

**The Utilization of an Isometric Protocol During the Early Intervention of Chronic Gluteus Medius  
Tendinopathy: CASE REPORT**

**By**

**Frederick M. Couverette III, SPT, CSCS**

**In partial fulfillment of the  
requirements for the course:  
PT 7243 Evidence-Based Practice Seminar II  
Department of Physical Therapy  
Angelo State University  
Member, Texas Tech University System  
September, 2022**

## **Abstract**

**Background and Purpose:** Chronic hip pain is just a way of life for many Americans. Of those individuals experiencing hip pain, many are due to Greater Trochanteric Pain Syndrome (GTPS). GTPS is often caused by a tendinopathy of the Gluteus Medius tendon. This case study follows the evaluation and treatment of a patient with hip pain consistent with GTPS.

**Case Description:** The patient's main concerns are chronic hip pain that limits her participation in daily activities such as her walking routine or climbing stairs. She presents with weakness of hip stabilizers and is at increased risk of falls. The primary intervention used to manage her tendinopathy symptoms is an isometric protocol outlined by other studies.

**Outcomes:** The patient experienced positive outcomes and responded well to the treatments. The outcome measures used were Manual Muscle Testing, the Lower Extremity Functional Scale, and a Single Leg Stance time. Her muscle strength increased and she was able to score better on the outcome measures used to determine her impairment level.

**Discussion:** The patient's positive response to the isometric protocol suggests the protocol can be effective for the treatment of GTPS. When considering this treatment option for a patient it is important to remember further research is needed to confirm the efficacy of the protocol. At this time it is uncertain if this protocol is more effective than other physical therapy interventions.

**Key Words:** Tendinopathy, Isometrics, GTPS

## **Introduction**

Chronic hip pain is just a way of life for many Americans with 14.3% of participants in one study reporting hip pain on most days over the last six weeks in a 2002 survey<sup>1</sup>. One common cause of chronic hip pain in adults is thought to be Greater Trochanteric Pain Syndrome (GTPS), responsible for 10-20% of patients reporting hip pain per year. While GTPS has many possible causes, it is currently thought to be primarily the result of Gluteus Medius or Gluteus Minimus tendinopathy<sup>2</sup>. When patients have tendinopathy involvement in the tendons of major muscles required for everyday tasks such as walking, it can greatly decrease their activity levels and cause debilitation among other issues. Invasive treatments such as corticosteroid injection or surgery in some cases are used, however, whenever conservative treatment is indicated it should be considered as the first attempt to treat the patient. Conservative treatment of injuries prevents the possibility of introducing infections or surrounding tissue damage through injection or incision sites. When reviewing current research, most recommendations for the conservative treatment of Gluteus Medius tendinopathy involved stretching and strengthening of the hip musculature<sup>3</sup>. There were several studies that looked at the use of isometrics in the treatment of Patellar, Achilles, and rotator cuff tendinopathy but not Gluteus Medius tendinopathy<sup>4,5,6</sup>. The purpose of this case report is to contribute to the body of research supporting the use of conservative treatment of Gluteus Medius tendinopathy with an isometric protocol followed by strengthening of the musculature.

## **Case Description**

The patient followed by this case report is a 73-year-old Caucasian female who presents to physical therapy with a referral for left-sided sciatica and left foot pain. When she is not limited by her pain, she tries to walk 3-5 miles per day, 5 times a week, though she is only able to walk 1 mile at max some days of the week now due to pain. She has also had to modify how she navigates stairs, taking one step up, or down, at a time. She has a history of breast cancer ten years ago, but she is currently cleared of any active cancer. She reports active osteopenia and is working with her primary care provider to manage it. The only surgical history she reports is her right-side mastectomy when she was treated for breast cancer. She reports no relevant family medical history. Her primary concern is her sciatica as she believes that is the cause of her foot pain. She has been experiencing this pain on and off for “several years” and she cannot link any specific activities to the times when she experiences pain. Her main symptoms are pain on the lateral side of the left leg that is worsened with activity. She reports numbness and tingling in her leg rarely and it does not seem to be associated with her symptoms. She states she does not have low back pain or pain on the back side of her legs. Her past treatments for this include a prior round of physical therapy, that seemed to make her pain worse, and corticosteroid shots that worked to some extent but never completely resolved her pain. She agreed to this round of physical therapy after her primary care provider recommended it to see if it could help address her foot pain. She has no red flags for non-MSK involvement, and her symptoms are changed by movement and rest.

## **Examination**

The assessment of this patient was performed with the use of several clinical tools including manual muscle testing,<sup>7</sup> goniometry<sup>8</sup>, the Lower Extremity Functional Score (LEFS) tool<sup>9</sup>, Single Leg Stance (SLS) time<sup>10</sup>, gait analysis, adverse neural tension testing, and palpation. These tools and measures were chosen due to their reliability and validity in assisting with the diagnosis of physical impairments being experienced by the patients. No imaging or laboratory testing was utilized in the diagnosis of this patient.

Manual muscle testing and active range of motion testing were performed to determine if the patient had any limitations in her movement or the ability of her muscles to stabilize the joint structures (See Tables 1, 2, and 3). It also allowed the physical therapist to rule in contractile tissue as the source of nociception due to changes in symptoms during active and passive range of motion. The LEFS allowed the patient to self-report functional limitations that are present in her everyday life. The performance of the SLS test (See Table 4) demonstrated the patient's ability to support herself on one leg and then compare it to the norms for her age group, ~11 seconds [10]. With her left leg well below this mark, she is at increased risk of experiencing a fall. After gait analysis (see Table 5), it was found that the patient has significant impairments in her gait. Finally, due to her complaints of sciatica, adverse neural tension testing was performed to assess the involvement of the sciatic nerve in her symptoms. She was positive for adverse neural tension in her left lower extremity, however, she stated that her symptoms during testing were not the pain that caused her to seek out therapy. Finally, palpation was performed to assess for any tenderness to palpation. This pain she experienced during palpation was familiar and as intense as the pain that she is seeking treatment to resolve (See Tables 4 and 7).

After compiling the findings from the examination, it was found that the patient exhibited significant weakness in musculature supporting the hip, decreased tolerance to activities involving single leg stance, adverse neural tension, decreased range of motion, pain with activities of daily living and hobbies, and balance deficits consistent with Greater Trochanteric Pain Syndrome (GTPS).

## **Intervention**

The treatment plan for this patient started by focusing on the management of sciatic nerve pain and decreased ankle mobility (See Table 8 for interventions). This was the original focus of the treatment plan and was present throughout the plan of care, however, during the first follow-up appointment, the patient reported tightness and pain along the lateral aspect of her left thigh. This was addressed with foam-rolling and soft tissue mobilization which revealed extreme tenderness to palpation originating at the superior greater trochanter. This discomfort worsened with abduction of the left lower extremity. At this point, the treatment strategy was changed to better address tendinopathy of left lower extremity abductors, specifically the Gluteus Medius (See Table 8 for interventions).

Treatment for lower extremity abductor tendinopathy was an isometric protocol<sup>11</sup>. During this protocol, the patient performs a 30-second isometric contraction of the involved hip abductors followed by a 90-second rest period. To perform this exercise the patient is placed in right side-lying with a straight left leg supported by a bolster at approximately a 30-degree angle. This is done to prevent the compression of the structures between the Ilio-Tibial Band and the Greater Trochanter of the Femur which could worsen the patient's symptoms. The patient then activates the hip abductors and holds the contraction for the specified time. This isometric protocol was the only intervention given to the patient as a home exercise program at this time. (See Table 9).

Once the patient's symptoms were at a level the patient considered manageable, the focus of treatment again switched. Now the focus was on the strengthening of the hip abductors (See Table 8 for interventions)<sup>12</sup>. Therapeutic exercises such as clamshells, slow marching, and

resisted sidestepping with a resistance band above the knees were performed with the patient reporting a Rating of Perceived Exertion within the range of 5-7/10<sup>13</sup>. At this time the patient was instructed to perform clamshells as her HEP (See Table 9).

Additional treatment strategies that were present throughout the patient's plan of care were manual therapy to correct the alignment of the Sacroiliac joint followed by core strengthening exercises to reinforce corrective maneuvers. To address symptoms of sciatic nerve pain the patient performed sciatic nerve glides<sup>14</sup>. Her treatment sessions were more frequent at the beginning of the plan of care when focusing on pain management and they became less frequent as strengthening became the main priority. The actual timeline of her treatment is presented in Table 8.



## **Outcomes**

Overall, the patient had favorable outcomes and showed improvement with outcome measures. The full results of the patient's performance on outcome measures can be found in Tables 6, 10, 11, and 12.

After the change was made from focusing on neural tension to treating the patient's tendinopathy, the patient saw a drastic results. Once she performed the isometric protocol, she noticed an immediate decrease in pain. From that point on, her pain stayed at a manageable level and continued to get better after each treatment session. Due to her pain levels decreasing from an 8/10 at eval to a 0/10 at the beginning of the third follow-up visit, strengthening of the supportive musculature was performed. She showed strength gains in her hip abductors and other musculature responsible for supporting the body in unilateral stance (See Table 10) which allowed her to increase her SLS time on her left lower extremity to a normal range for her age. This not only demonstrated her increased tolerance to activities involving unilateral support but also demonstrated a decrease in fall risk. Further demonstrating her increase in function, she reported a significantly higher score on the LEFS (See Table 6), surpassing the minimal clinically important difference for this scale<sup>9</sup>. Gait analysis still reveals many of her previous gait impairments, but they are less pronounced, and she reports she is better able to navigate curbs and stairs.

## **Discussion**

Research<sup>4,5,6</sup> shows the effectiveness of isometric protocols on tendinopathies. Though many different tendons are specified in this research, the Gluteus Medius, a major contributor of GTPS<sup>2</sup>, is underrepresented in the literature found during literature review for this treatment. The patient's performance on outcome measures such as MMT, AROM measurement, and SLS time in conjunction with self-reported outcome measures such as the LEFS and pain scale all indicate this treatment was successful in the treatment of GPTS.

This patient reported that she was very diligent with performing her home exercise program and incorporating the education she received into her everyday life. This patient was very motivated to participate in treatments due to her chronic history with her symptoms.

Within this case study there were some limitations. Of note it was not possible to observe the patient when she was not present in the clinic and therefore it is not possible to know how compliant she was with her HEP. Another area for potential limitation is the presence of multiple physical therapy interventions in addition to the isometric protocol and therefore the therapist cannot be certain the isometric protocol was the major factor resulting in pain relief. It should be noted the patient reported immediate relief after the isometric protocol was performed, however. A weakness present in the approach to treating this patient is the delayed identification of the tissue responsible for nociceptive input. A strength of the approach to treating this impairment was the understanding of the impairment and its causes to be able to apply research in similar areas to this patient.

The key finding in this case study is the efficacy of the isometric protocol in relieving pain in a patient with chronic hip pain due to GTPS. This patient responded very well

to this treatment and had almost no pain after her first treatment. When taking lessons from this case study it is important to remember that more research should be done to determine whether this case study will apply to a more diverse population. Another area for possible further research is to compare results of this isometric protocol on a patient population with GTPS to a control group of patients with GTPS receiving other physical therapy interventions.

## **Acknowledgments**

Special thank you to Ana Liza PT, DPT, FAAOMPT for supervising and consulting on the treatment and management of this patient.

## References

1. Christmas C, Crespo CJ, Franckowiak SC, Bathon JM, Bartlett SJ, Andersen RE. How common is hip pain among older adults? Results from the Third National Health and Nutrition Examination Survey. *J Fam Pract.* 2002;51(4):345-348.
2. Speers CJ, Bhogal GS. Greater trochanteric pain syndrome: a review of diagnosis and management in general practice. *Br J Gen Pract.* 2017;67(663):479-480.  
doi:10.3399/bjgp17X693041
3. Best Treatment for Tendinopathy. [www.humpalphysicaltherapy.com](http://www.humpalphysicaltherapy.com). Accessed August 5, 2022. <https://www.humpalphysicaltherapy.com/Injuries-Conditions/Ankle/Research-Articles/Best-Treatment-for-Tendinopathy/a~458/article.html>
4. Rio E, Kidgell D, Purdam C, et al. Isometric exercise induces analgesia and reduces inhibition in patellar tendinopathy. *British Journal of Sports Medicine.* 2015;49(19):1277-1283. doi:10.1136/bjsports-2014-094386
5. Bradford B, Rio E, Murphy M, et al. Immediate Effects of two Isometric Calf Muscle Exercises on Mid-portion Achilles Tendon Pain. *Int J Sports Med.* 2021;42(12):1122-1127. doi:10.1055/a-1398-5501
6. Clifford C, Challoumas D, Paul L, et al. Effectiveness of isometric exercise in the management of tendinopathy: a systematic review and meta-analysis of randomised trials *BMJ Open Sport & Exercise Medicine* 2020;**6**:e000760. doi: 10.1136/bmjsem-2020-000760
7. Schwartz S, Cohen ME, Herbison GJ, Shah A. Relationship between two measures of upper extremity strength: manual muscle test compared to hand-held myometry. *Arch Phys Med Rehabil.* 1992 Nov;73(11):1063-8. PMID: 1444773.

8. Kolber MJ, Hanney WJ. THE RELIABILITY AND CONCURRENT VALIDITY OF SHOULDER MOBILITY MEASUREMENTS USING A DIGITAL INCLINOMETER AND GONIOMETER: A TECHNICAL REPORT. *International Journal of Sports Physical Therapy*. 2012;7(3):306-313.  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3362980/>
9. Binkley JM, Stratford PW, Lott SA, Riddle DL. The Lower Extremity Functional Scale (LEFS): scale development, measurement properties, and clinical application. North American Orthopaedic Rehabilitation Research Network. *Phys Ther*. 1999 Apr;79(4):371-83. PMID: 10201543.
10. Springer, B.A., Marin, R., et al. (2007). “Normative values for the unipedal stance test with eyes open closed.” *Journal of geriatric physical therapy* 30(1): 8-15.
11. Rio E, Kidgell D, Purdam C, et al. Isometric exercise induces analgesia and reduces inhibition in patellar tendinopathy. *British Journal of Sports Medicine*. 2015;49(19):1277-1283. doi:10.1136/bjsports-2014-094386
12. Ohberg L. Eccentric training in patients with chronic Achilles tendinosis: normalised tendon structure and decreased thickness at follow up \* Commentary. *British Journal of Sports Medicine*. 2004;38(1):8-11. doi:10.1136/bjism.2001.000284
13. Crawford DA, Drake NB, Carper MJ, DeBlauw J, Heinrich KM. Validity, Reliability, and Application of the Session-RPE Method for Quantifying Training Loads during High Intensity Functional Training. *Sports (Basel)*. 2018;6(3):84. Published 2018 Aug 21. doi:10.3390/sports6030084

14. Ellis RF, Hing WA. Neural Mobilization: A Systematic Review of Randomized Controlled Trials with an Analysis of Therapeutic Efficacy. *Journal of Manual & Manipulative Therapy*. 2008;16(1):8-22. doi:10.1179/106698108790818594

## Tables and Figures

Table 1: MMT Initial Evaluation

Muscle group	Right	Left
Hip abductors	3-/5	3-/5 w/pain
Hip flexors	4-/5	4-/5
Knee flexors	4+/5	4/5
Knee Extensors	4+/5	4+/5
Hip internal rotation	4-/5 (in patient's range)	Not tested due to limited range
Hip external rotation	4-/5 (in patient's range)	Not tested due to limited range
Dorsiflexion	4/5	4+/5
Inversion	4-/5	4-/5
Eversion	4-/5	4-/5
Toe flexor intrinsics	4-/5	4-/5

Table 2: Joint Mobility at Initial Evaluation

Joint motion	Right	Left
Hip internal rotation	29.5 degrees	11.5 degrees
Hip external rotation	25 degrees	9.5 degrees
Dorsiflexion (Knee flexed)	11 degrees	14 degrees
Dorsiflexion (Knee extended)	2 degrees	6 degrees
Ankle Inversion	39 degrees	33 degrees
Ankle eversion	14 degrees	10 degrees
Plantar flexion	44 degrees	54 degrees

Table 3: Lumbar Mobility At Initial Evaluation

Lumbar ROM	Results
Flexion	WFL with decreased segmental mobility
Extension	WFL with decreased segmental mobility and some compensations
Sidebending Right	WFL with decreased segmental mobility
Sidebending Left	WFL with decreased segmental mobility



Table 4: Special Tests Initial Evaluation

Assorted tests	Right	Left
SLS	11 seconds	7 seconds w/pain
Supine straight leg raise	Negative	Positive
Palpation	Not tested	Tender to palpation of superior greater trochanter

Table 5: Gait Analysis

Gait analysis	Results
Flat level ground	Heel strike on initial contact, hip drop present bilaterally with L>R, asymmetrical stance phase time with R>L (pt reports due to pain), decreased step length, trunk lean to the left present.

Table 6: LEFS Results

Outcome measures	Score - Initial Eval	Score - Discharge
LEFS	42/80	64/80

Table 7: Pain Scale Reporting

Numeric Pain Scale	Results
Initial Eval	8/10
Follow-up #1	4/10
Follow-up #2	4/10
Follow-up #3	2/10
Follow-up #4	0/10
Discharge Visit	0/10

Table 8 - Interventions						
	Visit - IE 6/27	Visit - Follow-up #1 6/29	Visit - Follow-up #2 7/07	Visit - Follow-up #3 7/12	Visit - Discharge 8/02	Notes
Slump slider	Not performed	20 repetitions	20 repetitions	Not performed	Not performed	Patient is seated on chair and performs nerve glide or "floss" for sciatic nerve.
Soft-tissue Mobilization	Not performed	10 minutes with foam roller to lateral left thigh	8 minutes to posterior thigh/glute area with foam roller	Not performed	Not performed	Performed with foam roller to areas of patient tenderness. Foam roller was used.
TrA isometrics	Not performed	10 second holds for 5 minutes	10 second holds for 5 minutes	10 second holds for 5 minutes	Not performed	Pt is hooklying on mat and contracts transverse abdominus while keeping spine in neutral.
TrA isometrics w/ marching	Not performed	Not performed	Not performed	2 minutes each leg	Not performed	Patient performs TrA isometric while lifting one leg slowly off the mat and setting it back down.
Isometric protocol - Hip abductors	Not performed	30 second isometric hold + 90 second rest for 10 minutes. Frequency: as needed to control symptoms.	30 second isometric hold + 90 second rest for 10 minutes.	Not performed	Not performed	Right sidelying w/top leg straight and supported by bolster to ~30 degree angle. Raise leg slightly and hold.
Resisted lateral stepping	Not performed	Not performed	Not performed	6 laps with red resistance band around legs above knees	Not performed	Patient stands in parallel bars and sidesteps against the resistance of the resistance band placed around both legs slightly above the knee.
Clamshells	Not performed	Not performed	Not performed	2 sets of 10 with 5 second hold at the top of the repetition. Emphasized eccentric phase.	Not performed	
Slow marching in place	Not performed	Not performed	Not performed	30 repetitions per leg	Not performed	Patient stands in parallel bars and raises each leg one at a time alternating. Focus on pelvis remaining neutral and keeping core musculature engaged.
Shuttle	Not performed	Not performed	Not performed	10 minutes	Not performed	Patient lies supine on the shuttle machine and performs lower extremity extension with 25 pounds of resistance.
Reverse walking	Not performed	5 minutes	5 minutes	5 minutes	Not performed	Patient stands in parallel bars and walks backwards. Focus is on reaching back with leg and then forcing dorsiflexion as she completes the step.

Table 9: Home Exercise Program

Home Exercise Program Exercise	Description	Prescription
Isometric protocol	Right sidelying w/top leg straight and supported by bolster to ~30-degree angle. Raise leg slightly and hold.	30 second isometric hold + 90 second rest for 10 minutes. Frequency: as needed to control symptoms.
Clamshells	Right sidelying w/top leg straight and supported by bolster to a 0-degree angle. Raise leg throughout entire ROM.	10-second holds at top of repetition with 5 second rest alternating for 3 minutes. 2 times per day.

Table 10: MMT at Discharge

Muscle group	Right	Left
Hip abductors	3/5	3/5
Hip flexors	4-/5	4-/5
Knee flexors	4+/5	4/5
Knee Extensors	4+/5	4+/5
Hip internal rotation	4-/5 (in patient's range)	Not tested
Hip external rotation	4-/5 (in patient's range)	Not tested
Dorsiflexion	4/5	4+/5
Inversion	4-/5	4-/5
Eversion	4-/5	4-/5
Toe flexor intrinsics	4-/5	4-/5

Table 11: Joint mobility at Discharge

Joint motion	Right	Left
Hip internal rotation	29.5 degrees	39 degrees
Hip external rotation	25 degrees	23.5 degrees
Dorsiflexion (Knee flexed)	11 degrees	14 degrees
Dorsiflexion (Knee extended)	10 degrees	11 degrees
Ankle Inversion	39 degrees	33 degrees
Ankle eversion	14 degrees	10 degrees
Plantar flexion	44 degrees	54 degrees

Table 12 Special Test at Discharge

Assorted tests	Right	Left
SLS	11 seconds	10 seconds
Supine straight leg raise	Negative	Positive