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Use Of Core Stabilization Exercise And Medical Exercise Therapy In The Treatment Of A Patient With Chronic Post Partum Low Back Pain: A Case Report

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The patient signed an informed consent allowing the use of medical information and video footage for this report and received information on the institution's policies regarding the Health Insurance Portability and Accountability Act.

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Abstract:

Background and Purpose: Low back pain and lumbar hyper-mobility are common during and after pregnancy.[15] Postpartum low back laxity can contribute to LBP and can become chronic if not addressed. Core stabilization exercises (CSE) have been shown to improve function and reduce pain in patients with nonspecific chronic low back pain due to lumbar instability.[5] Additionally, Medical Exercise Therapy (MET) has shown good outcomes in reducing pain in patients with LBP[7] but has not been thoroughly investigated in the treatment of chronic post partum LBP. There is limited research reporting the use of a combined treatment protocol utilizing CSE and MET in the treatment of chronic low back pain in post-partum women.

Case Description: The patient was a 28-year-old female with bilateral hip and lumbosacral pain 2 years post partum. Intervention consisted of core stabilization exercise (CSE) using medical exercise therapy (MET) and manual lumbar traction. Outcome measures included the Lower Extremity Functional Scale (LEFS), Patient Specific Functional Scale (PSFS), and Numeric Pain Rating Scale (NPRS).

Outcomes: Results from initial evaluation to discharge (Lower Extremity Functional Scale (LEFS) – 48/80 to 62/80; Patient Specific Functional Scale (PSFS) – 4/10 to 7/10; Numeric Pain Rating Scale (NPRS) – 7/10 to 4/10) demonstrated decreased pain, increased ability to return to prior level of function, and improved ability to take care of her two-year-old daughter.

Discussion: Low back pain after pregnancy can be difficult to manage. This case report demonstrated a combined intervention of CSE and MET decreased pain and increased function in a 28-year-old female presenting with post-partum LBP. Future studies should investigate the combined effects of CSE and MET in a larger population of patient with LBP.

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Background:

Low back pain (LBP) is a common and debilitating condition, with a quarter of U.S. adults reporting an incidence of back pain over a 3-month period.[1] LBP has been reported as the leading cause of activity limitation and work absence in a large part of the world.[2] Lumbar low back pain and posterior pelvic pain are common during and after pregnancy,[3] with almost a third of pregnant women reporting back pain throughout their pregnancy and almost one fifth reporting pelvic pain.[4] Research has found that lumbar spine pain and posterior pelvic pain, that often occurs during pregnancy, must be treated with different types of interventions in order to effectively reduce the pathology. In 30-35% of patients, lumbar spine pain has been found to be caused by hypermobility at the the vertebral segments.[5]

Core stabilization exercises (CSE) are common in the treatment of low back pain and have been shown to be more effective than conventional exercise in reducing pain.[6] The development of this pain is debilitating and can potentially have affects on a woman's ability to function in her daily life.[3] In patients presenting with hypermobility in the lumbar spine, which is causing chronic low back pain, research has found that CSE in combination with general exercise can improve instability at those joints.[5] In one study, 47% of pregnant women experienced low back pain during pregnancy, and by participating in a program that included education and exercise, reduced back pain and as a result sick leave by 43 weeks.[3] Research is limited on an effective treatment program to treat chronic low back pain that occurs either during or after pregnancy. Core stabilizations exercises, however, have been demonstrated to reduce low back pain in multiple populations.[6]

Medical Exercise Therapy (MET) was developed in the 1960s in Norway and has become a well recognized treatment approach in parts of Europe and North America.[7] MET uses specially

designed equipment in order to grade exercises and treat a patient's condition specifically based on their dysfunction. The approach consists of 7-10 exercises, designed to treat a pathology globally, semi-globally, and locally. Global exercises are designed as broader exercise that treat a patient's whole body. Semi-global exercises are those which treat the entire affected limb, while local exercises are specific to the affected joint or area experiencing pain or dysfunction. In a complete program, a patient may be performing 1000 repetitions of exercise in one, sixty-minute therapy session.

While research is limited on the effects of MET on LBP, some studies have shown it to be a good alternative to conventional physical therapy. In one study comparing the efficiency and costs of MET to conventional therapy and self-exercise in the treatment of LBP, MET was found to have the highest patient satisfaction across all three therapies.[8] While costs were not reduced to the same extent as conventional therapy, MET appears to be a good alternative, that with higher satisfaction, patient's may be more likely to complete therapy. While there is limited research showing the most effective treatment for LBP, MET has been shown to effectively reduce pain, increase function, and reduce medical costs.[8] While there is research that supports the use of both CSE and MET in the treatment of LBP, research is limited on the efficacy of a combined treatment of the CSE and MET in the post-partum LBP population.

Purpose:

The purpose of this case report was to investigate a combined physical therapy treatment protocol of CSE and MET on a patient with chronic low back pain 2-years post-partum.

History:

The patient was a 28-year-old female who presented with bilateral posterolateral hip and lumbosacral pain, which began post-partum approximately two years prior. The patient had no prior pregnancies or episodes of LBP; however, she did report a coccyx fracture during her home birth delivery. The patient reported that she was breast feeding and had a 2 ½ cm diastasis recti at time of initial evaluation. The patient had, had no previous physical therapy treatment for this condition, but reported occasional massage, which tended to make the condition worse.

The patient was in good physical condition and reported that she enjoyed exercising 4-5 times per week, which consisted of running, biking, or yoga. However, since her pain had been getting worse, she was unable to participate in those activities. She also reported that she was unable to stand longer than one hour without pain, sit for greater than 10 minutes without pain, had difficulty squatting, and had difficulty lifting heavy objects, such as her daughter or groceries, from the ground. Pain in her low back and hips was also preventing her from fully caring for her two-year-old daughter, however, she had support from her mother when needed to help with childcare.

At initial evaluation, the patient was found to have a 50% reduction in lumbar extension active range of motion (AROM), excessive hip external range of motion (ROM) and limited internal ROM in her right hip. Patient presented with increased mobility at the L5-S1 segment in her lumbar spine and expressed relief of symptoms with unloading of the lumbar spine. Detailed information on results from the systems review can be found in Table 1.

Clinical Impression #1:

The patient was a 28-year-old female presenting with the health condition lumbar instability at the L5-S1 segment and decreased flexibility in bilateral hip flexors, and bilateral iliotibial bands. At the impairment level, the patient presented with lumbosacral pain resonating into bilateral hips with pain in her right hip greater than her left. Pain in this region was decreasing the patient's ability to perform activities of daily living, squatting, sitting for extend periods of time, running, and yoga. Pain also restricted the patient from participating in caring for her daughter and participating in recreational activity. Patient environmental factors included biking and driving (extended sitting) as modes of transportation and necessity of caring for her daughter in her home.

Based on the symptoms that the patient presented with during the initial evaluation it was determined that sacroiliac dysfunction, lumbar disc herniation, hip joint dysfunction, and sciatic nerve inflammation were all potential differential diagnoses with this case. Further information regarding birth history and status of diastasis recti was needed. Family medical history was thought to be insignificant but the patient was unsure of any relevant conditions.

Examination & Evaluation:

Pertinent information was gathered from the patient's verbal medical history as to inform the clinician of what impairments may be relevant to the patient's condition. The patient completed 2 self report outcome measures, the Lower Extremity Functional Scale (LEFS), and the Patient Specific Functional Scale (PSFS) as well as reporting her pain on the Numeric Pain Rating Scale (NPRS) at best, worst, and present. The LEFS has been found to be a reliable and valid tool in assessing function in people with various lower extremity pathologies.[9] Scores range

from 0-80 with the score out of 80 being the percentage of perceived function in a patient's lower extremity. The minimal clinically important difference has been reported as a difference of 9 points in various lower extremity pathologies.[9] The patient initially scored 48/80 on the LEFS, which suggested that the patient was at 60% of normal lower extremity function. The PSFS is self reported measure of a patient's perceived ability to complete specific activities. It has been found to be a reliable and specific tool in determining clinically important change in chronic low back pain.[10] Using the scale, the patient rates their ability to perform a certain activity on a scale of 0-10, with 0 being unable to perform, and 10 able to perform at prior level. Initially the patient scored a 4/10, which suggested the patient had moderate difficulty performing activity. Items included in this score were squatting, lifting a heavy object from the floor, and ability to stand for 1 hour.

Examination of the patient's lumbar active range of motion revealed a 50% reduction in extension ROM. This reduction in range of motion could have been due to hip flexor tightness causing the patient's pelvis to be pulled out of proper alignment. Without proper alignment the patient might have been in poor posture when performing functional activity, thus restricting her lumbar extension ROM. Since the patient reported increased symptoms when in lumbar extension, the manual unloading test was performed, which was positive, suggesting the patient had a load sensitivity.

The patient's segmental mobility was evaluated in sidelying with the clinician noting hypermobility at the L5-S1 segment, all other lumbar segments were normal. Hypermobility at the L5-S1 spinal segments could have been due to a multitude of factors including the patient's pelvic alignment and poor postural deviations. Also, laxity in the joint could have been due to higher levels of the hormone relaxin during and after pregnancy.[11]

The patient's hip flexor and iliotibial band flexibility was tested, which were both positive for restriction. This could have been due to the patient's activity level as well as any form of compensation the patient was making due to the patient's abnormal pelvic alignment. Since the patient's lumbar spine was hypermobile, muscles could have been compensating by tightening in order to create stability at the hypermobile segments.

Neurological testing was performed in order to rule out any underlying neurological pathology that could be contributing to the patient's symptoms. The patient underwent slump testing, and presented with positive left and right slump tests. These tests suggested nerve root irritation.

Clinical Impression #2

Based on patient's objective findings of a hypermobile segment at L5-S1, positive right slump testing and straight leg raise testing, the patient presented with signs and symptoms consistent with lumbar nerve pathology that potentially caused bilateral hip pain and SI joint pain. Based on the patient's prior level of function, motivation, age, and examination data, the patient was a good candidate for Physical Therapy. Prior to coming to physical therapy the patient was living an active lifestyle, participating in sports and recreation as well as caring for her 2-year-old daughter. The patient also had prior knowledge of anatomy and physiology with a degree in exercise science. This further improved her probability of success in physical therapy because of a better knowledge of her own anatomy and physiology. Based on examination findings, the patient was a good candidate for physical therapy and a core stabilization/exercise program was initiated including postural retraining, strengthening, and stretching. All exercises were based on the MET philosophy with low weight and high repetitions in order to decrease

pain and return the patient to normal function. Patient continued to be appropriate for the case due to presenting diagnosis and potential benefits and advancement in the use of a core stabilization program for the treatment of chronic low back pain using MET. Patient underwent 10 weeks of core stabilization training including strengthening, stretching, and postural retraining using the MET framework. The plan included lumbar traction and massage of the lumbar paraspinals and SI joint region as indicated. Pain assessment was performed using the NPRS at each visit in order to assess patient's pain level during functional activity. Mobility at the L5-S1 segment level were reassessed every 3-4 weeks including palpation of the lumbar paraspinals and SI joint region for assessment of tenderness to palpation. The LEFS and PSFS were used as outcome measures at initial evaluation and discharge in order to determine change in patient functional level during the course of treatment. Slump testing was reassessed at 8 weeks after start of care to determine radicular symptoms of the L5-S1 nerve root segment after treatment. Lumbar extension measures were assessed at 4-week intervals in order to assess patient functional range of motion during daily tasks.

Interventions:

Coordination, Communication, Documentation: The patient was instructed on exercises by the student physical therapist, physical therapist, and trained exercise technicians. Posture and form during exercise were monitored by physical therapists and exercise technicians at the clinic. The patient was seen through direct access and no other clinicians were seen at the time of evaluation. Initial evaluation and daily notes were prepared and documented using InsightEMR throughout the course of treatment.

Patient/client-related instruction: The patient was verbally instructed on self traction techniques that she could perform at home following two sessions of intervention. She was verbally given a home exercise program at three weeks after initial evaluation. The patient was instructed on lumbopelvic rhythm strategies and functional pelvic alignment for when she was planning on sitting for prolonged periods of time. Patient was advised to hold off on any activity (biking, running, hiking) that exacerbated her symptoms until three weeks after start of care. At three weeks, the patient was instructed to complete exercise sessions of her normal activity if she reported decreased pain on the NPRS. A written home exercise program (HEP) was not given to the patient until six weeks after initial evaluation due to therapist preference in assessing the patient's response to treatment in the clinic. The HEP consisted of instruction on proper strategies when lifting her daughter and exercise instruction related to her program in the clinic. Patient was asked to perform the HEP one time outside of therapy if she had therapy twice that week.

Procedural Interventions: The intervention consisted of 60 minute sessions, two visits per week, for 10 weeks of CSE, MET, neuromuscular re-education, manual therapy, and joint mobilization. CSE has been found to be more effective in reducing pain and disability and improving functional status than conventional exercise.[6] The MET treatment philosophy focuses on areas of pain and disability with high repetition and low weight training exercises. This promotes the release of endogenous opioids in the brain, which modulate pain perception and allow for increased tolerance to exercise.[7] Prior research has also found MET reduces pain and improves function in patients with multiple musculoskeletal disorders.[7] Interventions focused on patient goals and impairments that were found during her initial evaluation. CSE and MET were

used to address limitations in range of motion and instability found in the patient's low back and lower extremities. Weight increases for core stabilization exercises were made based on patient tolerance to exercise and her ability to complete three complete sets without increase in symptoms. As patient strength increased during intervention, increases in weight allowed the patients core to be further challenged. Exercises were added to the program when the patient's tolerance to exercise was increased and pain was not present during any of the exercises. Additional exercises were meant to challenge the patient's core and increase stability at the lumbosacral junction. Massage was used during the patient's program when she complained of increased pain at the SI joint and sacrum, which prevented her from fully participating in therapy on a given day. Similarly, stretching was used, in order to decrease pain, when the patient complained of pain or tightness at the insertion of the hip flexor at the lesser trochanter of the femur. Finally, as the patient progressed through her program, treadmill running was used as a test to assess the ability of the patient to maintain pelvic alignment during functional activity. Further detail on exercise frequency, duration, and description can be found in Appendix A.

Outcomes:

Results from this study showed improvement in pain, function, and AROM. The patient improved in the LEFS, PSFS, and NPRS with results from initial evaluation to discharge including 48/80 to 62/80, 4/10 to 7/10, and 7/10 to 4/10 respectively. Patient also reported that on some days, at best she had no pain at rest on the NPRS. The patient also demonstrated increased lumbar extension ROM from initial evaluation to discharge from 50% of full ROM to 80% of full ROM. Slump testing and SLR testing were both negative at discharge suggesting increased stability at the lumbosacral junction, no longer causing radicular symptoms. With

decreased pain and increased mobility, the patient reported increased ability to care for her daughter as well as sitting for 20 minutes without pain when driving. About half way through her time in physical therapy, the patient reported that she was able to bike to her sessions due to decreased pain in her daily life. This demonstrated increased ability to participate in functional activity and progress towards patient goals in therapy. Details on tests and measures performed during examination and at discharge are shown in Table 2.

Discussion:

Excessive lumbar translation has been shown to be a cause of chronic low back pain.[12] Previous studies have suggested that CSE in combination with general exercises improved excessive lumbar segmental translation.[5] The combination and effects of CSE and MET, has not previously been documented in a patient with postpartum LBP. Throughout the course of treatment, the patient's pain and functional ability was variable as she went through her program. Strategies for lifting and functional pelvic alignment, appeared to improve her ability to function as the primary caregiver for her daughter and her ability to perform ADLs. The patient was also able to return to recreational activity on a more consistent basis, and about six weeks into her treatment, was able to bike to and from sessions with limited pain. In addition, throughout her treatment, manual lumbar traction provided the patient with pain relief. Manual lumbar traction is used widely among physical therapy practice but the efficacy of its use has been questioned by multiple studies. Previous research has reported that of 1000 physical therapists in the United States 76% had reported using traction.[13] This suggests that even with limited efficacy for it's use, many patients respond positively to the intervention, as our patient did throughout her treatment.

A factor that was not fully considered throughout the course of treatment was instability. While core stabilization improved the patient's function, suggesting a possible improvement in stability at the L5-S1 segment, at discharge the patient still had complaints of pain and disability. Since the patient had not returned to her baseline level of function, these findings suggested the possibility of extraneous factors affecting her condition.

Previous research has found that 67% of women reported low back pain immediately following birth and 37% reported low back pain during the first year after pregnancy.[14] The patient presented with a multitude of factors that could have been contributing to her chronic LBP including, a traumatic birthing process and the presence of a two centimeter diastasis recti. Posterior pelvic pain and low back pain were not differentiated in this case, and have been suggested that assessing these two conditions separately is essential in treating pregnant and postpartum women.[3] Without this differentiation, the full scope of dysfunction may not be recognized, and women who are treated for low back pain may get worse.

In this case, the combination of CSE and MET with additional lumbar traction, demonstrated improvement in the patient's medical status from initial evaluation to discharge. Decreased pain and increased function at discharge, suggests that CSE and MET in combination may be able to successfully treat chronic LBP in a postpartum woman. Using a similar model in clinical practice may benefit those who are not responding to a conventional exercise program to treat chronic LBP.

In conclusion, it is important to consider patient medical history, prior level of function, and differential diagnosis when treating patients with chronic low back pain. It is also important to consider etiology of the possible disorder as well as what events may have led to the onset of disability. Without, these considerations, underlying pathology may be missed and a patient may

not successfully reach their baseline level of function through treatment. Ultimately, this case demonstrated that the combined use of CSE and MET was 80% successful in reducing pain and improving function in a 28-year-old woman with chronic postpartum low back pain. Since there is limited research supporting the efficacy of a combined treatment, future studies should investigate the combined effects of CSE and MET in a larger population.

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360 Table 1: Systems Review

System	Impairment
Cardiovascular/Pulmonary	Normal
Musculoskeletal	Lumbar Active Range of Motion – Lumbar extension ~50% of normal (Normal range: 3-49º); All other Lumbar Active Range of Motion – Within Functional Limits Hip Active Range of Motion – Within Functional Limits Hip Passive Range of Motion – Slightly excessive Hip External Rotation Range of motion noted in the right hip and decreased internal rotation range of motion noted in the right hip Hip Flexibility – Restricted motion noted in the Hip Flexors and Iliotibial Band of bilateral lower extremities and restriction noted in the piriformis of the right lower extremity. Gastrocnemius, soleus, hamstrings, quadriceps were all within normal limits of flexibility in bilateral lower extremities. Lumbar Segmental Mobility – Slightly increased movement noted with PIVM of the L5-S1 segment. All other segments L1-L5 were within normal limits. Joint Integrity Testing of the Lumbar Spine – Manual traction of the lumbar spine was performed, which alleviated the patient's symptoms. Tenderness to palpation was noted at the sciatic notch, right SI joint, and in the L5-S1 region.
Neuromuscular	Achilles tendon reflex testing (S1) – Normal (2+) Patellar tendon reflex testing (L4) – Normal (2+) Lower extremity sensation – Normal Lower extremity myotomal testing – Normal Neural Tension testing of the Sciatic Nerve – Negative
Integumentary	Normal
Communication	Appropriate
Affect, Cognition, Language, Learning Styles	Patient was a happy 28-year-old English-speaking female with no limitations in cognition. Learning style – patient preferred pictures and demonstration.

Table 2: Test & Measures and Outcome Measures at Initial Evaluation and Discharge

Tests & Measures	**Initial Evaluation Results**	**Final Results**
Lower Extremity Functional Scale (LEFS)	48/80	62/80
Patient Specific Functional Scale (PSFS)	4/10	7/10
Hip Scour Test	Negative	Negative
Slump Test	Right Slump Test – Positive with dorsiflexion and cervical flexion on the right. Left slump test – positive with dorsiflexion and cervical flexion on the right.	Negative
Flexion Abduction External Rotation Test (FABER)	Negative	Negative
Straight Leg Raise	Positive – patient reports slight increase in symptoms with straight leg raise testing.	Negative
Numerical Pain Rating Scale (NPRS)	Pain at present – 3 Pain at best – 3 Pain at worst - 7	Pain at best - 0 Pain at worst - 4

Appendix A: Exercises & Interventions

Intervention	Description
Wide grip pull down	The patient was standing with neutral pelvic alignment and with a slight angle to the pull down bar. A pull-down bar was set-up so that the patient's arms were fully extended when holding onto the bar. The patient held the bar with hands gripped distal to the bend in the pull-down bar and pulled the bar to the top of the chest
Rows	Patient was standing with neutral pelvic alignment. Pulleys with two handles were set-up in front of the patient with the top of the pulley at about shoulder height. The patient then brought the pulleys in towards their chest with thumb-up hand positioning squeezing their rhomboids and middle traps.
Bridge	The patient was instructed to lie supine on a mat table in hooklying. They then were instructed to raise their buttocks 4-6 inches off the table squeezing their glutes taking two seconds to ascend and 1 second to descend back to the table.
Golf Stabilizations	The patient was standing with neutral pelvic alignment. The patient was instructed to stand facing a single handhold on the pulley system, which was set-up at about shoulder height. The patient was then instructed to hold the pulley out from the pulley system with about 110 degrees of elbow flexion and rotate their upper body on their hips keeping their hips square. This was repeated facing both directions.
Squats	Two 10-pound weights were set up on a step stool as to imitate the height of the patient's daughter. The patient was instructed to stand with legs 3-4 inches wider than shoulder width and feet pointed at about a 45 degree angle outward (sumo squat). The patient was then instructed to squat down and pick up the 10 lb weights then stand back up, bending knees as to not allow the knees to pass over the toes and keeping the back in neutral alignment throughout the motion.
Planks	Prone in front of a mirror, the patient was instructed to rise up on forearms/elbows and toes while maintaining a neutral spine and neutral pelvic alignment.
Dead Bugs	The patient was instructed to lie supine in front of a mirror. With knees and hips flexed to a 90º-90º position as well as arms at 90º of flexion, the patient was instructed to extend the hip and knee of the R leg and fully flex the L arm then repeat that on the opposite extremities. The arms and legs did not contact the ground throughout the range of motion.
Bird/Dogs	In quadruped, the patient was instructed to straighten opposite arm and leg (R Arm, L leg) slow and controlled while maintaining a neutral pelvis with minimal hip rotation.
Standing Hip Extension	The patient was standing leaning against a mat table with back in neutral alignment and about 90º of hip flexion. The patient was then instructed to bend the R knee to 90º and bring the thigh straight back as to contract the R glutes and hamstrings. This was then repeated on the L side.
Joint Mobilization: Manual Traction	The patient was in hooklying on a plinth or high-low table. The therapist then straddled the table with buttocks at the edge of the patient's toes. A mobilization strap was then wrapped around the midline of the therapist's scapulas and then around the upper calves of the patient with the therapist's hands between the belt and the calves. The therapist then applied grades 2-4 traction of the patient's lumbar spine by extending back into the belt.
Manual Therapy: Hip Flexor Stretching	The patient was placed in supine with their left leg and foot on the ground off the side of a high-low table. The back of the high low table was then raised about 4-5 inches placing the patient's hip in slight extension. The therapist then applied pressure to the ischial tuberosity of the right ischium as to tilt the pelvis posteriorly. The right knee was then bent until the patient described a mild to moderate stretch without any pain.
Sacro-Iliac Joint (SIJ) Gapping	The patient was prone on a high-low table with their face in a face cutout. Using their left thumb, the patient applied pressure to each SI joint and increased pressure by using the R hand as to gap the SI joint with grade 2-3 mobilizations.
Manual Therapy: SIJ/Sacrum Massage	The patient was prone on a high-low table with their face in a face cutout. Using their left thumb the therapist applied a soft tissue massage and pressure to the muscles of the low back and sacrum in a direction parallel to the fibers of the lumbar paraspinals.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9
Wide Grip Pull Downs	**Day 1:** 1x 40 20# **Day 2:** 3x30 20#	3x30 20#	3x30 20#	3x30 20#	**Day 1:** 3x30 20# **Day 2:** 3x30 25#	3x30 25#	3x30 25#	3x30 25#	3x30 25#
Rows	**Day 1:** 1x40 12# **Day 2:** 3x30 12#	3x30 12#	3x30 12#	3x30 14#	3x30 14#	**Day 1:** 3x30 14# **Day 2:** 3x30 16#	3x30 16#	3x30 16#	3x30 16#
Bridge	**Day 1:** 2x20 BW* **Day 2:** 3x20 BW	3x20 BW	3x20 BW	3x20 BW	3x20 BW	3x20 SL*/BW	3x20 BW	3x20 BW	3x20 BW
Golf Stabilizations	**Day 1:** 1x40 4# BL **Day 2:** 3x30 4# BL	3x30 4# BL	3x30 4# BL	3x30 6# BL	3x30 6# BL	3x30 6# BL	**Day 1:** 3x30 6# BL **Day 2:** 3x30 8# BL	**Day 1:** 3x30 8# BL **Day 2:** 3x30 6# BL	3x30 6# BL
Straight Bar Stabilizations	**Day 1:** 1x40 10# **Day 2:** 3x30 10#	3x30 10#	3x30 10#	3x30 15#	3x30 15#	3x30 15#	3x30 20#	3x30 20#	3x30 15#
Manual Traction: Lumbar	10 mins	10 mins	10 mins	10 mins	**Day 1:** 10 mins **Day 2:** 15 mins	**Day 1:** 10 mins **Day 2:** 12 mins	10 mins	10 mins	10 mins
Squats			**Day 1:** 2x10 20# **Day 2:** 3x10 20#	**Day 1:** 3x10 20# **Day 2:** HELD	3x10 20#	3x10 20#	3x10 20#	3x10 20#	3x10 20#
Planks				**Day 2:** 10x10 secs	10x10 secs	**Day 1:** 10x10 secs	3x30 secs	**Day 1:** 4x30 secs **Day 2:**	5x30secs

						Day 2: 3x30 secs		5x30secs	
Manual: Prone Hip Flexor Stretch					**Day 2:** 4x30secs	5x30secs	5x30secs	**Day1:** 5x30secs **Day 2:** HELD	HELD due to time
Dead bugs							3x15 BL	3x15 BL	**Day 1:** 3x15 BL **Day 2:** HELD
Standing Hip Extension									Day 1: 2x20 BL Day 2: HELD
Bird/Dogs									3x15 BL
HEP Instruction		**Day 2:** self traction	**Day 2:** Squats w/ daughter, bridging, self traction		**Day 2:** self hip flexor stretching	**Day 2:** Planks		**Day 2:** WGPD RTB, Rows RTB, GS RTB, Dead bugs	Full program performed at gym – see Appendix A.
Treadmill						**Day 1:** 7 mins at 5mph **Day 2:** 10 minutes at 5mph			
Joint Mobilization		**Day 2:** L SIJ, Sacrum							
Massage		**Day 2:** BL SIJ, Sacrum							

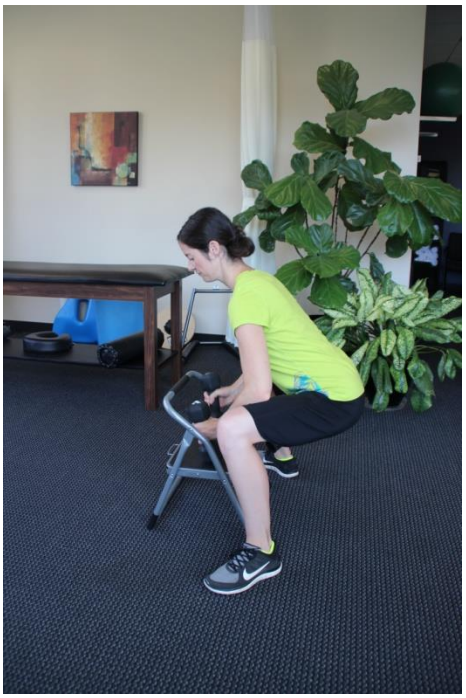

Figure 1: Squats

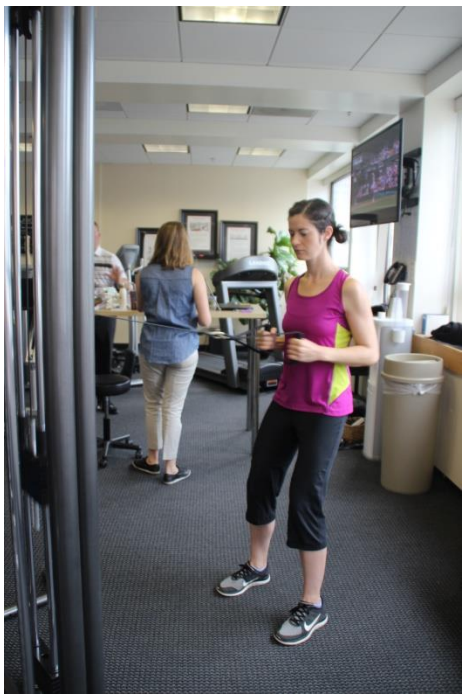

Figure 2: Rows

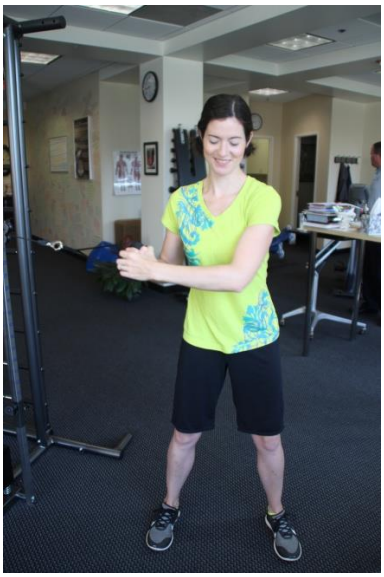

Figure 3: Golf Stabilizations

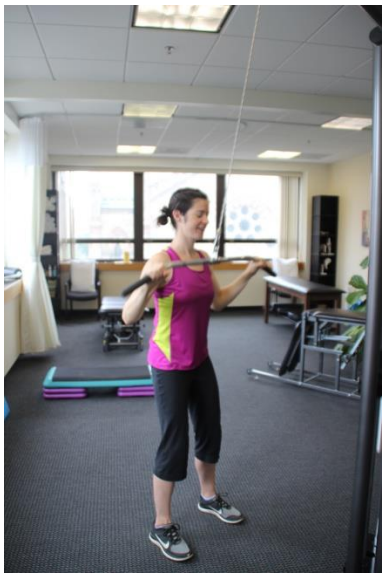

Figure 4: Straight Bar Pull Downs

Appendix B: Outcome Measures

Lower Extremity Functional Scale

We are interested in knowing whether you are having any difficulty at all with the activities listed below because of your lower limb problem for which you are currently seeking attention. Please provide an answer for **each** activity.

Today, do you or would you have any difficulty at all with:

(Circle one number on each line)

Activities	Extreme Difficulty or Unable to Perform Activity	Quite a Bit of Difficulty	Moderate Difficulty	A Little Bit of Difficulty	No Difficulty
a. Any of your usual work, housework, or school activities.	0	1	2	3	4
b. Your usual hobbies, recreational or sporting activities.	0	1	2	3	4
c. Getting into or out of the bath.	0	1	2	3	4
d. Walking between rooms.	0	1	2	3	4
e. Putting on your shoes or socks.	0	1	2	3	4
f. Squatting.	0	1	2	3	4
g. Lifting an object, like a bag of groceries from the floor.	0	1	2	3	4
h. Performing light activities around your home.	0	1	2	3	4
i. Performing heavy activities around your home.	0	1	2	3	4
j. Getting into or out of a car.	0	1	2	3	4
k. Walking 2 blocks.	0	1	2	3	4
l. Walking a mile.	0	1	2	3	4
m. Going up or down 10 stairs (about 1 flight of stairs).	0	1	2	3	4
n. Standing for 1 hour.	0	1	2	3	4
o. Sitting for 1 hour.	0	1	2	3	4
p. Running on even ground.	0	1	2	3	4
q. Running on uneven ground.	0	1	2	3	4
r. Making sharp turns while running fast.	0	1	2	3	4
s. Hopping.	0	1	2	3	4
t. Rolling over in bed.	0	1	2	3	4
Column Totals:					

SCORE: _____/80

Error (single measure): ±5 scale points
MDC: 9 scale points
MCID: 9 scale points

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Patient Specific Functional Scale

	Activities	Extreme Difficulty or Unable to Perform Activity	Quite a Bit of Difficulty	Moderate Difficulty	A Little Bit of Difficulty	No Difficulty
1	Any of your usual work, housework, or school activities.	0	1	2	3	4
2	Your usual hobbies, re creational or sporting activities.	0	1	2	3	4
3	Getting into or out of the bath.	0	1	2	3	4
4	Walking between rooms.	0	1	2	3	4
5	Putting on your shoes or socks.	0	1	2	3	4
6	Squatting.	0	1	2	3	4
7	Lifting an object, like a bag of groceries from the floor.	0	1	2	3	4
8	Performing light activities around your home.	0	1	2	3	4
9	Performing heavy activities around your home.	0	1	2	3	4
10	Getting into or out of a car.	0	1	2	3	4
11	Walking 2 blocks.	0	1	2	3	4
12	Walking a mile.	0	1	2	3	4
13	Going up or down 10 stairs (about 1 flight of stairs).	0	1	2	3	4
14	Standing for 1 hour.	0	1	2	3	4
15	Sitting for 1 hour.	0	1	2	3	4
16	Running on even ground.	0	1	2	3	4
17	Running on uneven ground.	0	1	2	3	4
18	Making sharp turns while running fast.	0	1	2	3	4
19	Hopping.	0	1	2	3	4
20	Rolling over in bed.	0	1	2	3	4
	Column Totals:					

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