



2016

Chronic Low Back and Pelvic Girdle Pain 10 Months Post-Partum: A Case Study

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**CHRONIC LOW BACK AND PELVIC GIRDLE PAIN 10 MONTHS POST-PARTUM: A
CASE STUDY**

by

Heidi Hansen

**Bachelor of Arts
Saint Lawrence University, 2004**

A Scholarly Project Submitted to the Graduate Faculty of the

Department of Physical Therapy

School of Medicine

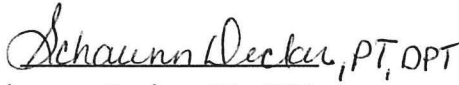
University of North Dakota


in partial fulfillment of the requirements for the degree of

Doctor of Physical Therapy

**Grand Forks, North Dakota
August, 2016**

This Scholarly Project, submitted by Heidi Hansen in partial fulfillment of the requirements for the Degree of Doctor of Physical Therapy from the University of North Dakota, has been read by the Advisor and Chairperson of Physical Therapy under whom the work has been done and is hereby approved.


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PERMISSION

Title Chronic Low Back and Pelvic Girdle Pain 10 Months Post-Partum: A Case Study

Department Physical Therapy

Degree Doctor of Physical Therapy

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Signature

A handwritten signature in black ink, appearing to be "J. Doe", written over a horizontal line.

Date

6/10/16

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ACKNOWLEDGEMENTS

Thank you to my advisor Schawnn Decker, PT, DPT for her extreme patience and guidance during the writing of this project. Thank you as well to Michele Labrecque, PT, DPT for her input and advice throughout this process. Thank you to my Clinical Instructor Paula Berry who gave me a taste of the kind of clinician I would like to become. Lastly, thank you to my wonderful husband Daniel who has supported me all the way through Physical Therapy school. I could not have managed without you.

ABSTRACT

Background and Purpose

Due to the increase in relaxin hormone during pregnancy women often experience increases in joint and ligament laxity. The result of this increase in laxity during or after pregnancy can lead to problems with postural and/or gait abnormalities, diastasis recti (separation between left and right side of rectus abdominus muscle) and pain, specifically, low back and pelvic girdle pain. Activities of daily living are often impacted because of these problems. The purpose of this case study is to highlight some of the principal issues and therapeutic options for post-partum women as presented through the case of one new mother.

Case Description

The patient is a 35 year old Caucasian female presenting at an outpatient orthopedic clinic ten months postpartum. Her chief complaints include periodic sharp pain down back and left groin, muscle spasms/hitching in left abdomen, locked-in low back, left hip grinding, decreased hip and lumbar range of motion and hip instability. She is limited by pain in many of her ADLs including lifting and carrying her 20lb son.

Intervention

Therapeutic exercise, manual therapy and therapeutic interventions were employed over the course of 14 weeks and 28 sessions to treat this patient's LE ROM limitations, joint tightness and core muscle weakness.

Outcomes

Following PT intervention the patient improved in overall lower extremity ROM, core strength and joint motion. Functionally, she was able to return to her normal ADLs with minimal pain symptoms.

Discussion

The functional gains made by this patient throughout the course of her therapy sessions demonstrate the importance of physical therapy as a useful tool in post-partum recovery. Given the extreme changes to the musculoskeletal system during and after pregnancy it is important for physical therapy to assume a greater role in working with this population.

CHAPTER 1

BACKGROUND AND PURPOSE

BACKGROUND

According to the government census, there were 3,952,841 babies born in 2012.¹ Pregnancy imposes substantial musculoskeletal changes on women during and after the gestational period. These changes include weight gain, increased ligamentous laxity, decreased neuromuscular coordination, altered weight distribution and joint kinematics, decreased abdominal muscle strength, anterior pelvic tilt and increased thoracic kyphosis and lumbar lordosis.² The individual's center of gravity moves cranially and anteriorly as the fetus grows which affects overall joint stresses and balance. To compensate for the change in balance, women often assume a wider base of support during standing and gait.³ All of these changes have implications for the functional capacity of women in the postpartum period. During pregnancy, women experience an increase in sex hormones to allow the body to accommodate necessary changes associated with gestation. The principal hormone associated with these morphological changes is Relaxin. Relaxin affects the musculoskeletal system by altering the properties of cartilage and tendon by activating collagenase to decrease the stiffness and increase the overall laxity of these tissues.^{4,5} This hormone is also involved in bone remodeling by increasing bone resorption. In the skeletal muscle, Relaxin affects the length of time for the healing process and reduces tissue fibrosis.⁴ The resulting effects of this hormone, combined with the musculoskeletal changes during pregnancy, can lead to common disorders including

diastasis recti and pain, specifically, sacroiliac joint (SI), low back and pelvic girdle pain in the antepartum and postpartum woman.

Diastasis rectus abdominus occurs during pregnancy when the rectus abdominis muscles elongate and separate as the abdominal wall expands (See Figure 1). The lengthening and change in position of the rectus abdominis alters the biomechanical pull and decreases the functional strength of this muscle.⁶ The most separation usually occurs at the level of the umbilicus.^{6,7} This gap is called the “inter-rectus distance”. A widening of >2.7 cm at the level of the umbilicus is considered a pathological diastasis of the rectus abdominis muscle.⁶ Current evidence suggests that diastasis rectus abdominis is common immediately after birth, with spontaneous resolution during the postpartum period.⁶ However, for many women, diastasis rectus abdominis does not resolve spontaneously during the postpartum period or even months or years after giving birth. Evidence suggests that diastasis rectus abdominis is often still prevalent at six months postpartum.⁸ However, despite the fact that the musculoskeletal symptoms of low back and pelvic pain often coexist with diastasis rectus abdominis, there are no direct link associating these symptoms.³ Additionally, a systematic review found that there were no conclusive results on the effects of antepartum or postpartum exercise on the prevention or resolution of diastasis recti. The study attributed this to insufficient evidence and poor studies.⁹ It is clear that additional studies are needed to identify the best practice principles for the treatment of diastasis rectus abdominus.

The most common complaint associated with pregnancy and the post-partum period is low back and pelvic girdle pain, with a prevalence estimated between 50% and 76%.⁹ Research has shown that women with a high intensity of pain during pregnancy have a greater risk for

back pain post-partum.³ The primary cause of low back pain occurs during pregnancy when the normal curve of lumbar lordosis increases to compensate for the superior and anterior center of gravity changes associated with pregnancy and to compensate for the changes in the pelvic girdle.^{10,11} The pelvic girdle is made up of the ilia, ischia and pubis bones and their connections with the sacrum at the SI joint and with the femur at the acetabulum (See Figure 2).

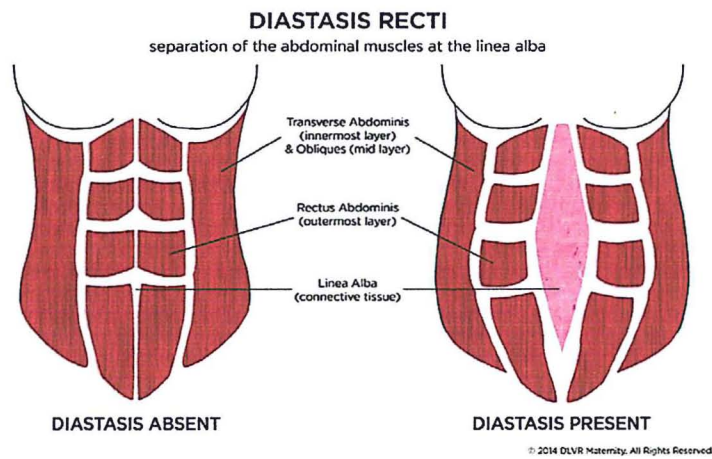


Figure 1. Diastasis Recti¹²

During pregnancy, relaxin and other sex hormones affect the ligaments and muscles supporting the pelvic girdle to allow more motion in the pelvic joints. Postpartum pain and postural abnormalities are expected to decrease as circulating sex hormone levels stabilize to pre-pregnancy levels⁷. However, even after these levels stabilize, many women continue to have SI joint, pelvic and low back pain which progress to chronic conditions.

These musculoskeletal conditions can be compounded in the post-pregnancy period by the change in lifestyle, habits and body mechanics involved in caring for a child. A study by Borg-Stein³ found that women reported a reduced quality of life due to these changes and the associated pain. This study showed the symptoms in postpartum females similar to people with

severe illness in terms of physical function. Existing World Health Organization (WHO) guidelines (2013) printed in *Postnatal care for the Mother* stated, "All women should be encouraged to mobilize as soon as appropriate following the birth. They should be encouraged to take gentle exercise and time to rest during the postnatal period."¹³ However, no further directives, referrals or guidelines are provided. Despite the prevalence of 50-76% women who experience low back and pelvic girdle pain during and post pregnancy, only 15-30% report being treated for their pain.³ These patients present with musculoskeletal and functional capacity related impairments making them ideal candidates to benefit from physical therapy; however, this is an undertreated population. Currently there is no standardized referral or protocol in place for women to receive physical therapy in the first 12 months post-partum. This period of time is when women are likely to experience one or all of the afore-mentioned impairments in addition to the changes of functional habits associated with infant care.⁹

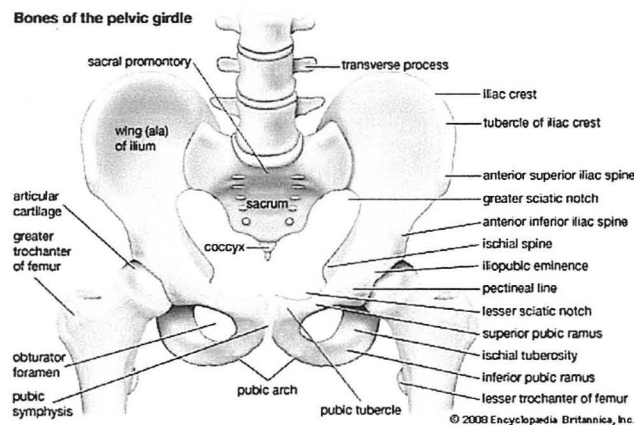


Figure 2. Bones of the Pelvic Girdle¹⁴

Knowledge about the changes in muscle structure and functional ability is key in order to develop specific exercise programs for resolution of diastasis rectus abdominis, low back and pelvic girdle pain in postpartum women. This population is specifically suited to receive the

benefits from physical therapy services.

PURPOSE

The purpose of this case study is to highlight some of the principle symptoms and therapeutic interventions that can be beneficial for postpartum women as presented through the case of one new mother.

CHAPTER 2

CASE DESCRIPTION

The patient was a 35 year old English speaking Caucasian female presenting to an outpatient orthopedic clinic ten months postpartum. Her chief complaints included periodic sharp pain down her back and left groin, muscle spasms/hitching in her left abdomen, a locked-in low back, and left hip pain, grinding, decreased range of motion (ROM) and instability. She reported that most of these symptoms either began and/or increased during and after her pregnancy. The patient gave birth via emergency C-section. She reported constant 4/10 pain on the Visual Analog Scale (VAS) in her low back since the beginning of her second trimester. The patient also developed diastasis rectus abdominis during her pregnancy and reported persisting abdominal weakness. The intermittent 6/10 pain in her low abdomen started during her third trimester, increased during early labor and had since localized to her left lower quadrant. The 5/10 pain in her left hip began postpartum. She reported that it was constant when standing and walking, but it was absent at rest. She was currently independent with all self-care and home management activities of daily living (ADLs) but reported that she performed these activities with minimal to moderate pain symptoms. At the time, she reported taking Ibuprofen and used ice for pain management.

Prior to her pregnancy, the patient was independent and pain-free with all self-care, home management, work and community ADLs. She earned a Bachelor's of Science degree in Forestry and worked for the National Parks Service. Her work duties required intermittent desk

work and physical activity including mountain trail hiking and park system trail building and maintenance while carrying a 30-60 pound backpack. She lived in the area for over ten years and developed a network of friends and colleagues. She lives with the support of her husband and nearby parents. Currently, she was on an extended maternity leave caring for her infant son in her two story home, performing activities that required bending, lifting and carrying a 20 pound child, in addition to housework and cooking. There are two steps to enter her house with no hand rail. The bedrooms and full bathroom are located on the second floor with twelve stairs to access the second level and a hand railing on the right when ascending. Laundry was located on the first floor. She enjoyed taking frequent walks with her child while carrying him in a front-facing child pack. Patient was right hand dominant, and reported carrying her child mainly on her right side.

Patient experienced pain but no limitation during self-care and home management activities. Her impairments limited her ability to participate in recreational (running and hiking) and community activities at her previous level. Additionally, she was limited in her ability to return to her employment at the Park Service due to the physical demands of the job.

Patient believes she is of average health. She exercised regularly (4-5 times per week) prior to her pregnancy and now was limited in her ability to walk, hike and jog depending on the severity of her symptoms. She was a non-smoker, occasionally drinks alcohol, and drinks two cups of coffee daily. She reported a high level of stress with motherhood and had consulted a physician for stress support. She was breast feeding, and reported irregular sleeping patterns due to nighttime feedings. Her husband worked full time and was able to assist with childcare when he was home. The patient's parents lived two-hours away and were

available to assist as needed.

Patient had a family history of high blood pressure and osteoarthritis and her past medical history included hyperthyroidism and seasonal allergies. Due to her active lifestyle in the Parks Service, patient had experienced numerous ankle and knee sprains bilaterally. She often experienced pain in her left knee for which she consulted an orthopedic physician prior to her pregnancy. She reported that an MRI showed evidence of micro-tearing of her left anterior cruciate ligament (ACL) and medial collateral ligament (MCL). No medical follow-up was planned for these injuries. She experienced intermittent episodes of low back pain for over eight years, but not at the frequency or severity as she was currently experiencing. When she was 12 years old, she injured her lower thoracic/upper lumbar spine due to a significant fall. She reported her left leg was shorter than her right leg and she used orthotic inserts in both shoes.

The patient's goals for therapy were to decrease pain in low back and hip with walking, bending and picking up her son. She also wanted to gain overall strength and endurance in order to return to work performing trail maintenance for the national park.

Examination

Range of Motion (ROM)

Due to the presenting symptom of her low back pain, the Active Range of Motion (AROM) of her lumbar spine was assessed in standing. The patient was found to be limited in left (L) side bending by 20 degrees with pain present at the end range. Her lumbar spine movement was also assessed with combined motions. She was found to have pain and stiffness with combined lumbar extension and (L) side bending. All other motions of the lumbar spine were found to be

WNL and painfree.

The patient's hip AROM and passive range of motion (PROM) was then assessed. AROM of her right (R) hip was found to be grossly WNL. AROM of her (L) hip was notably limited in flexion, and external rotation. Goniometric measurements were taken of her (L) hip PROM with (L) hip flexion measured at 100 degrees with pain throughout the motion and increasing at the end range. PROM of (L) hip external rotation was measured at 45 degrees with pain at end range. All other motions of the (L) hip were WNL and painfree.

Strength

Hip strength was assessed using manual muscle testing. The results are listed in Table 1.

Table 1. Hip Strength

Motion	(R) Hip	(L) Hip
Flexion	5/5	4/5 with pain
Extension	5-/5	5-/5
Internal Rotation	5/5	5-/5
External Rotation	5/5	5-/5
Abduction	5-/5	4/5

Abdominal strength assessment

A strength assessment of her abdominal muscles was indicated by the patient's subjective report of diastasis recti during pregnancy. The patient was found to have 3/5 strength in her abdominal muscles.

Special Tests and Measures

During the initial examination, numerous special tests were performed to assess hip and pelvic function and neurologic involvement. These special tests included a Thomas Test to assess the length of quad and hip flexor muscles, a Gillet Test to assess Iliosacral joint mobility, and a Straight Leg Raise to assess neural involvement with low back pain symptoms. Additional assessments were performed to assess pelvic/SI alignment, true leg length and hip joint mobility. The results of these special tests and measures are listed in Table 2.

Table 2. Special Tests and Measurements.

Special Tests/ Measurements	(R) LE	(L) LE
Thomas Test	Positive	Positive
Gillet Test	Positive	Positive (L>R)
Straight Leg Raise	Negative	Negative
Pelvic/SI Alignment Assessment	Anterior innominate rotation	No rotation
Hip joint mobility	Negative	Positive for anterior and lateral capsular tightness
True Leg Length	—	Approximately 1 inch shorter than (R) LE
Functional Leg Length Supine to Sit Test	Difference present	Difference present

Functional Assessments

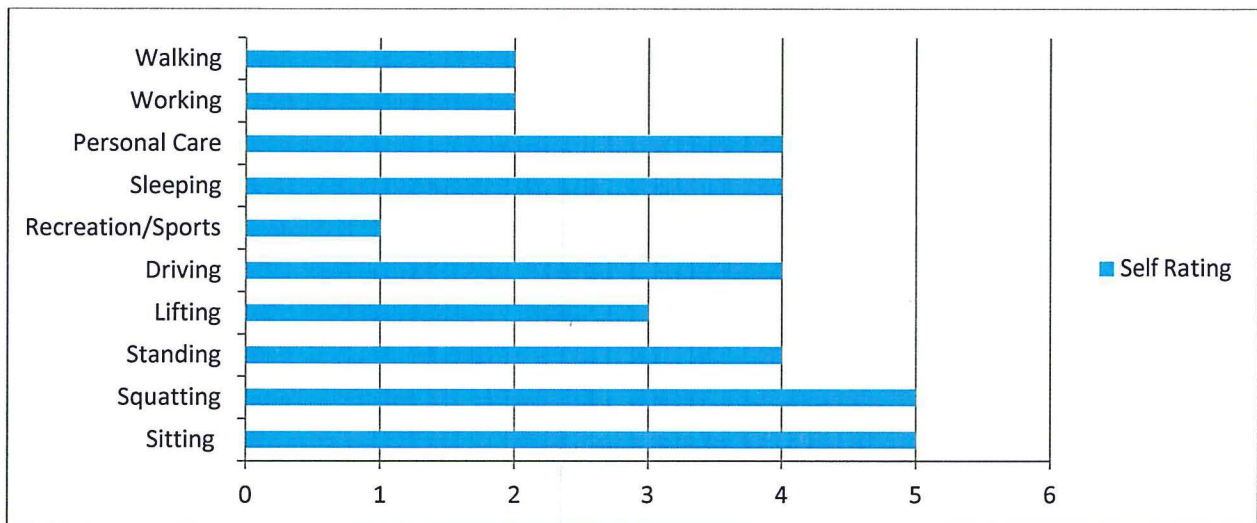
Gait assessment

The patient’s walking and running gait was assessed. It was found that patient walked with a slight right hip drop during left stance phase. During running she was lacking left hip extension and demonstrated increased right trunk rotation.

Functional assessment while holding her 20lb child:

Patient was right and front side dominant when carrying her child. She demonstrated an increased swayback posture and lateral shift to the left with walking, bending, standing, and squatting. A systems review was performed which cleared her for any neurological, integumentary, pulmonary, gastrointestinal and/or cardiovascular symptoms. Patient was primarily experiencing signs and symptoms associated with musculoskeletal impairments.

Table 3. CareConnections Functional Index Score – Initial Evaluation Score



CareConnections Functional Index¹⁵

The patient completed the CareConnections Functional Index Assessment of the Lumbar Region prior to her initial Physical Therapy session (see Appendix A). On this document, she rated the severity of her symptoms on a scale of 0-5 as related to her ability to function. A score of 0/5 meant that she was unable to complete the task while a score of 5/5 indicated that she had no limitations in completing the task. According to her assessment, she indicated that she was most limited in walking, working and recreation/sports. This assessment correlated

with the patient's subjective information. The results of the CareConnections Functional Index completed prior to the initial patient evaluation are listed in Table 3. The patient completed this same assessment prior to patient discharge to gauge improvements achieved over the course of therapy.

Evaluation

The patient demonstrated signs, symptoms and functional limitations that were consistent with a diagnosis of left hip pain, diastasis rectus abdominis, SI joint dysfunction and low back pain.

Patient musculoskeletal problems

Following the examination, the patient was found to have the problems listed below:

1. Right pelvis anterior alignment
2. Hypomobile bilateral SI joints (L>R)
3. 3/5 Abdominal strength
4. 4/5 Left hip flexion and abduction strength
5. 4/10 pain in left hip with standing and walking
6. Left leg was shorter than right leg
7. Decreased lumbar lordosis
8. Static and dynamic swayback posture
9. Decreased (L) hip ROM with flexion and external rotation
10. Decreased ROM and pain at end range with lumbar (L) sidebending and combined lumbar extension with (L) sidebending
11. Pain during self-care and home management activities

12. Limited ability to participate in previous recreational and community activities

13. Limited ability to return to her employment at the National Parks Service due to the physical demands of the job

Risk reduction / prevention needs

- Static and dynamic postural education was needed to prevent further impairment.
- Heel lift was needed on left foot to prevent further impairment from leg length discrepancy.
- Full body strengthening and stretching regiment was needed to prevent further joint mobility impairment.

PT Diagnosis

Patient's symptoms and assessment fit under Practice Pattern: 4D: Impaired Joint Mobility, Motor Function, Muscle Performance, and Range of Motion Associated with Connective Tissue Dysfunction. The ICD-9 Codes were 719.45: Hip Pain, 724.2: Low back pain.

Prognosis

Patient had a good prognosis due to her strong motivation to decrease her symptoms and return to work. She also had a previous history of good physical function. Additionally, she had a strong family and community support. It was expected that patient would decrease low back, hip and abdominal pain to 1/10 on the VAS scale with all daily activities in self-care, home and community environments over the course of eight weeks

Long Term Goals (all to be met in 8 weeks):

1. Following PT intervention, patient will increase AROM of (L) hip to WNL in all planes without pain in order to return to previous level of activity including walking and hiking.

2. Following PT intervention, patient will increase (L) hip Strength to 5-/5 or greater in all planes in order to perform the duties necessary to return to work.
3. Following PT intervention, patient will be able to perform lifting activities without symptoms in order to lift and care for her toddler without pain limitations.
4. Following PT intervention, patient will decrease low back and pelvic/hip pain felt in standing and walking to 0 out of 10 so that she may return to her work in the Park Service.
5. Following PT intervention, patient will be able to engage in previous recreational activities without pain in order to return to her prenatal level of work and activity.

Short Term Goals (all to be met in 2 weeks):

1. Following PT intervention, patient will achieve and maintain even pelvic alignment in order to perform standing and walking activities without pain.
2. Following PT intervention, patient will have improved bilateral SI joint mobility so that she can perform standing and walking activities without pain.
3. Following PT intervention, patient will have decreased pain symptoms (2/10) with walking and standing so that she can perform all elements of her self-care and home maintenance with minimal symptoms of pain.

Discharge Criteria

Prior to discharge, patient will increase (L) hip AROM with flexion and external rotation to WNL, patient will increase (L) hip strength to 5/5 in all planes, patient will maintain even pelvic/SI alignment and will be able to walk unlimited distances without c/o pain in low back and hip.

Plan of care

Based on initial evaluation findings, the patient was scheduled two times per week for four weeks, followed by one time per week for four weeks for the following PT interventions:

- Therapeutic activities to improve functional performance at home and in the community to meet functional goals, including patient education.
- Therapeutic exercise to address impairments in strength, muscle imbalance, endurance and biomechanics.
- Neuromuscular re-education to address impairments in posture.
- Home exercise program to address strength and motion impairments.
- Manual therapy techniques including soft tissue and joint mobilization, strain/counter-strain, muscle energy techniques and manual traction to improve joint and tissue motion.
- Gait training to address impairments in mobility.
- Return to previous activity level simulation and strengthening exercises.

CHAPTER 3

INTERVENTION

The numerous pelvic, hip, lumbar, abdominal and thoracic dysfunctions of this patient, as determined by the initial examination, were addressed over a period of eight weeks using a combination of therapeutic exercise, manual therapy and therapeutic activity interventions.

Therapeutic Exercise

Stretching Exercises

Patient was instructed on several stretching exercises to increase length and extensibility of hip flexors, quadriceps, hamstrings, piriformis, adductors and lumbar spine into rotation (bilateral). She was given verbal and written instructions to hold each stretch for 30 seconds, repeat 2-3 times per set, and to perform these stretches every day if possible. These various stretches were added to her Home Exercise Program (HEP) with detailed pictures and written instructions on day of PT. She was given these stretches during her initial evaluation session and asked to continue them at home for the duration of her course of treatment.

Strengthening Exercises

The patient was instructed on several strengthening exercises to increase the overall power of her core muscles including individual strengthening of her transversus abdominis, abdominal obliques, multifidi, and gluteus medius muscles. She was instructed to perform 10 reps, 2-3 sets per time, and to perform these strengthening exercises 3-5 times per week. These various strengthening exercises were added to her HEP with detailed pictures and written instructions on day of PT.

Combined Strengthening Exercises

As a progression to the individual core strengthening exercises listed above, the patient was instructed on two combined strengthening exercises to improve the strength of her co-contracting core muscles. These two exercises were bridging and quadruped alternating upper extremity (UE) & lower extremity (LE) extension (the "bird-dog"). She was instructed to perform 10 reps, 2-3 sets, and to perform these strengthening exercises 3-5 times per week. These exercises were introduced during the third PT session and repeated during the next session to confirm appropriate positioning. They were added to her HEP with detailed pictures and written instructions on day of PT. The patient was asked to complete these exercises at home for the duration of her course of treatment.

Home Exercise Program (HEP)

As mentioned above, the patient was provided with HEP handout with the aforementioned therapeutic exercises pictured with written instructions. The efficacy of these exercises was reassessed verbally during each treatment session as well as answering any questions that the patient had on technique and position. A list of specific exercises and copies of the HEP are included in Appendix B.

Manual therapy techniques

SI Joint Muscle Energy Technique

To address her SI joint dysfunction during her first PT session, the patient was treated with a two-part muscle energy technique to promote SI joint congruity. This technique was performed first in side-lying with the patient lying on the involved SI joint with the bottom LE extended. The uninvolved LE was bent at 90°/90° and patient was given instructions to press

the knee into the hands of the therapist and to hold for six seconds. This was repeated six times. In the second part of this technique, the patient had both knees bent to her chest in side-lying, then she placed her bottom arm underneath and behind her so that her hips and LEs were in side-lying position and her shoulders and UEs were in prone position. This position was called the "pretzel" position. The therapist stood at the level of the patient's bent knees and elevated/supported the ankles while pushing the hips into greater flexion with one hand. The other hand was used to assess movement at the involved SI joint. When movement was detected, the patient was asked to use her own muscle energy to hold this position for six seconds. This was repeated six times and then the patient was reassessed for improvement using the Gillet Test and Functional Leg Length Test. This treatment was performed during the second and fourth PT sessions as indicated when the patient's SI joints lacked the appropriate movement as confirmed with the Gillet's special test.

Right Anterior Pelvic Tilt Muscle Energy Technique

The patient's right sided anterior alignment of her pelvis was treated during the initial PT session with a muscle energy technique in which the patient was lying supine with her hips at 90° and legs relaxed. The therapist supported both knees and asked the patient to pull her (R) knee cranially towards her right shoulder while simultaneously pushing her (L) knee caudally towards the end of the table. This position was held for six seconds and repeated six times. To ensure proper alignment of the pubic symphysis following this technique, the patient was treated with the pubic symphysis balancing procedure, or "shotgun", during which the patient was asked to use a maximal force to adduct her knees against therapist resistance. This procedure was performed three times, each repetition was held for three seconds. Following

this procedure, patient pelvic alignment was reassessed using the Functional Leg Length test. This technique was performed during the second, fourth and fifth PT sessions when the patient's pelvic levels were uneven and terminated when equal pelvic levels were reached.

Belt Assisted Left Hip Mobilization

The patient was treated during the second PT session with left hip mobilization into distraction (grade III & IV) using a mobilization belt in order to decrease capsular tightness and movement restrictions in (L) hip. Distraction was repeated with therapist driven movement into hip flexion and external rotation to increase pain-free movements in these planes of motion. Hip mobilization was terminated when sufficient capsular movement was achieved. (L) hip AROM was reassessed and found to be improved in flexion and external rotation. This intervention was repeated during the third, fourth and sixth therapy sessions based on anterior capsular tightness of the patient's (L) hip joint.

Posterior-Anterior (PA) Glides of Lumbar and Thoracic Spine

The patient's decreased ROM of lumbar and thoracic spine was treated during the third session with PA glides, grades III & IV, to increase segmental movement of vertebrae for ease of motion into lumbar flexion, extension, side bending and rotation. Following treatment, patient's lumbar and thoracic AROM was reassessed for changes. This intervention was repeated during the fourth therapy session and discontinued once the foam rolling self-mobilization technique was introduced.

Lumbar Gapping

During the third PT session, the Lumbar Gapping technique was performed bilaterally in side-lying to increase lumbar side bending. The patient's UEs and LEs were positioned to isolate

vertebral segments lacking side bending mobility and the therapist applied lateral and upward forces to gap the segment being treated. This was repeated on multiple sections of the lumbar spine. Lumbar side bending ROM was reassessed following this treatment for any changes. This intervention was repeated in the fourth session and discontinued once the foam rolling self-mobilization technique was introduced.

Therapeutic Activities

Static and Dynamic Postural Education

During the second and fourth PT sessions the patient was provided with education including visual demonstration and tactile cues on appropriate static postural alignment to address swayback posture. Dynamic postural education was also provided to inform patient of the best techniques for bending, squatting, carrying and lifting while holding a 20 lb baby.

These static and dynamic postural corrections were reassessed and practiced at every following therapy session to promote healthy postural conditioning.

Gait Training

Gait training was instructed with the patient while walking and running on a treadmill (max 5 mph) in order to address patient's gait abnormalities. Visual and tactile education was provided to assist patient to increase left hip extension during left toe-off and to increase right trunk rotation with reciprocal arm swing during ambulation. Gait patterns were reassessed for changes after intervention. Gait assessment and training was repeated during every treatment session to promote healthy walking and running patterns.

Heel Lift Shoe Insert

During the initial evaluation, the patient was fitted for a ½ inch heel lift for her left shoe

in order to even out her true leg length discrepancy. Patient was presented with two separate insert options and asked to spend time walking with each of them and note any changes in her symptoms. During the following session, she reported which insert had the maximum improvement on her symptoms and she was asked to use this ½ inch insert during all physical activity.

Foam Roller

During the fourth session, the patient was instructed on the use of a full length foam roller to increase segmental movement of her thoracic spine. She was provided with visual and tactile cues as well as a hand-out detailing the proper positioning of the foam roller in vertical and horizontal alignments. She was provided with education on different rolling techniques, extension positions and UE movements to increase movement in her thoracic spine. The patient was given the opportunity to practice foam rolling activities on two separate sessions, using the clinic foam roller before or after PT sessions. The patient was encouraged to purchase a foam roller for home use at which time foam rolling therapeutic activities were added to the patients HEP.

CHAPTER 4

OUTCOMES

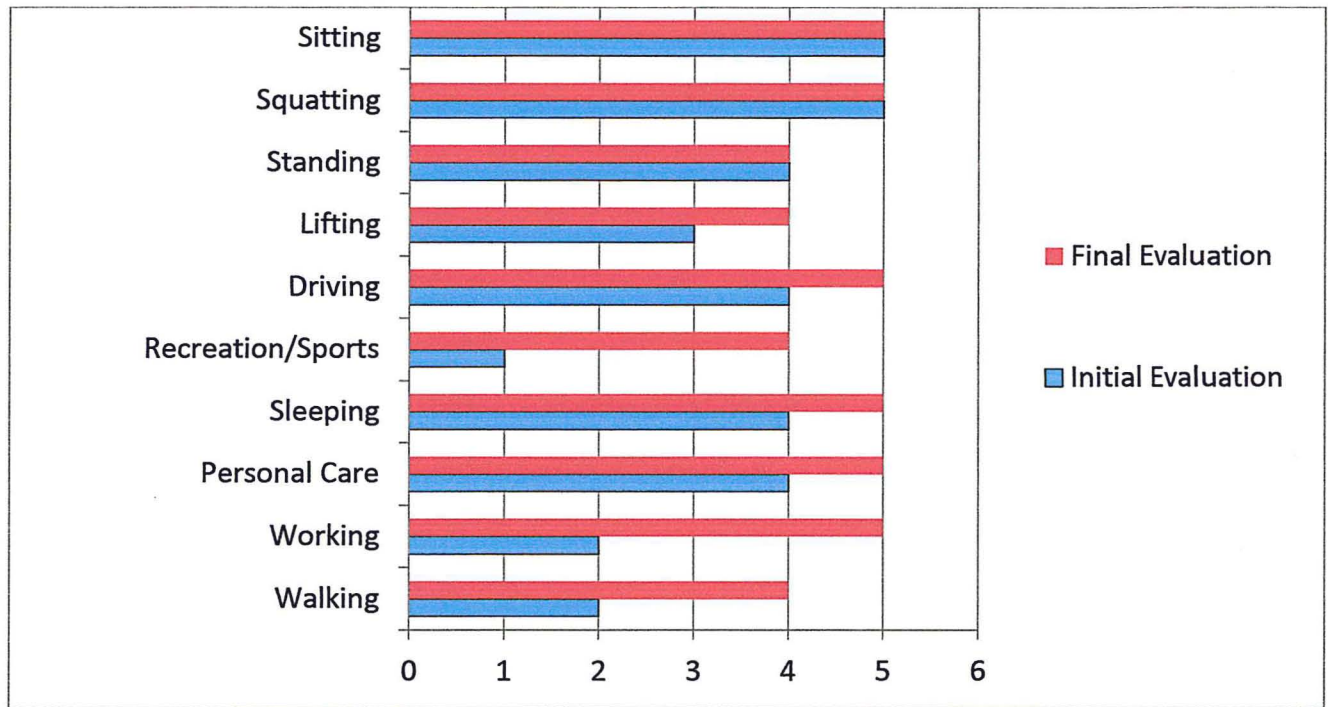
Following PT intervention, the patient showed a decrease in pain (2/10) following use of a heel lift in (L) shoe with all activities. She demonstrated an increase in ROM and ease with active movement into (L) hip flexion and external rotation. She had an increase in available motion of lumbar (L) side-bending. She continued to improve upon her walking and jogging gait patterns to increase (L) hip extension during the toe-off phase of gait. She reported that she had been able to walk all distances with minimal reports of pain symptoms (1/10). She initiated a return to running program with reports of minimal pain symptoms. Structurally, she had improved pelvic/SI alignment. She demonstrated appropriate movement of her SI joints bilaterally during Gillet's Test.

Functionally, she was able to bend, lift and carry her baby using the appropriate body mechanics learned in therapy. She could perform these actions with minimal pain symptoms. She made significant improvements on her CareConnections Functional Index Score. Each item was scored from zero to five. The patient was assessed at her initial examination and re-assessed during her final examination. During the course of her treatment, she progressed from a three to four in lifting, a one to a four in recreational activities and from a two to a five in working. A graph of the initial and final examination scores from the CareConnections Functional Index is located in Table 4.

Overall, the patient was extremely satisfied with her progress in physical therapy. She felt that she continued to make important improvements which allowed her to

return to her previous level of activity.

Table 4. CareConnections Functional Index Scores – Initial & Final Evaluation Scores



CHAPTER 5

DISCUSSION

Despite the multiple deficits presented during the initial evaluation, this patient demonstrated significant functional improvements and decreased pain symptoms following the course of her physical therapy sessions. Current research supports that the relaxin hormone produced during pregnancy can exacerbate previous structural abnormalities of the body due to the increased laxity of the ligaments¹⁰. In the case of this patient, her ½ inch true leg length discrepancy exacerbated her (L) sided hip and SI pain, as well as caused weakness and functional limitations during and post pregnancy. This was compounded by the slow recovery of her abdominal muscles following her C-section surgery and her prevalent diastasis rectus abdominis which provided minimal core support to the (L) hip, lumbar and SI joint areas.

Following physical therapy treatment, the rapid return of strength and pain free motion obtained by this patient was expected based on her previous level of activity prior to her pregnancy and C-section surgery. The addition of a ½ inch heel lift in the left shoe reduced the strain of the left leg length discrepancy on her pelvis, hip and low back. The addition of the heel lift also allowed the patient to initiate a strengthening regiment with her low back, hip and pelvis in structurally good alignment. The patient's education for postural awareness in conjunction with the core strengthening exercises were equally beneficial to position and support the lumbar spine.

The muscle energy techniques used to correct alignment at the pelvis and SI joints were valuable. Using the patient's own muscle power and with repeated performance, the patient

could hold the correct alignment without therapist intervention. Equally important were the mobilization techniques used to gain joint motion in the left hip and lumbar spine.

With the achievement of correct anatomical positioning, normal osteokinematic and arthrokinematic movements allowed this patient to focus on her overall therapy goal and she was able to return to her previous level of function and activities. Functional training, using best practice techniques for lifting, holding and carrying her baby, created a postural awareness vital to the patient to help protect her body. Gait training allowed her to return to a running program and ensured correct movement patterns to avoid future injury as she regained endurance and strength.

The functional gains made by this patient throughout the course of her physical therapy sessions demonstrate the importance of physical therapy as a useful tool in postpartum recovery. At this time, the dominant practice is for OB/GYN or general practice physicians to refer a patient to PT for postpartum care upon patient request. Given the extreme changes to the musculoskeletal system during and after pregnancy, it is important for physical therapy to assume a greater role in working with this population. A study by Borg-Stein et al.³ reported the underuse of physical therapy services by stating that only 32% of women with low back pain during pregnancy report this to their providers. This indicates that many women accept this pain and functional limitation as a normal and untreatable symptoms of pregnancy. Of the 32% of women who reported their low back pain to a health care provider, only 25% of their prenatal providers recommended a specific treatment, such as a referral for Physical Therapy. These statistics present two separate problems. First, there needs to be an increase in communication between physical therapists and prenatal providers about the scope of physical

therapy practice in the field of women's health and the many patient benefits which come with an increase in appropriate referrals. Secondly, there needs to be an increase in awareness of the population on the scope of practice of physical therapists. At this time, there are many physical therapists specifically certified in the field of Women's Health. Much of their training is specific to obstetrics and obstetrics related musculoskeletal impairments. Direct access is available in most US states which would allow women to seek postpartum support without a physician referral. An increase in public knowledge on the benefit of physical therapy during the postpartum time period may also increase the number of patients who ask for a physical therapy referral. Further study is needed to determine the best practice for referral and treatment of this population.

Reflection of Practice

In reflection on the quality of care and services chosen for this patient, there are few changes which would have been appropriate. First, the assessment of this patient's iliosacral dysfunction was incomplete in that it relied primarily on the information gleaned from the Gillet's test and functional leg length assessment. The Gillet's Test is a movement test used to assess iliosacral movement dysfunction. It has an 80% interrater reliability as a diagnostic tool which is low.⁸ Iliosacral dysfunction should be determined based on movement tests, such as the Gillet's Test, in combination with palpation of pelvic landmarks. In the case of this patient, the Gillet's Test was used as an assessment tool to determine both iliosacral and sacroiliac dysfunction and the need for interventions. No provocation tests or sacral movement tests were performed to isolate the exact musculoskeletal dysfunction demonstrated by this patient.

In future practice, I will likely use movement tests in combination with SI provocation tests and palpation to drive the chosen interventions as recommended by evidence-based practice.^{16,11}

Research has shown the importance of incorporating the pelvic floor muscles into all core rehabilitation activities.^{9,17} They serve as the floor of the core muscles and are essential to proper stabilization of the core. Neither the assessment nor integration of pelvic floor strengthening exercises was performed during the therapy sessions with this patient. In future practice, I will incorporate teaching the proper method to strengthen the pelvic floor muscles via Kegel exercises. This will be as important as instructing the patient on awareness and activation of the transversus abdominis and multifidus muscles to strengthen the core.

Lastly, the treatment of this patient's diastasis rectus abdominis was incomplete in that she was not instructed on the proper way to brace her core with her arms to support the position of the rectus abdominis during strengthening activities. Also, there was no discussion of an abdominal brace to support her weakened core muscles during her activities of daily living. In future practice, I may choose to provide the patient with education on proper form during core strengthening activities. I may also discuss the availability and potential benefits of using an abdominal brace until core strength is reinstated and the rectus abdominis can return to a functional position.

This case is one example of musculoskeletal involvement during the pregnancy and post partum period; however it is reflective of a much larger population of patients. Millions of women may benefit from similar treatments as were administered to this patient during her episode of care. However, without the knowledge of the role of Physical Therapy in women's health, or an appropriate referral source they may not be receiving these services. It is through

promoting the role of Physical Therapists and further research into the field of Women's Health therapy that this may change. In my future practice, I intend to advocate for both.

APPENDIX A: CareConnections Functional Index Patient Worksheet

NAME _____
 DATE _____ Initial Visit Discharge Visit

PROBLEM AREA (Please check one):

- Upper Extremity (A,D) Lower Extremity (B,F) Cervical/Thoracic (C,D) Lumbar (D,F) TMJ (C,E)

FUNCTIONAL INDEX

PART I: Answer all five sections in Part I. Choose the one answer in each section that best describes your condition.

WALKING

- Symptoms do not prevent me walking any distance.
- Symptoms prevent me walking more than 1 mile.
- Symptoms prevent me walking more than 1/2 mile.
- Symptoms prevent me walking more than 1/4 mile.
- I can only walk using a stick or crutches.
- I am in bed most of the time and have to crawl to the toilet.

WORK

(Applies to work in home and outside)

- I can do as much work as I want to.
- I can only do my usual work, but no more.
- I can do most of my usual work, but no more.
- I cannot do my usual work.
- I can hardly do any work at all (only light duty).
- I cannot do any work at all.

PERSONAL CARE

(Washing, Dressing, etc.)

- I can manage all personal care without symptoms.
- I can manage all personal care with some increased symptoms.
- Personal care requires slow, concise movements due to increased symptoms.
- I need help to manage some personal care.
- I need help to manage all personal care.
- I cannot manage any personal care.

SLEEPING

- I have no trouble sleeping.
- My sleep is mildly disturbed (less than 1 hr. sleepless).
- My sleep is mildly disturbed (1-2 hrs. sleepless).
- My sleep is moderately disturbed (2-3 hrs. sleepless).
- My sleep is greatly disturbed (3-5 hrs. sleepless).
- My sleep is completely disturbed (5-7 hrs. sleepless).

RECREATION/SPORTS

(Indicate Sport if Appropriate _____)

- I am able to engage in all my recreational/sports activities without increased symptoms.
- I am able to engage in all my recreational/sports activities with some increased symptoms.
- I am able to engage in most, but not all of my usual recreational/sports activities because of increased symptoms.
- I am able to engage in a few of my usual recreational/sports activities because of my increased symptoms.
- I can hardly do any recreational/sports activities because of increased symptoms.
- I cannot do any recreational/sports activities at all.

ACUITY

(Answer on initial visit.)

How many days ago did onset/injury occur? _____ days

PART II: Choose the one answer that best describes your condition in the sections designated by your therapist.

A. UPPER EXTREMITY

CARRYING

- I can carry heavy loads without increased symptoms.
- I can carry heavy loads with some increased symptoms.
- I cannot carry heavy loads overhead, but I can manage if they are positioned close to my trunk.
- I cannot carry heavy loads, but I can manage light to medium loads if they are positioned close to my trunk.
- I can carry very light weights with some increased symptoms.
- I cannot lift or carry anything at all.

DRESSING

- I can put on a shirt or blouse without symptoms.
- I can put on a shirt or blouse with some increased symptoms.
- It is painful to put on a shirt or blouse and I am slow and careful.
- I need some help but I manage most of my shirt or blouse dressing.
- I need help in most aspects of putting on my shirt or blouse.
- I cannot put on a shirt or blouse at all.

REACHING

- I can reach to a high shelf to place an empty cup without increased symptoms.
- I can reach to a high shelf to place an empty cup with some increased symptoms.
- I can reach to a high shelf to place an empty cup with a moderate increase in symptoms.
- I cannot reach to a high shelf to place an empty cup, but I can reach up to a lower shelf without increased symptoms.
- I cannot reach up to a lower shelf without increased symptoms, but I can reach counter height to place an empty cup.
- I cannot reach my hand above waist level without increased symptoms.

B. LOWER EXTREMITY

STAIRS

- I can walk stairs comfortably without a rail.
- I can walk stairs comfortably, but with a crutch, cane, or rail.
- I can walk more than 1 flight of stairs, but with increased symptoms.
- I can walk less than 1 flight of stairs.
- I can manage only a single step or curb.
- I am unable to manage even a step or curb.

UNEVEN GROUND

- I can walk normally on uneven ground without loss of balance or using a cane or crutches.
- I can walk on uneven ground, but with loss of balance or with the use of a cane or crutches.
- I have to walk very carefully on uneven ground without using a cane or crutches.
- I have to walk very carefully on uneven ground even when using a cane or crutches.
- I have to walk very carefully on uneven ground and require physical assistance to manage it.
- I am unable to walk on uneven ground.

C. CERVICAL/TMJ

CONCENTRATION

- I can concentrate fully when I want to with no difficulty
- I can concentrate fully when I want to with slight difficulty.
- I have a fair degree of difficulty in concentrating when I want to.
- I have a lot of difficulty in concentrating when I want to.
- I have a great deal of difficulty in concentrating when I want to.
- I cannot concentrate at all.

HEADACHES

- I have no headaches at all.
- I have slight headaches which come less than 3 per week.
- I have moderate headaches which come infrequently.
- I have moderate headaches which come 4 or more per week.
- I have severe headaches which come frequently.
- I have headaches almost all of the time.

READING

- I can read as much as I want without increased symptoms.
- I can read as much as I want with slight symptoms.
- I can read as much as I want with moderate symptoms.
- I cannot read as much as I want because of moderate symptoms.
- I can hardly read at all because of severe symptoms.
- I cannot read at all.

D. LUMBAR*/CERVICAL/UPPER EXTREMITY

DRIVING

- I can drive my car or travel without any extra symptoms.
- I can drive my car or travel as long as I want with slight symptoms.
- I can drive my car or travel as long as I want with moderate symptoms.
- I cannot drive my car or travel as long as I want because of moderate symptoms.
- I can hardly drive at all or travel because of severe symptoms.
- I cannot drive my car or travel at all.

LIFTING

- I can lift heavy weights without extra symptoms.
- I can lift heavy weights but it gives extra symptoms.
- My symptoms prevent me from lifting heavy weights but I manage if they are conveniently positioned. (e.g. on a table)
- My symptoms prevent me from lifting heavy weights but I manage light to medium weights if they are conveniently positioned.
- I can lift only very light weights.
- I cannot lift or carry anything at all.

PAIN INDEX

Please indicate the worst your pain has been in the last 24 hours on the scale below



PLEASE DO NOT COMPLETE THE FOLLOWING SECTIONS ON FIRST VISIT

IMPROVEMENT INDEX

Please indicate the amount of improvement you have made since the beginning of your physical therapy treatment on the scale below.



WORK STATUS (check most appropriate)

- 1. No lost work time
- 2. Return to work without restriction
- 3. Return to work with modification
- 4. Have not returned to work
- 5. Not employed outside the home

Work days lost due to condition: _____ days

I am aware that the information gathered on this form may be used anonymously for research or publication. Please initial: _____

E. TMJ

TALKING

- I can talk without any increased symptoms.
- I can talk as long as I want with slight symptoms in my jaws.
- I can talk as long as I want with moderate symptoms in my jaws.
- I cannot talk as long as I want because of moderate symptoms in my jaws.
- I can hardly talk at all because of severe symptoms in my jaws.
- I cannot talk at all.

EATING

- I can eat whatever I want without symptoms.
- I can eat whatever I want but it gives extra symptoms
- Symptoms prevent me from eating regular food, but I can manage if I avoid hard foods.
- Symptoms prevent me from chewing anything other than soft foods.
- I can chew soft foods occasionally, but primarily adhere to a liquid diet.
- I cannot chew at all and maintain a liquid diet.

F. LUMBAR*/LOWER EXTREMITY

STANDING

- I can stand as long as I want without increased symptoms.
- I can stand as long as I want, but it gives me extra symptoms.
- Symptoms prevent me from standing for more than 1 hour.
- Symptoms prevent me from standing for more than 30 minutes.
- Symptoms prevent me from standing for more than 10 minutes.
- Symptoms prevent me from standing at all.

SQUATTING

- I can squat fully without the use of my arms for support.
- I can squat fully, but with symptoms or using my arms for support.
- I can squat 3/4 of my normal depth, but less than fully.
- I can squat 1/2 of my normal depth, but less than 3/4.
- I can squat 1/4 of my normal depth, but less than 1/2.
- I am unable to squat any distance due to symptoms .

SITTING

- I can sit in any chair as long as I like.
- I can only sit in my favorite chair as long as I like.
- My symptoms prevent me sitting more than 1 hour.
- My symptoms prevent me sitting more than 1/2 hour.
- My symptoms prevent me sitting more than 10 minutes.
- My symptoms prevent me from sitting at all.

* Lumbar questions adapted from Osteostyry.

APPENDIX B: Home Exercise Program Exercise List and Handouts

Home Exercise Program: Complete List of Exercises

Stretching

Bilateral Quadriceps (Standing)

Bilateral Hamstring (Standing)

Bilateral Hip Adductor (Supine)

Piriformis (Supine)

Low Back with Rotation (Supine)

Strengthening & Stabilizing

Isometric Abdominal Hold (Supine)

Lower Extremity Lift (Supine)

Bridging (Supine)

Lumbopelvic stabilization with arm & leg raise "Bird-Dog" (Quadruped)

Trunk Stabilization with Upper Extremity Flexion (Hook-lying)

Hip Abduction (Side-lying)

Hip Abduction "Monster Steps" (Standing)

Mobilization

Foam Rolling Thoracic Spine (Supine)

HIP / KNEE - 59 Stretching: Quadriceps - Advanced

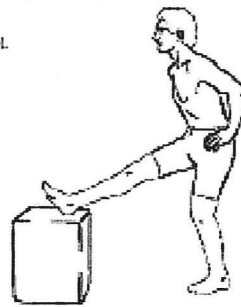


Leaning edge of table, right knee bent up, other foot on floor. Using hand or foot, pull heel toward buttock.
Hold 30 seconds REPEAT.
Repeat 1-2 times per set. Do 1-2 sets per session.
Do 1-2 sessions per day.

HIP / KNEE - 59 Stretching: Hamstring (Standing)

Place right foot on stool.
Slowly lean forward, keeping back straight, until stretch is felt in back of thigh.
Hold 30 seconds.

Repeat 1-2 times per set.
Do 1-2 sets per session.
Do 1-2 sessions per day.

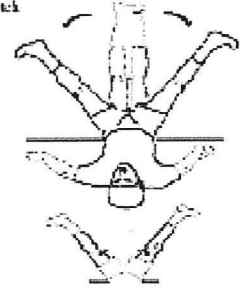


**ADJACENT MUSCLE EXERCISE - 18
Hip Adductor: Wall Suck**

Lie on back with hips against wall. Back of thighs on wall. Pull legs apart until stretch is felt in inner thighs. Hold 30 seconds. Relax.

Repeat 1-2 times.
Do 1-2 times a day.

Advanced: At end of stretch, rotate thighs outward.



HIP / KNEE - 48 Piriformis (Supine)



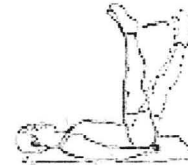
Cross legs, right on top. Gently pull other knee toward chest until stretch is felt in buttock/hip of top leg.
Hold 30 seconds.
Repeat 1-2 times per set. Do 1-2 sets per session.
Do 1-2 sessions per day.

LOW BACK - 19 Supine With Rotation



Lie on side with top knee drawn inward close, bottom leg straight. Rotate upper body to the left.

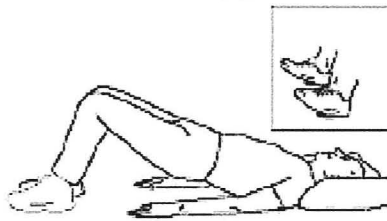
INTERMEDIATE - 9 Lower Lift



Lie on back. Legs straight up, slightly turned out, hands under hips. Exhale, slowly lowering legs a few degrees. Inhale, returning. Knees close together. Knees may be slightly bent, leaving quads relaxed.

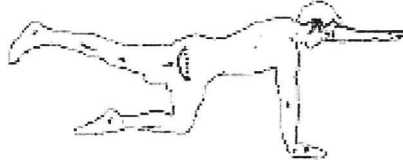
Repeat 30 times. Do 1-2 sessions per day.
NOTE: Keep neutral spine, back flat.

AROM - 62 HIP: Extension, Bridging Piriformis



Place feet on surface. Lift feet above, raise hips up and hold for 30 seconds.
5-10 reps per set, 1-2 sets per day.

**LUMBOPELVIC STABILIZATION - 25
Bridging With Arm / Leg Raise (Quadruped)**



On hands and knees find neutral spine. Tighten pelvic floor and abdominals and hold. Alternating, lift arm to shoulder level and opposite leg to hip level.
Repeat 10 times, 2-3 sets. Do 1 times a day.

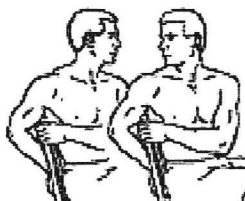
TRUNK STABILITY - 5 Extremity Flexion (Hook Lying)



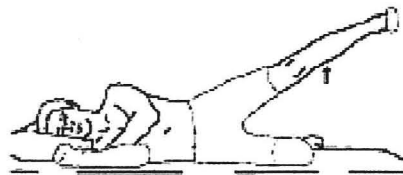
pull belly toward back, toward backbone, reaching fingers towards ceiling and lift head and shoulders up off the floor.
Hold 3-5 sets, repeat 10 times, 2-3 sets.

SPINAL MOBILIZATION - 6 Cervico-Thoracic: Extension / Rotation (Sitting)

rotate body to the left, hold 10 seconds, 2-3 sets. 1x per day

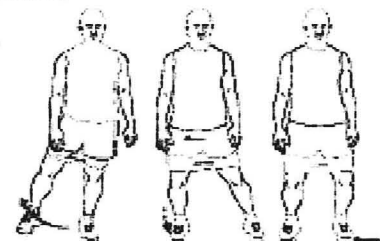


HIP / KNEE - 21 Strengthening: Hip Abduction (Side Lying)



raise and lower top leg 10 times then perform 10 slow small circles one direction and then the other. 1-2 sets. 1x per day

HEP - 6 Hip Abduction Side-Support: Monitor Steps (Eccentric)



With hand around ankles, step out to side, lifting leg and then slowly lowering. 6" height of pillow. 1x per day

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