

GREATER TROCHANTERIC PAIN SYNDROME

CLINICAL PRACTICE GUIDELINE

Disclaimer

- This guideline is designed to assist clinicians in treating patients with greater trochanteric pain syndrome (GTPS) through an evidence-based load management approach.

Contact Information:

- For questions, contact Dr. Sujan Gogu's clinic.

Progression:

- Time and criterion-based, considering soft tissue healing, patient demographics, and clinician evaluation.

Background

Definition

- Greater trochanteric pain syndrome (GTPS) is characterized by lateral hip pain and tenderness in the peritrochanteric region. The pain may radiate down the thigh and into the posterior hip but rarely extends past the knee.

Causes

- Previously attributed solely to trochanteric bursitis, GTPS pain can also originate from the trochanteric bursa, gluteus medius and minimus tendons, and the iliotibial band. MRI studies have shown that trochanteric bursitis is uncommon and usually coexists with gluteal pathology.

Primary Cause

- Recent studies identify gluteal tendinopathy as the primary cause of lateral hip pain. The incidence of GTPS is highest between the fourth and sixth decades of life, with a female to male ratio of 4:1.

Pathology

- Gluteal tendons' deep undersurface fibers are prone to pathology and tears, especially in the lower ranges of hip abduction. These tendons endure high compressive loads during hip adduction against the bony insertion, adapting to form atrophic areas due to lack of tensile load, making them vulnerable even to small activity changes. This explains the higher prevalence of tendinopathy in older patients, as collagen turnover decreases with age, prolonging recovery time.

Key Factors in Rehabilitation

- **Compressive Forces:** Compressive forces, not just tensile loads, may contribute to GTPS and need correction for effective treatment.
- **Pain Monitoring:** Track pain intensity (0-10 scale) and adjust load if pain increases and does not return to baseline within 24 hours.
- **Mechanical Loading:** Use progressive mechanical loading with different strength training modes (isometric, isotonic, eccentric, isokinetic). Heavy-slow resistance (HSR) may be more effective than isolated eccentric loading, especially for athletes or early treatment.
- **Isometrics:** Apply isometric exercises to reduce pain and cortical inhibition of muscles.
- **Central Pain Processing:** Be aware of potential central sensitization in some tendinopathy cases.

Clinical Management

- **Load Management and Education:** Emphasize proper load management and patient education.
- **Mechanical Loading:** Implement progressive mechanical loading.
- **Kinetic Chain Deficits:** Address kinetic chain deficits.

- **Graded Return to Activity:** Ensure a graded return to activity to manage tendinopathy effectively.

Definitions

- **Strong Level Evidence:** Supported by systematic reviews, meta-analyses, or more than 5 randomized controlled trials (RCTs).
- **Moderate Level Evidence:** Supported by 3 to 4 RCTs.
- **Low Level Evidence:** Supported by 1 to 2 RCTs or clinical case series.
- **Expert Opinion:** Based on case studies, expert opinions, or the authors' own opinions.

Recommendations

Risk Factors

- Abrupt increase in physical activity
- Repeated compressive or tensile loads
- Lumbopelvic and lower extremity mechanics
- Females over 40 years old

Differential Diagnosis

- Gluteal tendon tear
- Ischiofemoral impingement, quadratus femoris tear, piriformis syndrome
- Intra-articular hip conditions (e.g., hip osteoarthritis, avascular necrosis, femoroacetabular impingement/labral tear, slipped capital femoral epiphysis)
- Stress fractures
- Lumbar or sacroiliac joint pathology
- Systemic diseases (e.g., cancer, rheumatoid arthritis)

Examination

- Assessment of gait, posture (lumbopelvic), kinetic chain, and functional movements
- Screen for lumbar and sacroiliac joint issues

- **Special tests:** 30-second single-leg stance, resisted external derotation test, tenderness over the greater trochanter, painful hip abductor manual muscle testing
- **Outcome tools:** VISA-G, HOOS, HOS
- **Pain Reduction and Load Management:** Employ isometric loading and avoid compressive positions (see appendix for details)
- **Isotonic Loading:** Incorporate heavy-slow resistance through concentric-eccentric phases
- **Energy-Storage Loading:** Use plyometric exercises
- **Return to Activity/Sport:** Gradual reintroduction to activities and sports

Phases of Progression

- **Interventions:**
 1. Educate patients on load management and lateral hip precautions
 2. Perform gluteal isometric contractions with the tendon in shortened positions
 3. Implement a progressive muscle-tendon loading program
 4. Correct kinetic chain deficits with a focus on gait mechanics and activities of daily living

Criteria for Discharge

- Full range of motion, strength, and power achieved
- Pain-free resistance testing, even with high loads and in compressed positions
- Achievement of patient-specific goals
- A long-term maintenance program in place for self-management of symptoms
- Return to sports activities without experiencing reactive pain

Examination

Subjective Symptoms Associated with GTPS

- Discomfort or difficulty when lying on the same side as the affected hip
- Pain or difficulty during prolonged standing or walking

- Trouble climbing stairs or navigating inclines
- Struggles with transitioning from sitting to standing
- Discomfort when walking up or down hills
- Pain while sitting

Objective Assessment

- Manual muscle testing (MMT) of hip abduction and dynamometry
- Measurement of hip range of motion (ROM)
- Screening of the lumbar spine and sacroiliac (SI) joints
- Pain assessment through palpation of the greater trochanteric area
- Evaluation of gait on flat surfaces and stairs, as well as body mechanics during transfers and sport-specific activities
- Assessment of lumbopelvic control during both high and low-level tasks

Special Tests

- **30-Second Single Leg Stand Test:**

Perform for up to 30 seconds (or until pain in the greater trochanteric area occurs) with light fingertip support if needed, while keeping the trunk upright. Observing the patient's ability to control the pelvis can provide additional insight for treatment (Low load test).



- **Resisted External Derotation Test:**

- **Patient Position:** Supine with hip and knee flexed to 90 degrees, and the hip placed in external rotation. If pain is present, slightly adjust the external rotation to alleviate discomfort.
- **Clinician Position:** Standing beside the leg being tested, with one hand supporting the knee and the other at the lateral ankle.
- **Movement:** The patient attempts to return the leg to the neutral hip position against the clinician's resistance at the ankle. The test is positive if it reproduces lateral hip pain.

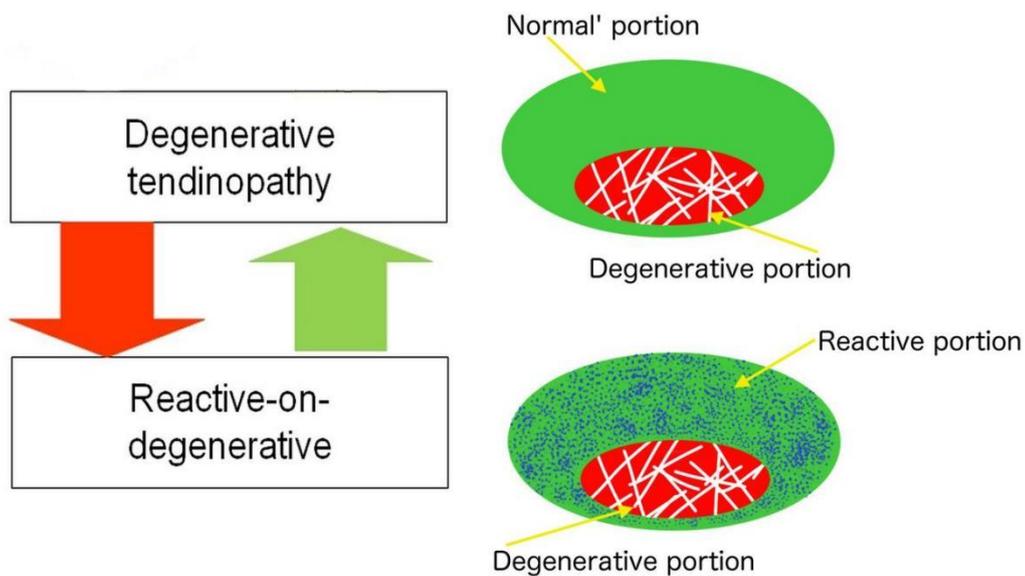
Outcome Study

A recent study highlighted that maximum walking distance and the ability to manage shoes and socks on the Harris Hip Score domains were useful in distinguishing GTPS from hip osteoarthritis.

Classification

Tendinopathy can be categorized into three stages, reflecting the progression of tissue pathology:

1. Reactive
2. Degenerative
3. Reactive-on-degenerative.



Reactive Tendinopathy

This stage involves a non-inflammatory proliferative response in the tendon's cells and matrix, typically triggered by a sudden increase in physical activity. It is more common in younger individuals. With appropriate management, the tendon can potentially return to its normal structure. Treatment should focus on gradually increasing the tendon's load capacity through a progressive loading program. Avoid unloading or performing heavy load eccentric exercises, as these may worsen the condition at this stage.

Degenerative Tendinopathy

At this stage, there are significant changes in both the matrix and cells, and the pathology is less reversible. Progressive loading does not usually lead to a restructuring of the matrix.

Reactive-on-Degenerative Tendinopathy

This phase recognizes that different parts of the tendon may be at various stages of tendinopathy simultaneously. Areas that are structurally normal might experience reactive tendinopathy while other regions are in the degenerative phase. Treatment should aim to optimize the adaptation of the tendon as a whole.

Corrective Interventions

Educate patients on how to minimize compression and reduce hip adduction by implementing the following strategies:

- 1 **Sleeping Position:** Avoid lying on the affected side. Opt for sleeping on your back with a pillow under your knees, or in a ¼ prone position.
- 2 **Leg Position:** Refrain from crossing your legs.
- 3 **Stretching:** Avoid stretches targeting the piriformis, iliotibial band (ITB), and adductors
- 4 **Standing Posture:** Prevent standing or leaning on one hip, as this causes uneven weight bearing on the lower extremities
- 5 **Exercise:** Avoid running on uneven surfaces or hills and focus on enhancing lumbopelvic stability.

For additional patient education materials, refer to the appendix

Phase I: Pain Reduction and Load Management	
Indications	<ol style="list-style-type: none"> 1. Reactive Pain: Pain level greater than 3/10 during or after activity or isotonic loading that persists for more than 24 hours. Acceptable pain levels may vary based on patient tolerance and therapeutic guidelines. 2. Activity Limitation: Inability to maintain current activity levels due to pain. 3. Tenderness: Localized tenderness at the tendon. 4. Pain Tests: Discomfort during single-leg standing test and external derotation test. 5. Pain with Lying: Pain when lying on the affected side.
Activity	<ol style="list-style-type: none"> 1. Education: Instruct on reducing compressive forces on the

Modifications	<p>tendon and the pain-monitoring model; avoid end-range stretching.</p> <ol style="list-style-type: none"> 2. Loading Adjustment: Reduce activity load and modify volume. 3. Recovery Guidance: Provide education on expected recovery progression; cognitive behavioral therapy if needed. 4. Assistive Devices: Use crutches or supportive devices for load management and gait normalization, if indicated. 5. Cross-Training: Incorporate biking and swimming as tolerated to maintain activity levels. 6. Adjustments: Increase in night pain may signal excessive load; adjust accordingly.
Prolonged Isometric Contractions	<ul style="list-style-type: none"> • Position: Perform with the tendon in a shortened, non-compressed, or midrange position. • Prescription: <ul style="list-style-type: none"> ➤ 5 repetitions of 45-60 seconds ➤ 2-3 times per day ➤ Increasing from 40% to 70% of maximal voluntary contraction ➤ Include 1-2 minute rest periods between contractions ➤ Perform daily ➤ Exercises can be done with theraband, side-lying abduction (affected side uppermost with a pillow between legs), or standing, always in slight abduction to prevent compression. (Refer to appendix for details.)
Treatment of Kinetic Chain Impairments	<ol style="list-style-type: none"> 1. Correction: Address kinetic chain deficits and restore active trunk stability. 2. Retraining: Focus on functional retraining for weight-bearing tasks (both double-leg and single-leg) with emphasis on avoiding hip adduction during dynamic activities.
Criteria to	<ol style="list-style-type: none"> 1. Loading Tolerance: Ability to complete isotonic loading with

Progress to Phase 2	<p>minimal reactive pain (less than 3/10 pain or no increase in baseline pain lasting more than 24 hours).</p> <ol style="list-style-type: none"> 2. Pain Reduction: Decreased pain with activities of daily living (ADLs). 3. Gait Normalization: Achieve normalized gait.
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Phase II: Isotonic Loading Progression	
Indications	<ol style="list-style-type: none"> 1. Strength Deficits: Weakness in the gluteus medius and minimus. 2. Pain History: Previous experiences with painful loading.
Heavy, Slow Resistance Exercise (HSR)	<p>Prescription:</p> <ul style="list-style-type: none"> ➤ Perform 3-4 sets of concentric-eccentric exercises ➤ Start with 15 repetitions ➤ Progress to 6 repetitions ➤ Conduct exercises every other day. <p>Initial Phase:</p> <ul style="list-style-type: none"> ➤ Perform exercises within a modified range of motion (ROM) to avoid tendon compression. ➤ Gradually increase to full ROM as strength and pain levels improve. <p>Suggested Exercises:</p> <ul style="list-style-type: none"> ➤ Upright skating ➤ Skating in squat ➤ Sidestepping ➤ Band side glide ➤ Bridges

	<ul style="list-style-type: none"> ➤ Clamshells ➤ Side-lying hip abduction. <p>*(Refer to appendix for details.)</p>
Stretching Exercises	<p>Evidence Level:</p> <ul style="list-style-type: none"> ➤ Low <p>Approach:</p> <ul style="list-style-type: none"> ➤ Implement end-range stretching to address ROM deficits. ➤ Avoid stretching the iliotibial band (ITB) and piriformis.
Prolonged Isometric Contractions	<p>Prescription:</p> <ul style="list-style-type: none"> ➤ Perform with the tendon in a shortened, non-compressed, or midrange position. <p>Protocol:</p> <ul style="list-style-type: none"> ➤ 5 repetitions of 45-60 seconds ➤ 2-3 times per day ➤ Increasing from 40% to 70% of maximal voluntary contraction ➤ Include 1-2 minute rest periods between contractions. ➤ Perform daily.
Cognitive Behavioral Therapy/Graded Exposure	<p>Evidence Level:</p> <ul style="list-style-type: none"> ➤ Low <p>Indication:</p> <ul style="list-style-type: none"> ➤ Use only for cases of chronic pain or central sensitization.
Criteria to Progress to	<ol style="list-style-type: none"> 1. Range of Motion: Achieve full ROM. 2. Strength Tolerance: Complete 3-4 sets of 6 repetitions

Phase 3	<p>through full ROM with minimal pain, and no increase in pain lasting more than 24 hours. Aim for approximately 7/10 on the Borg Rate of Perceived Exertion scale for strengthening.</p> <ol style="list-style-type: none"> 3. Pain-Free ADLs: No pain with activities of daily living (ADLs). 4. Tenderness: Absence of tenderness upon palpation of the gluteal tendons. 5. Single-Leg Stand Test: Perform a single-leg stand for 30 seconds without pain or trunk deviation.
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Phase III: Energy Storage Loading Progression (Plyometrics)	
Indications	<ol style="list-style-type: none"> 1. Symmetrical Strength: Achieve balanced strength bilaterally, measured by 10 RM and manual muscle testing. 2. Energy Storage Tolerance: Tolerate the introduction of energy storage exercises (e.g., hop testing) with minimal pain.
Sport or Activity-Specific Movements	<p>Expert Opinion:</p> <ul style="list-style-type: none"> ➤ Volume and Intensity Progression: Start with increasing volume, then move to higher intensity as appropriate for the sport or activity. ➤ Prescription: Perform exercises every third day, progressively increasing to the volume required by the specific sport or activity. ➤ Functional Corrections: Include squats, lunges, and single-leg activities, ensuring the pelvis remains level and avoiding hip adduction.

<p>Heavy, Slow Resistance</p>	<p>➤ Evidence Level:</p> <p>Strong</p> <p>➤ Prescription:</p> <ul style="list-style-type: none"> • Perform 3-4 sets of concentric-eccentric exercises • Start at 15 repetitions and progressing to 6 repetitions • Conduct exercises every other day. <p>➤ Initial Phase:</p> <ul style="list-style-type: none"> • Start with modified ROM to prevent tendon compression • Progress to full ROM as strength and pain levels improve.
<p>Prolonged Isometric Contractions</p>	<p>➤ Evidence Level: Strong</p> <p>➤ Prescription:</p> <ul style="list-style-type: none"> • Perform with the tendon in a shortened, non-compressed, or midrange position as needed for pain management. <p>➤ Protocol:</p> <ul style="list-style-type: none"> • 5 repetitions of 45-60 seconds • 2-3 times per day, increasing from 40% to 70% of maximal voluntary contraction • Include 1-2 minute rest periods between contractions. • Perform daily.
<p>Criteria to Progress to Phase 4</p>	<p>Expert Opinion:</p> <p>1. Exercise Tolerance: Complete energy storage exercises with minimal pain and at a volume that replicates the demands of</p>

	<p>the sport or activity.</p> <p>2. Long-Term Maintenance: Implement a proper long-term maintenance program for self-management of symptoms.</p>
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Example of Initial Weekly Structure at Phases III and IV	
Day 1	Plyometrics/Return to play exercises, isometrics (if needed).
Day 2	Strengthening exercises, isometrics (if needed).
Day 3	Isometrics.
Day 4	Rest
Day 5	Plyometrics/Return to play exercises, isometrics (if needed).
Day 6	Strengthening exercises, isometrics (if needed).
Day 7	Isometrics

Phase IV: Return to Sport/Activity

- 1

Controlled Progression: Ensure a gradual increase in training intensity and volume, allowing adequate recovery time for the athlete and thorough evaluation
- 2

Symptom Monitoring: Evaluate symptoms such as stiffness, pain, and swelling after training sessions, especially the following day, to guide appropriate adjustments in training intensity or volume.
- 3

Individual Variation: Tailor progression based on each athlete’s baseline abilities and perceived exertion to safely advance through sport-specific activities.

Indications	Ability to complete sport/activity-specific exercises with minimal
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	pain.
Proper Warm-Up Routine	<p>Expert Opinion:</p> <p>Use gentle, dynamic movements relevant to the sport or activity to prepare the body.</p>
Sport/Activity-Specific Drills	<p>Expert Opinion:</p> <p>Reintegration into competitive activities should occur no more frequently than every three days initially</p>
Heavy, Slow Resistance	<p>Evidence Level:</p> <ul style="list-style-type: none"> ➤ Strong <p>Prescription:</p> <ul style="list-style-type: none"> ➤ Perform 3-4 sets of concentric-eccentric exercises ➤ Start at 15 repetitions and progressing to 6 repetitions. ➤ Conduct exercises at least twice per week. <p>Initial Phase:</p> <ul style="list-style-type: none"> ➤ Begin with modified ROM to avoid tendon compression ➤ Progress to full ROM as strength and pain levels permit.
Prolonged Isometric Contractions	<p>Evidence Level:</p> <ul style="list-style-type: none"> ➤ Strong <p>Prescription:</p> <ul style="list-style-type: none"> ➤ Perform with the tendon in a shortened, non-compressed, or midrange position as needed for pain management. <p>Protocol:</p> <ul style="list-style-type: none"> ➤ 5 repetitions of 45-60 seconds

	<ul style="list-style-type: none"> ➤ 2-3 times per day ➤ Increasing from 40% to 70% of maximal voluntary contraction ➤ Include 1-2 minute rest periods between contractions. ➤ Perform daily.
Criteria for Discharge	<p>Expert Opinion:</p> <ol style="list-style-type: none"> 1. Full Range of Motion and Strength: Achieve full ROM and strength/power. 2. Pain-Free High Load Testing: Complete high load resistance tests without pain, especially in positions that usually compress the tendon. 3. Full Training: Return to full training with minimal pain.
Maintenance of Tendon Health	<ul style="list-style-type: none"> • Importance of Loading: Failing to maintain an adequate level of mechanical loading can lead to rapid tissue-specific catabolic changes. • Off-Season Management: Emphasize the importance of continuing the loading program during the off-season to prevent a decline in tendon integrity and stiffness.

Appendix A: Activities to Avoid/Change

When your hips are flexed beyond 90 degrees or you cross your leg past the midline of your body, the structures on the side of your hip experience increased compression. This compression can lead to pain and irritation, delaying tissue healing and perpetuating the pain cycle. Modifying your activities is essential for healing and pain relief. Following these modifications will help reduce symptoms and ultimately alleviate pain.

Activities to Avoid

Do not cross your legs while sitting.



Avoid sitting in a slouching position.



Do not "hang" on either hip while standing.



Avoid flexibility and stretching exercises targeting the IT band/piriformis.

Alternative Activities

Place a towel roll between your knees to keep them apart.

Increase your seat height so that your hips are at an angle greater than 90 degrees.



When sleeping on your non-painful side, put two pillows between your knees.



If you must sleep on your painful hip, use an egg crate to make the

Activities to Avoid	Alternative Activities
	<p>surface softer.</p>

Appendix B: Abduction Exercises

Exercise Type	Description
<p>Low-Load Isometric Abduction</p>	<p>Focus on gentle activation of the "trochanteric abductor" (gluteus medius and minimus) while keeping the iliotibial band tensioners (TFL, upper gluteus maximus, and vastus lateralis) relaxed.</p>
<p>Supine with Belt/Band</p>	<p>Perform isometric abduction while lying on your back using a belt or band.</p> 
<p>Sidelying Abduction Isometric</p>	<p>In sidelying position, cue patients to imagine lifting the top leg into abduction with the shin horizontal.</p> <p>Alternative Home Exercise:</p> <ul style="list-style-type: none"> ➤ Band side slides: Maintain optimal pelvic and trunk alignment.

Exercise Type	Description
	
Upright Skating or Skating in Squat	Perform abduction exercises in an upright skating motion or while squatting.
Upright Side Stepping with Band	Perform side-stepping while standing with a band around your legs.
Standing Abduction	<p>Instruct the patient to imagine doing side splits without actual movement occurring.</p> <p>Alternative Home Exercise: Upright side stepping with band.</p> 