spine and SI screening • Pain provocation with palpation to greater trochanteric region • Examination of gait on level surfaces and stairs/examination of body mechanics with transfers and sport-specific activity • Lumbopelvic control during high and low level tasks
Special Tests	• 30 second single leg stand test: Recommended for up to 30 seconds (or until onset of greater trochanteric pain) allowing light fingertip support with trunk maintained in vertical position. Although not part of the test, observing the patient's ability to control the pelvis can help guide treatment (Low load test)[1] • Lateral hip pain with resisted external derotation test[3] **Patient**: supine with hip and knee passively flexed up to 90 degrees. Hip passively placed into external rotation. If any pain is present in that position, slightly decrease the external rotation position just enough to relieve pain. **Clinician:** standing just to the side of the leg being tested. One hand supporting knee, other hand at lateral ankle. **Movement**: Patient is asked to return the leg to the neutral hip position against resistance of the clinicians hand at the ankle. The test is positive when the lateral hip pain is reproduced.  
Outcome Study	• In a recent study, maximum walking distance and ability to manipulate shoes and socks on Harris Hip Score domains helped differentiate GTPS from hip osteoarthritis.[23]

Classification

Tendinopathy has been described as a continuum of tissue pathology, which can be classified as reactive, degenerative, or reactive-on-degenerative phases.[18]

- Reactive tendinopathy is a non-inflammatory proliferative response in the cell and matrix. It is usually a result of a burst of unaccustomed physical activity and is more common in a younger person. At this stage, it remains possible for the tendon to regain its normal structure with optimal management. Treatment at this stage should be aimed at improving the load capacity of the area of aligned fibrillar structure through a progressive loading program. Unloading or performing heavy load, eccentric exercise could cause deleterious effects in this stage.

- Degenerative tendinopathy demonstrates progression of both matrix and cell changes. There is little capacity for reversibility of pathological changes at this stage. Progressive loading does not necessarily result in a restructure of the matrix.

- Reactive-on-degenerative describes the concept of some areas of the tendon may be in different stages of tendinopathy at the same time. Structurally normal areas of the tendon may be vulnerable to reactive tendinopathy concurrent with other areas in the tendon in the degenerative phase. Treatment strategies should be directed at optimizing adaptation of the tendon as a whole.

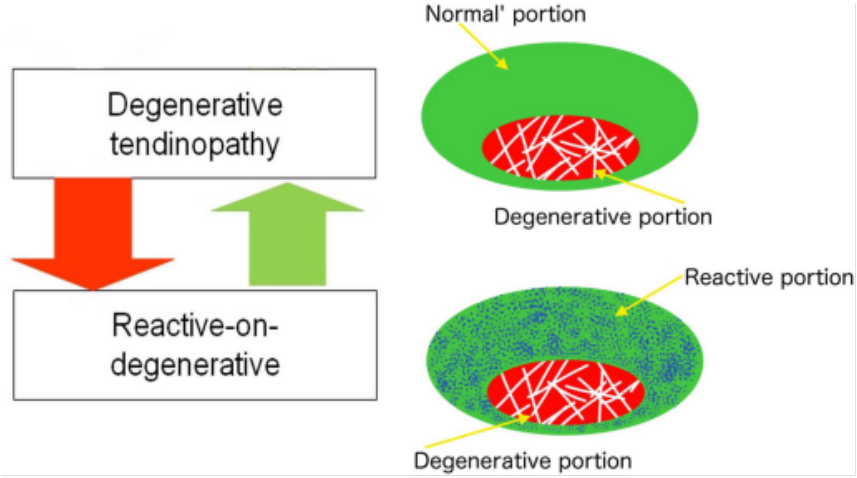

Image from Cook et al. 2016

Corrective Interventions

Patient education in reducing compression (including postural changes to sitting and sleeping posture, transfers and exercise) for reducing hip adduction:

- Avoid lying on affected side (change to supine with pillow under knees or ¼ position from prone)
- Avoid crossing legs
- Avoid piriformis, ITB, and adduction stretching
- Avoid standing and “hanging” on one hip (uneven LE weight bearing)
- Avoid running on uneven surfaces/hills and improve lumbopelvic stability

See appendix for patient education handout.

Phase I: Pain Reduction and Load Management

Indications	1. Patient experiences reactive pain (More than 3/10 pain during or after activity/isotonic loading that lasts greater than 24 hours). Range of acceptable pain levels may vary dependent on patient tolerance and understanding of therapeutic ranges 2. Unable to maintain current activity levels due to pain 3. Localized tenderness at tendon 4. Pain with single leg standing test and external derotation test 5. Pain lying on affected side
Activity Modifications *expert opinion*	1. Patient education in reducing compressive forces on the tendon (including no end-range stretching) and the pain-monitoring model 2. Reduced loading and modified volume of activity 3. Patient Education: expected recovery progression, cognitive behavioral therapy if indicated 4. If indicated, use of crutch or STC for load management and gait normalization 5. Cross training with biking, swimming, as tolerated 6. Increase in night pain may indicate load was too high and needs to be adjusted
Prolonged Isometric Contractions *strong level evidence*	Perform with tendon in shortened/non-compressed/midrange position. *Prescription*: 5 repetitions of 45-60 seconds, 2-3 times per day, progressing from 40% to 70% maximal voluntary contraction. 1-2 minute rest periods between contractions. Daily. Isometrics can be done with theraband, side lying abduction (affected side uppermost and pillow between legs), or standing. All exercises should be done in slight abduction to avoid compression. (See appendix)
Treatment of Kinetic Chain Impairments *expert opinion*	1. Correction of kinetic chain deficits and restore active trunk stability 2. Functional retraining in weight-bearing double-leg and single-leg tasks with emphasis on avoiding hip adduction during dynamic tasks.
Criteria to Progress to Phase 2 *expert opinion*	1. Can complete isotonic loading with minimal reactive pain (<3/10 pain or no increase in baseline pain lasting longer than 24 hours) 2. Decreased pain with ADLs 3. Normalized gait

Phase II: Isotonic Loading Progression

Indications	1. Strength deficits of the gluteus medius and minimus 2. History of painful loading
Heavy, Slow Resistance Exercise (HSR) *strong level evidence*	*Prescription*: 3-4 sets of concentric-eccentric exercise starting at 15 repetitions and progressing to 6 repetitions, performed every other day *Initially, complete exercise in modified ROM (avoiding hip adduction) to avoid compression of tendon then progress into full ROM as strength and pain levels allow Suggested exercises: upright skating, skating in squat, sidestepping, band side glide, bridges, clamshells, and side lying hip abduction. (See appendix)
Stretching exercises *low level evidence*	End-range stretching to address ROM deficits (avoid stretching ITB and piriformis)
Prolonged Isometric Contractions *strong level evidence*	Perform with tendon in shortened/non-compressed/midrange position. *Prescription*: 5 repetitions of 45-60 seconds, 2-3 times per day, progressing from 40% to 70% maximal voluntary contraction. 1-2 minute rest periods between contractions. Daily.
Cognitive Behavioral Therapy/ Graded Exposure *low level evidence*	Only indicated for cases of chronic pain or central sensitization
Criteria to Progress to Phase 3 *expert opinion*	1. Full ROM 2. Able to complete 3-4 sets of 6 repetitions throughout full ROM with minimal pain and no increase in pain lasting greater than 24 hours (patients should be at about 7/10 on Borg Rate of Perceived Exertion scale for strengthening purposes) 3. No pain with ADLs 4. No tenderness to palpation of gluteal tendons 5. Able to perform single leg stand test for 30 seconds without pain or trunk deviation

Phase III: Energy Storage Loading Progression (Plyometrics)

Indications	1. Symmetrical strength bilaterally (recommended strength tests: 10 RM, Manual muscle testing) 2. Tolerates introduction of energy storage exercises (hop testing) with minimal pain
Sport or Activity-Specific Movements *expert opinion*	1. Progressing volume then intensity. *Prescription*: every third day, progressing to a volume required by the sport/activity 2. Functional corrections including squats/lunges/single leg activities keeping pelvis level and avoiding hip adduction
Heavy, Slow Resistance *strong level evidence*	*Prescription*: 3-4 sets of concentric-eccentric exercise starting at 15 repetitions and progressing to 6 repetitions, performed every other day *Initially, complete exercise in modified ROM to avoid compression of tendon then progress into full ROM as strength and pain levels allow
Prolonged Isometric Contractions *strong level evidence*	Perform with tendon in shortened/non-compressed/midrange position. This is done as needed at this phase for pain management. *Prescription*: 5 repetitions of 45-60 seconds, 2-3 times per day, progressing from 40% to 70% maximal voluntary contraction. 1-2 minute rest periods between contractions. Daily.
Criteria to Progress to Phase 4 *expert opinion*	1. Able to complete energy storage exercises with minimal pain and at a volume that would replicate the demands of the sport/activity 2. Proper long-term maintenance implemented for self-management of symptoms

Example of Initial Weekly Structure at Phases III and IV

Day 1: Plyometrics/return to play, isometrics if needed
Day 2: Strengthening, isometrics if needed
Day 3: Isometrics
Day 4: Rest
Day 5: Plyometrics/Return to play, isometrics if needed
Day 6: Strengthening, isometrics if needed
Day 7: Isometrics

Phase IV: Return to Sport/Activity

It is important to have a gradual and controlled progression that allows the athlete sufficient time to recover and gives the therapist time to evaluate symptoms. The evaluation of symptoms such as stiffness, pain, and swelling after training, especially the following day, can assist in determining appropriate increases in training intensity or volume. Because individual patients have different baseline abilities, using their perceived exertion will assist in determining how to progress the specific sport activities.

Indications	Can complete introduction of sport/activity-specific exercise with minimal pain
Proper Warmup Routine *expert opinion*	Gentle, dynamic movement relevant for the sport or activity
Sport/ Activity-Specific Drills *expert opinion*	Reintegration into competition (no greater than every three days initially)
Heavy, Slow Resistance *strong level evidence*	*Prescription*: 3-4 sets of concentric-eccentric exercise starting at 15 repetitions and progressing to 6 repetitions, performed at least twice per week *Initially, complete exercise in modified ROM to avoid compression of tendon then progress into full ROM as strength and pain levels allow
Prolonged Isometric Contractions *strong level evidence*	Perform with tendon in shortened/non-compressed/midrange position. This is done as needed at this phase for pain management. *Prescription*: 5 repetitions of 45-60 seconds, 2-3 times per day, progressing from 40% to 70% maximal voluntary contraction. 1-2 minute rest periods between contractions. Daily.
Criteria for Discharge *expert opinion*	1. Full ROM and strength/power 2. Pain-free high load resistance test, ensuring no pain in positions that normally compress the tendon 3. Full training with minimal pain

Failing to maintain a customary level of mechanical loading will result in a rapid tissue-specific shift towards catabolic activity. It is vital to emphasize the importance in the off-season management because tendons require a certain level of load maintenance. Continuing the loading program to prevent reduction in tendon integrity and stiffness is important.

Authors: Ann-Marie Walters, PT, cert MDT; Robin A. Sopher, PT, DPT; J.J. Kuczynski, PT, DPT, OCS
Reviewer: Kate Glaws, PT, DPT, SCS; John Ryan, MD
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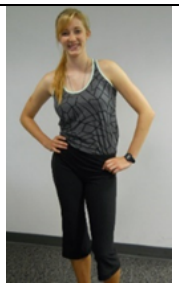
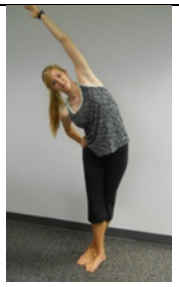
24. OSU Tendinopathy. J.J. Kuczynski, PT, DPT

Appendix A: Activities to Avoid/Change

The structures at the side of your hip have increased compression when your hips are flexed over 90^0 and when you cross your leg past the midline of your body. This compression causes pain and irritation to occur.

Irritation or pain at the side of your hip will delay tissue healing, and the pain cycle will continue. Modifying your activities is necessary to allow for healing to occur. It is important you follow these changes to notice a decrease in your symptoms, and to eventually alleviate pain.

Activities to Avoid		Activities to Change	
Avoid crossing legs while sitting		Use towel roll between knees to avoid knees coming together	
Avoid sitting in “figure 4” position		Raise seat height so that hips are at an angle greater than 90^0	
Avoid “hanging” on either hip while standing		When sleeping on your non-painful side, put two pillows between our knees	
Avoid flexibility and stretching exercises targeting IT Band/piriformis			
Avoid sleeping on painful hip	If you must sleep on painful hip, use an egg crate to soften surface		

Appendix B: Abduction

Low-Load Isometric Abduction

Cue patients for attention on gentle “trochanteric abductor” activation (gluteus medius and minimus) while attempting to keep the iliotibial band tensioners relaxed (TFL, upper gluteus maximus, and vastus lateralis

Supine with belt/band

Sidelying abduction isometric (cue patient to imagine preparing to lift the top leg into abduction-shin horizontal)

Standing (instruct patient to imagine doing the side splits (without movement occurring)

Low-Velocity, High-Load Abduction

Upright skating or skating in squat

Alternative home version: Band side slides. Maintain optimal pelvic and trunk alignment Upright side stepping with band

Alternative home version: Upright side stepping with band