12-2020

Mobilizations And Strengthening For Radiating Hip And Anterior Knee Pain: A Case Report

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Thai Ho, BS, is a Doctor of Physical Therapy student at the University of New England, 716 Stevens Ave, Portland, ME 04103. Address correspondence to Thai Ho at tho2@une.edu.

The patient has signed an informed consent allowing the use of his medical information and has received the information on the institutions policies on the Health Insurance Portability Accountability Act (HIPAA).

The author acknowledges Jim Cavanaugh, PT, PhD, for assistance with the construction of this case report, Erin Pike, PT, DPT, for supervision and assistance with treatment, and the patient for their consent and cooperation.

Keywords: Hip mobilizations, Hip Instability, Knee Osteoarthritis, Anterior Thigh/Knee Pain

Abstract

Background and Purpose: The most common joint disorder in the United States is osteoarthritis (OA). Knee OA occurs in 10% men and 13% in women aged 60 years or older. Hip instability is commonly defined as hip joint unsteadiness that may cause pain. Joint restrictions and lack of hip strength may be associated with these two conditions. However, there is limited literature on hip strengthening and mobilizations on positive outcomes with hip instability. Therefore, the purpose of this case report was to utilize hip strengthening and mobilizations interventions on a patient with hip instability and knee OA. Case Description: The patient was a 71-year-old male who presented with radiating hip and knee pain. Lower extremity myotomes, range of motion (ROM), the Lower Extremity Functional Scale (LEFS), Single Limb Stance Test (SLST), and Plumb line test were used to evaluate improvements. Interventions implemented included lower extremity strengthening, stretching, manual therapy, and balance training. Outcomes: The patient attended 11 visits over 6 weeks. LEFS improved from 47/80 to 53/80 and SLST on the right leg with eyes open from 7 seconds to 10 seconds. Discussion: Although the patient showed relatively small improvements, he reported a reduction in difficulty and pain during his work and daily living activities throughout the 6-week rehabilitation process. The patient was educated on his posture and proper body mechanics, which may have contributed to his reduction in radiating hip and knee pain. Utilizing hip strengthening and mobilization interventions for treatment of hip instability and knee OA may have positive outcomes but requires further investigation. Future research should focus on lower extremity strengthening and manual therapy for knee OA and hip instability.

Manuscript Word Count: 2767

Introduction/Background and Purpose

Hip instability is a broad term for hip joint unsteadiness, which can be accompanied with or without pain.[1] Hip instability can be caused by a traumatic injury or can be atraumatic leading to capsular laxity or structural bony abnormality.[2] Hip instability has not received much attention due to the fact that it is poorly defined and lacks consistent objective evaluative criteria.[1] The initial treatment for hip instability usually begins with strengthening the hip dynamic stabilizers.[2] If conservative treatment fails the next option is surgery, which entails repairing of injured soft tissue structures or addressing structural bony abnormalities.[2] The integrity of the labrum and bony acetabular rim contributes to hip joint stability.[1] The two structures increase the surface area and the volume within the hip joint creating a distribution of joint stresses during loading.[1] The muscular component of hip stability includes the periarticular muscles and the iliopsoas musculotendinous unit.[1] The periarticular muscles assist with hip stability by increasing the joint reaction forces and compressing the femoral head into the acetabulum, while the iliopsoas muscle group helps resist anterior translation of the femoral head.[1] Therefore, muscle stability and strength in the hips will help improve the quality of how the hip joint functions.

Along with hip instability, knee osteoarthritis (OA) is another diagnosis that affects the lower extremities and can limit function. Knee OA is a degenerative joint disease that involves wear and tear of the articular cartilage in the knee.[3] Knee OA is a progressive disease and it comes along with knee pain that is worse with activity.[3] Symptoms can include knee stiffness, swelling, and pain that worsens from sitting or resting.[3] Knee OA is the most common form of arthritis found in both men and women and will continue to rise with the high prevalence of obesity.[3] There are about 240 cases of knee OA per 100,000 people per year and about 10% - 13% of 60 year-olds are diagnosed with knee OA.[3] Although knee OA is a progressive disease there are modifiable risk factors that can slow the progression or help prevent the knee joint

disease.[3] Modifiable risk factors include articular trauma, occupation, muscle imbalance, weight and overall health.[3] The treatment for knee osteoarthritis has two approaches: non-surgical and surgical.[3] The non-surgical approach includes physical therapy, activity modification, medication, knee bracing and corticosteroid injections.[3] In a study performed by Deyle et al,[4,5] manual therapy applied to the lumbar spine, hip, and ankle if needed along with a standardized knee exercise program can delay or prevent the need for surgical intervention for patients diagnosed with knee osteoarthritis.[4,5]

Physical therapy interventions that are often used for hip instability and knee osteoarthritis focus on lower extremity strength, endurance, and manual therapy. Thus, the purpose of this case report was to apply the interventions above when a patient has both diagnoses concurrently.

Patient History and Systems Review

The patient agreed to be a part of this case report and was informed that the information provided would not reveal his identity. He signed a consent form and received a copy. He was a seventy-one-year-old Caucasian male, and his occupation was a carpenter and a farmer. He worked on his farm with his wife and milked goats to make cheese, yogurt, and other dairy products, managed his chickens and built houses for a living. He reported that he regularly climbed up and down ladders during his work hours. He drove a large pickup truck that had truck step bars for getting in and out of the truck.

The patient had emergency cauda equina surgery about a year ago and immediately after surgery he was fully functional. He started working again right after his surgery and his pain returned. When his pain returned, he started going to physical therapy to resolve his irritation and did well and became functional again. Unfortunately, at the beginning of this year he began to develop right anterior hip pain that radiated down to his right knee and reported that the pain was

usually relieved after a bowel movement. He did not get physical therapy treatment at the time for several reasons including the impact from the coronavirus disease 2019. The patient also had a medical history of a lumbar decompression on L4 – L5 about little over a year ago.

Refer to table 1A for the systems review performed at the initial visit. The patient had been referred to physical therapy by an orthopedic physician for lower extremity strengthening and lower extremity hip/knee pain. The orthopedic physician also prescribed a hip exercise. The exercise involved moving his right hip up and down, which immediately relieved his pain. He reported that his right hip and knee pain were unbearable and was only taking ibuprofen for relief. He reported that the pain was worse when he got out of his truck. He also reported he had no problem with sitting, although the pain that was in his right knee would come and go throughout the day. His primary complaint was his right hip and right knee pain impacting his carpenter and farm work. He was aware of his pain and understood that physical therapy would increase his function to return to work.

The patient was a good candidate for this case report for several reasons. He had a history of coming to physical therapy for his other pain (post-cauda equina surgery). He was compliant with his home exercise program (HEP) and reported that after every time he performed it the pain would disappear.

Examination- Test and Measures

The patient initially scored 47/80 (58.75%) on the Lower Extremity Functional Scale (LEFS). This test was reliable and assisted with the clinical decisions made (please refer to table 2A).[6] The patient's Timed Up and Go (TUG) time was also assessed. He completed it in less than 14 seconds putting the patient not at a fall risk for his age.[7] The patient's active range of motion (ROM) in his bilateral lower extremities was assessed during the initial examination (IE), using the therapist's experience to indicate whether the patient had limited motion. The findings

indicated that the patient did have restrictions with right internal rotation and hip extension, which was 10 degrees for both. The most important findings were that the plumb line was moderately posterior to the hip joint, indicating that his pelvis was posteriorly tilted. Assessment of the patient's lower extremity reflexes and myotomes concluded that L3 and S1 had diminished reflexes bilaterally. Deep tendon reflexes were assessed to check the integrity of the two-neuron reflex arc involving the spinal brainstem segment that innervates the muscle.[8] The patient showed hyporeflexia which can be indicative of a disease that contains one or more parts of the two-neuron reflex arc.[8] Next, the patient's myotomes were assessed and found to be normal. Myotomes are a collection of muscle fibers innervated by the motor axons within each segmental nerve root.[9] Injury to the myotome nerve root can cause signs of weakness when being tested. The patient's unilateral lower extremity balance was assessed using the Single Limb Stance Test (SLST).[10] The patient stood on one limb and was timed for 10 seconds. He performed 7 seconds on the right leg and 10 seconds on the left leg. The Straight Leg Raise Test and Well Leg Raise Test were used on the patient in supine. The patient's leg was lifted on the affected side and non-affected side from 35 degrees to 70 degrees.[11] Both tests were found negative and the diagnosis herniated disc was ruled out.[11] The Flexion Adduction and Internal Rotation test to rule out femoral acetabular impingement (FAI). The FAI test was used, and the patient's hip was flexed, internally rotated, and adducted.[12] The test was found negative and FAI was ruled out.[12] Further details of LE findings appear in Table 1B.

Clinical Impression: Evaluation, Diagnosis, Prognosis

Upon systems review and IE, the patient presented with radiating right hip and knee pain. The patient performed a right hip hike exercise, which relieved his right hip/knee pain during static standing. This confirmed the diagnosis of hip instability. The patient had two other diagnoses that he came in with, right knee patellofemoral pain syndrome and unilateral primary

osteoarthritis in the right knee. The primary osteoarthritis in the right knee was confirmed with his radiography, but the right patellofemoral pain syndrome remained a question due to his right knee pain being immediately alleviated from a hip drop exercise in standing.

The patient continued to be appropriate for this case due to his increased pain levels during static standing, his positive outlook on his diagnoses, and his motivation to improve his physical function to return to work with minor difficulties. The patient's official ICD-10 medical diagnoses were M22.2X1 (Patellofemoral disorders, right knee), M25.351 (Other instability, right hip), and M17.11 (Unilateral primary osteoarthritis, right knee). The physical therapy diagnosis included hip muscular imbalance and postural malalignment. The prognosis for the patient was generally positive, due to several factors including his motivated attitude towards the diagnosis and immediate positive response to exercise. Research has shown that manual therapy in the lower extremity joints (hip, knee, and ankle) and spine along with supervised exercise has functional benefits for patients that are diagnosed with osteoarthritis of the knee.[4,5]

The patient did not need any other referrals to any other healthcare provider. His functional status was planned to be reassessed using the LEFS every thirty days as required by Medicare. Physical therapy interventions included manual therapy for his spine, hip, knee, ankle if needed along with core strengthening, lower extremity strengthening, and postural training. The lower extremity strengthening had a heavy emphasis on hip musculature. Short-term and long-term goals reassessed at 4 weeks and 8 weeks (Please refer to Table 2B).

Intervention and Plan of Care

<u>Coordination, Communication, Documentation</u>

The IE and the plan of care (POC) information were communicated with the patient and his orthopedic physician. All the patient's documented notes were recorded on an electronic medical records system. The referring orthopedic physician had full access to the patient's POC

and daily notes. A re-examination was performed by the student physical therapist at 4 weeks and the patient's subjective report was documented after each treatment session.

Patient/Client-Related Instruction

Following the IE, the patient was educated on his online HEP and remained compliant. This was confirmed through patient reporting knee and hip pain relief with HEP. He was educated on how to perform his exercises via verbal and tactile cues during the treatment sessions. He was also educated on how to exit his truck without twisting his spine/hips, due to exacerbated pain with this specific activity.

Procedural Interventions

The patient participated in 11 treatment sessions over a six-week period, with a duration of each visit varying from 30-60 minutes. Interventions applied during each visit are provided in Table 3A, including the duration, frequency, and technique of the manual therapy. The timeline for the entire program is illustrated in Figure 1. Progressions were based on observation of the patient's functional performance and clinical judgement. The interventions consisted of lower extremity strengthening, postural cueing during exercises, soft tissue mobilization, flexibility exercise and joint mobilizations.

The initial hip flexor flexibility exercise performed by the patient was in half-kneeling. He was cued to keep an upright posture to increase the intensity of the hip flexor stretch. The passive hip flexor stretching exercise included the patient rolling a tennis ball on his right hip flexor muscle while in prone. Active and passive stretching has shown to increase flexibility in tight hip flexor muscles and increases hip extension ROM.[13]

Lower extremity strength and balance training included an emphasis on hip and knee strengthening, as requested by the orthopedic physician. Hip muscle weakness has been shown to increase in those with knee osteoarthritis due to the increase in medial compartment loading of

the tibia femoral joint.[14] Hip strengthening included isotonic exercises activating the adductors, hip abductors, hip internal/external and hip extensor muscles. Hip flexor strengthening was also added to the POC due to the iliopsoas muscle group resisting anterior translation of the femoral head.[1] The POC followed with closed chain hip exercises using orange, blue, and green therabands (The Hygienic Corporation Akron, OH) for moderate resistance. Resistance exercise has been shown to be effective for treating strength insufficiency and muscle activation imbalance in those with knee osteoarthritis.[15] The balance exercise incorporated into the POC was the single-limb stance, to help improve the patient's static steady-state balance.[16]

Manual therapy interventions included soft tissue mobilization (STM) to the psoas muscles, gluteus medius muscles, and the patient's post-surgical scar. These interventions were chosen to increase the patient's flexibility in those specific areas and were implemented using clinical judgment. However, there is lack of evidence for the use of STM for the purpose of increasing flexibility. Other manual therapy interventions included hip mobilizations (lateral/internal rotation and posterior) and lumbar traction for the purpose of relieving the patient's right knee and hip pain.[17] Hip mobilization with movement was performed in supine. The patient's right hip and knee were flexed to 90 degrees as the clinician assisted with a lateral distraction while internally rotating the patient's hip joint. This mobilization was performed during initial treatment and relieved the patient's right hip and knee pain immediately. Lateral hip distractions were discontinued as posterior hip glides were implemented. Posterior hip glides were used to treat the patient's anterior femoral translation. This treatment was used based off of clinical judgement. There are limited randomized controlled trials on hip mobilizations/lumbar traction on the treatment of anterior knee pain. However, the intervention was implemented due to immediate relief of his right knee/hip pain. Recent evidence demonstrated the short-term

effects of mobilization with movement on improving knee flexion ROM, lower extremity strength and hypoalgesia effect in patients with knee osteoarthritis.[1]

Outcomes

The patient showed similar baseline testing results on the RE at 4 weeks as shown in Table 1B. For an accurate measure of the patient's improvements, all tests and measures were performed identical to the IE. The patient's hip ROM and posture did not change. However, the patient had improvements with his LEFS score from 47 to 53 points. Specifically, he reported less difficulty with getting in and out of the car and with work activities. The patient's right leg SLST also improved from 7 to 10 seconds. However, his left SLST did not improve.

Over the course of his treatments, the patient reported gradual improvements with standing balance and pain reduction throughout the day. The patient reported no pain in his right knee while exiting his car and was able to perform all his ADLs with little to no difficulty. The only residual right hip and knee pain he reported would randomly appear while standing and talking to his customers. He reported that he was compliant with his HEP and that it helped reduce his pain. The patient attended all 11 treatment sessions, but he needed to leave 2-3 treatments early due to his work schedule.

Discussion

This case report demonstrated the intended purpose of hip strengthening and mobilizations for the management of a patient diagnosed with hip instability and knee osteoarthritis. The patient did not show improvements in hip ROM, gross lower extremity strength, deep tendon reflexes, and posture within the 6-week period. Although the increase in the patient's LEFS score did not exceed a published minimally clinically important difference value of nine points,[6] he reported that his improvements made his work and daily activities easier. The objective measures, especially his balance and range of motion, likely did not

improve due to the 6-week time constraint.

One of the strengths in this case report was the use of evidence-based interventions and patient education. Manual therapy and lower extremity strengthening were applied to the patient's diagnoses. These interventions have been reported to increase functional outcome.[5] Kalisvaart et. al described that the iliopsoas muscle unit helps resist anterior translation of the femoral head.[1] Therefore, the author prescribed hip flexor strengthening and performed posterior hip mobilizations. The patient was also educated on his posture and proper body mechanics while getting out of his truck. After his adjustments in his posture and body mechanics, he reported a reduction in pain throughout the day. A limitation in this case was the lack of an objective measure of the patient's isolated muscle strength. Another limitation was that the individual effectiveness of the hip strengthening, mobilizations, and patient education could not be fully determined because they were delivered in combination.

In conclusion, strength/balance training and manual intervention may benefit a patient diagnosed with hip instability and knee osteoarthritis. Although, there needs to be further research to confirm that hip instability can be treated with strength training.

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TABLES and FIGURES

Table 1A. Systems Review

Systems	Findings
Cardiovascular/Pulmonary	Not impaired
Musculoskeletal	Low Back Pain with Passive Right Hip Extension
Neuromuscular	Reflex/Sensory Integrity: L3 and S1, 1+ (Diminished) Bilateral
Integumentary	Not Impaired
Communication	Not impaired
Affect, Cognition, Language, Learning Style	Not impaired Preferred Language: English Learning Style: Verbal, Tactile, and Visual

Table 1B. Tests and Measures

Examination Measure	Initial Evaluation Results	Outcomes at 4 weeks
Posture	Hips anterior to plumb line	Hips anterior to plumb line
Lower Extremity Myotomes	L2 Hip Flexion: Left 5/5 Right 5/5 L3 Knee Extension: Left 5/5 Right 5/5 L4 Ankle Inversion: Left 5/5 Right +4/5 L5 Great Toe Extension: Left 5/5 Right +4/5 S1-2 Ankle Plantar Flexion: Left 5/5 Right +4/5	L2 Hip Flexion: Left 5/5 Right 5/5 L3 Knee Extension: Left 5/5 Right 5/5 L4 Ankle Inversion: Left 5/5 Right +4/5 L5 Great Toe Extension: Left 5/5 Right +4/5 S1-2 Ankle Plantar Flexion: Left 5/5 Right +4/5
Reflex	L3 Patellar Tendon: Bilateral 1+ Diminished S1 Achilles Tendon: Bilateral 1+ Diminished	L3 Patellar Tendon: Bilateral 1+ Diminished S1 Achilles Tendon: Bilateral 1+ Diminished
Range of Motion	Hip Extension: Left PROM 10 degrees, Right PROM 10 degrees Internal rotation: Left Within normal limits, Right PROM 10 degrees	Hip Extension: Left PROM 10 degrees, Right PROM 10 degrees Internal rotation: Left Within normal limits, Right PROM 10 degrees
Special Tests	Straight Leg Raise: Negative Well Leg Raise: Negative Flex Internal rotation Adduction Test: Negative	Straight Leg Raise: Negative Well Leg Raise: Negative Flex Internal rotation Adduction Test: Negative

PROM = Passive Range of Motion

Table 2A: Functional Outcomes

Functional Outcome Measure	Initial Evaluation	Outcomes
Lower Extremity Functional Scale (LEFS)	Total points: 47	Total points: 53
Timed Up and Go (TUG)	Less than 14 seconds	Less than 14 seconds
Single Limb Stance Test (SLST)	Left Leg, Eyes Open, Firm: Good (10 seconds) Right Leg, Eyes Open, Firm: Fair (7 seconds)	Left Leg, Eyes Open, Firm Good (10 seconds) Right Leg, Eyes Open, Firm: Fair (10 seconds)

Table 2B: Short and Long-Term Goals

Short Term Goals	Long Term Goals
1. Symptomatic Improvements: The Patient will decrease his pain in the right knee and hip to 2/10 within 4 weeks. (Goal Unaccomplished) 2. Biomechanical Improvements: The patient will improve his posture by decreasing his hip/pelvic girdle asymmetry to trace levels within 4 weeks. (Goal Unaccomplished) 3. Functional Tests: Balance: Patient will perform single limb stance for at 10 seconds in bilateral lower extremities within 4 weeks. (Goal Accomplished)	1. Symptomatic Improvements: The patient will centralize his radicular symptoms within 8 weeks. (Unable to assess) 2. Biomechanical Improvements: The patient will improve his posture by decreasing his hip/pelvic girdle asymmetry to normal levels within 8 weeks. (Unable to assess) 3. Functional Tests: Balance: Patient will perform single limb stance for at 20 seconds in bilateral lower extremities within 8 weeks. (Unable to assess) 4. Reflex/Sensory Integrity: Myotomes: The patient will increase his myotome testing to bilaterally 5/5 in hip flexion, knee extension, ankle inversion, great toe extension, ankle plantar flexion within 8 weeks. (Unable to assess)

Table 3A: Interventions by Treatment Session

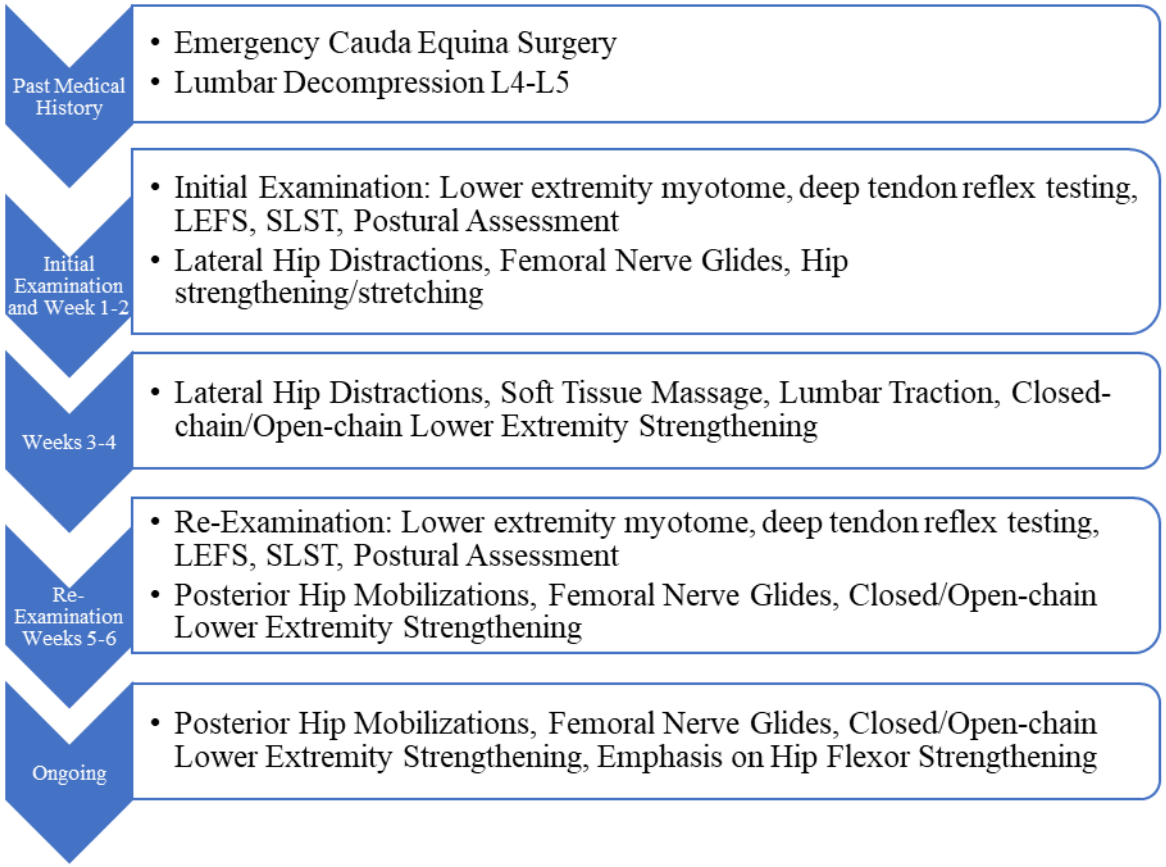
Manual Therapy	**Rx 1**	**Rx 2**	**Rx 3**	**Rx 4**	**Rx 5**	**Rx 6**	**Rx 7**	**Rx 8**	**Rx 9**	**Rx 10 (RE)**	**Rx 11**
R Lateral Hip Distraction in 90 degrees Flexion with IR Mobilization with Movement	5 minutes Grade: II/III	5 minutes Grade: II/III	5 minutes Grade: II/III	6 minutes Grade: II/III	6 minutes Grade: II/III	6 minutes Grade: II/III	7 minutes Grade: II/III				
R Posterior Hip Glide in 30 degrees Flexion (Oscillatory)								10 minutes Grade: II/III		10 minutes Grade: II/III	10 minutes Grade: II/III
R Long Axis Hip Distraction (Sustained)											5 minutes Grade: II/III
R Femoral Nerve Glide (Mobilize and Elongate)	5 minutes									10 Minutes	
Psoas and Gluteus Medius STM (Strumming)		8 minutes	8 minutes	8 minutes		8 Minutes			4 Minutes	8 Minutes	
Lumbar Traction Hook-lying (Intermittent)				5 minutes		8 Minutes	8 Minutes				
Post-Surgical Scar STM on L4-L5 (Strumming)									4 Minutes		
Flexibility Exercises											
Hip Flexor Stretch (Half-Kneeling)		3x30 seconds		3x30 seconds							
Psoas Tennis ball rolling in Prone (R Hip)								5 minutes			
Strengthening Exercises											
Bridging	3x10	3x10	3x10 Blue TB around Knees		3x10 Blue TB around Knees	3x10 Blue TB around Knees					
Side-lying Hip Abduction		3x10 Bodyweight									
Side-lying Hip ER (Clam shells) TB around Knees					3x10 Blue TB around	3x10 Blue TB around					

					Toes	Toes					
Hip Clocks: 3-point TB around Ankle							3x10				
Standing Knee Flexion (Hamstring Curl) with Ankle Weight							3x10 3 lb.		3x10 3 lb.		
Dynamic Hip Abduction (Side Steps) TB around Toes					3x10 Blue TB around Toes	3x10 Blue TB around Toes					
Step-Ups: Forward onto 12-inch Step						3x10 holding 5 lb. dumbbells in each hand					
Single Leg Deadlift							3x10				
Leg Press (Life Fitness Pro Horizontal Leg Press, Rosemont, Illinois)							3x10 100 lb.				
Standing Hip Flexion TB around Midfoot								3x10 Orange TB	3x10 Orange TB		
Supine Hip Flexion TB around Midfoot								3x10 Orange TB			
Side-Lying Hip ER (Knee to Knee)								3x10 Bodyweight	3x10 Bodyweight	3x10 1 lb. ankle weights	3x10 1 lb. ankle weight
Side-Lying Hip IR (Reverse Clamshells Heel to Heel)								3x10 Bodyweight	3x10 Bodyweight	3x10 1 lb. ankle weights	3x10 1 lb. ankle weight
Straight Leg Raise (Supine)								3x10 Bodyweight	3x10 with 2 lb. ankle weight		
Straight Leg Raise (Side-lying for Adduction)										3x10 with 1 lb.	

										ankle weight	
Corrective Bodyweight Squats											3x10
Slide Board Hip Adduction (Towel Under Foot)											3x10
Standing Shoulder Rows (Scapular Retraction)			3x10 Orange TB	3x10 Green TB							
Standing Shoulder Extensions			3x10 Orange TB	3x10 Green TB							
Balance Exercises											
Single Limb Stance					3x30 seconds	3x30 seconds					

R = Right, TB = Theraband, IR = Internal Rotation, ER = External Rotation, STM = Soft Tissue Massage, Empty Box = Indicates Exercise Was Not Performed

Figure 1. Timeline for Episode of Care



LEFS = Lower Extremity Functional Scale, SLST = Single Limb Stance Test

374 **CARE Checklist**

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CARE Content Area	Page
1. **Title** – The area of focus and "case report" should appear in the title	1 376
2. **Key Words** – Two to five key words that identify topics in this case report	1 377
3. **Abstract** – (structure or unstructured) a. Introduction – What is unique and why is it important? b. The patient's main concerns and important clinical findings. c. The main diagnoses, interventions, and outcomes. d. Conclusion—What are one or more "take-away" lessons?	2 378 379
4. **Introduction** – Briefly summarize why this case is unique with medical literature references.	3,4
5. **Patient Information** a. De-identified demographic and other patient information. b. Main concerns and symptoms of the patient. c. Medical, family, and psychosocial history including genetic information. d. Relevant past interventions and their outcomes.	4,5
6. **Clinical Findings** – Relevant physical examination (PE) and other clinical findings	5,6
7. **Timeline** – Relevant data from this episode of care organized as a timeline (figure or table).	20
8. **Diagnostic Assessment** a. Diagnostic methods (PE, laboratory testing, imaging, surveys). b. Diagnostic challenges. c. Diagnostic reasoning including differential diagnosis. d. Prognostic characteristics when applicable.	6,7
9. **Therapeutic Intervention** a. Types of intervention (pharmacologic, surgical, preventive). b. Administration of intervention (dosage, strength, duration). c. Changes in the interventions with explanations.	7,8,9,10
10. **Follow-up and Outcomes** a. Clinician and patient-assessed outcomes when appropriate. b. Important follow-up diagnostic and other test results. c. Intervention adherence and tolerability (how was this assessed)? d. Adverse and unanticipated events.	10
11. **Discussion** a. Strengths and limitations in your approach to this case. b. Discussion of the relevant medical literature. c. The rationale for your conclusions. d. The primary "take-away" lessons from this case report.	10,11
12. **Patient Perspective** – The patient can share their perspective on their case.	5
13. **Informed Consent** – The patient should give informed consent.	1