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Chronic Low Back Pain with Possible SI Involvement and Weak Abdominals: A Case Study

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CHRONIC LOW BACK PAIN WITH POSSIBLE SI INVOLVEMENT AND WEAK ABDOMINALS: A CASE STUDY

by

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Signature Stacy Remer

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ABSTRACT

Background and Purpose: Chronic, non-specific low back pain is highly prevalent and is a cause for a large proportion of medical expenses along with many people's pain and disability. This case report presents a variety of interventions implemented for a patient with low back pain and her reaction to therapy. **Case Description:** The case study presents a 42 y/o mother to three children. Her pain began about two years ago and has been persistent throughout that time. She has tried many different forms of treatment through medical physicians, physical therapy, and massage therapy but nothing has had long-term relief of her symptoms. This patient works part-time but loves spending time with her children and exercising through aerobic training, weight training, and group fitness classes. **Interventions:** Interventions included abdominal strengthening through supine and seated pelvic tilts, hanging knees to chest with biofeedback, and toe touches with a physio ball. Stretching of the anterior thigh musculature and hip capsule, which consisted of the goalie stretch, the couch stretch, and the warrior pose. A psoas release was performed on the patient, along with instructing the patient how to perform a self psoas release at home. **Outcomes:** Outcomes at discharge were favorable for this patient. She decreased her pain level from a 7/10 to a 1/10 and increased her lumbar range of motion to be within normal limits. More important, the patient was able to get back to the activities she was missing prior to outpatient physical therapy sessions. **Discussion:** The patient progressed well and tolerated physical therapy. More research is needed in regards to if there is any correlation between the psoas muscle and low back pain.

CHAPTER I

BACKGROUND AND PURPOSE

Low back pain (LBP) affects thousands of Americans each year and is the leading cause of disability for individuals especially within the workforce. Low back pain also leads to many activity and participation restrictions for people in our country.[1] In populations who suffer from low back pain, this pain can be defined as acute, subacute, or chronic.[1,2] According to Koes et al, acute low back pain is defined as being present for less than six weeks and subacute low back pain persists for six weeks to three months.[2] Once the pain is present longer than three months it is considered chronic low back pain.[2,3] Patients who suffer from acute LBP usually find relief within four to six weeks, but some patients will transition to the chronic LBP stage, having pain and disability for longer than three months.[4] Patients with chronic LBP are most concerning because the pain can persist for months or years after transitioning to a chronic stage of low back pain. In addition to the acuity of back pain, another common classification is related to the cause of the back pain. There are two 'classifications' of low back pain, specific and non-specific. Specific LBP has an exact or known cause for pain in the lumbar or sacral region. Whereas non-specific LBP has an unknown ideology. Non-specific LBP accounts for about 90% of all patients who suffer from low back pain.[2] Some examples of specific low back pain are outlined by Koes et al, these include compression fractures, spondylolisthesis, tumor, ankylosing spondylitis and very rarely an infection.[2] Other possible causes of specific low back pain are: radiculopathy, lumbar stenosis, cauda equina syndrome, Scheuermann's disease, or scoliosis.[2,5] The classification of non-specific, chronic low back pain will be discussed and examined further

throughout this case study. Some signs and symptoms which can be correlated with low back pain are: muscle ache, pain in the buttock, pain that radiates down the leg, or pain that is better with positional changes.[6] More worrisome signs and symptoms could include: bowel or bladder changes, numbness and tingling in the area, or radicular symptoms down the leg.[7]

A wide variety of factors influence the prevalence of LBP, such as occupation, sex, age, education, physical strength, anatomical build and flexibility.[1] The Mayo Clinic also states lack of exercise, excess weight, improper lifting techniques and smoking may all lead to a greater risk of low back pain.[6] It is still unknown as to a cause for LBP, but these are some risk factors that may increase a person's likelihood to develop low back pain within their lifetime. In regard to gender, women are more likely than men to suffer from low back pain.[1,3] According to Meucci et al, they hypothesized possible reasons why women are more effected by LBP than men include women being exposed to more musculoskeletal demands due to pregnancy, caring for their children and a double workday.[3] A double workday is described as working at their job and then coming home to do housework and other chores around the home.[3] Another possible risk factor for chronic LBP is weak abdominal musculature, although Reenen et al, reports there is inconclusive evidence that correlates abdominal muscle strength and low back pain.[8]

Clinical practice guidelines for low back pain recommend that health care professionals focus on two main points with patients who suffer from low back pain, especially for the patients in the acute stage. These two recommendations include, prevention of recurrences of LBP and prevention of the transition to chronic low back pain.[1] According to Meucci et al, 5-10% of all low back pain cases will transition from either acute or subacute LBP to chronic LBP.[3] Early intervention is important for these patients in order to reduce the likelihood of transitioning from acute or subacute to chronic LBP.

Many different treatments and interventions have been utilized in treating chronic low back pain. Interventions which are recommended to be used with patients who suffer from chronic LBP according to the *Low Back Pain: Clinical Practice Guidelines*: thrust manipulative techniques, increasing trunk coordination, core strengthening and other endurance exercises to reduce pain and disability in patients with chronic LBP.[1] When the patient has mobility deficits noted in the lumbar spine, repeated exercises in a specific direction were found to be beneficial in reducing pain for these patients.[1] The McKenzie technique utilizes repeated movement to successfully reduce back pain in many types of patient populations. Other exercise techniques like strengthening and aerobic conditioning have also been found to be effective in reducing chronic low back pain. Searle et al found exercise strengthening and resistance exercise to be superior to other intervention strategies for treatment of chronic low back pain.[9] The researchers also found that cardiorespiratory exercise had no effect on reducing low back pain for patients.[9] Therefore, it appears there are a wide variety of physical conditioning exercises that are effective for treating patients with chronic low back pain.

In addition to physical activity, patient education and knowledge is another important aspect in treating individuals with low back pain. It is important to avoid focusing on the negative aspects of their LBP. Therapists should instead center attention on everyday activities their patients enjoy and can still complete. As healthcare providers it is important to focus on helping the patient understand what is occurring in their painful area and the basic anatomy of their spine.[1] Other helpful patient education concepts include the neuroscience behind the pain they are experiencing, prognosis of LBP in a positive manner, and strategies to deal with the pain to help decrease their fear of pain.[1] It is important to help the patient get back to activities they love to do in their everyday life, even if it is restricted in the beginning. Allowing patients to get

back to their favorite activities early, even in a restricted manner will show the patient that therapy is not just focused on the pain they are experiencing, but rather on improving their activity levels and participation in daily life.[1]

The purpose of this study will be to outline the importance of physical therapy in the treatment of chronic, non-specific low back pain and how it can be a very useful tool to reduce the occurrence of LBP. The case study presents a 42 y/o woman who has suffered from chronic, non-specific low back pain for over two years, due to unknown ideology. The case study provides an overview of the impact of chronic LBP on everyday life and emphasizes the role of evidence based physical therapy in reducing the prevalence of chronic LBP. This case study will look at a variety of interventions utilized for the patient, which included; core strengthening and stabilization exercises, hip flexor stretching, and psoas release.

CHAPTER II

CASE DESCRIPTION

This patient was selected for the case study due to unique utilization of intervention strategies, which resulted in a resolution of symptoms for the patient. The patient was seen in outpatient physical therapy for chronic low back pain, which has persisted for over two years. This patient is a 42 y/o female and a mother of three young children. She has had pain in the lumbar area consistently for two years, about one year after the birth of her third child. No positive correlation was made between the patient's low back pain and her pregnancy, but the pregnancy and subsequent delivery could be a contributing factor to her low back pain. She works part-time in the school system, so due to her flexible schedule she did not have any problems getting to physical therapy appointments.

The patient has seen multiple healthcare professionals to find a potential cause for her low back pain. Medical physicians, physical therapists and massage therapists provided temporary resolution of her low back pain. A variety of interventions were attempted including functional dry needling, lumbar extensor strengthening, electrical stimulation, and soft tissue massage with no lasting reduction of symptoms.

The patient had imaging performed, but this did not show anything significant. Her pain was reported consistently at a 4/10, reaching up to a 7/10 when the pain was at its worst. The scale utilized to report the patient's pain was 0/10 means no pain and a 10/10 means worst pain ever experienced. She reported no radicular symptoms, and the pain is focused in the low back region. This patient stated that exercising and sitting for long periods of time seem to aggravate

and increase her pain levels. Long car rides are not tolerable due to the pain she experiences from sitting for long periods of time. Working out has always been a passion for this patient, but she has been unable to work out on a regular basis for the past two years due to the pain experienced in her low back during exercise. Her normal workouts include running, abdominal workouts, and a light lifting program including the use of dumbbells and kettle bells. Running and her abdominal workouts cause the most pain for this patient. Upon further questioning and observation it was discovered that her abdominal workouts consisted of repetitive flexing through the lumbar spine. This led to an increase in loading of the lumbar spine and could have been a source of pain in the lumbar region.

The patient's prognosis was good due to low back pain being treatable and within the scope of PT practice. This patient was also highly motivated and committed to therapy as she wanted to get back to her activities of daily living pain free. The patient was also expectant of positive outcomes from therapy and was willing to work hard for encouraging results. The original plan of care included therapeutic exercise to increase strength and endurance in the lumbar paraspinals and abdominal musculature. The plan of care was adjusted as needed based on the patient's response to treatment. Stretching and manual therapy would be utilized as needed to increase range of motion in lumbar spine.

Examination

Upon initial observation the patient demonstrated good posture, sitting up straight while on the exam table. She did readjust many times to settle into a more comfortable position. The patient stated her pain occurred bilaterally at a level of 4/10 at rest and a 7/10 at its worst. Notably, the right side was more painful than the left side. The 7/10 pain is noted during and after activity.

Lumbar range of motion was tested next with this patient. Lumbar flexion, extension, bilateral side bending, and bilateral lumbar rotation were performed. The patient reported pain in the lumbar region with each motion, which lead to a decrease in the range of motion for this patient. Both lumbar flexion and extension range of motion were very limited due to pain in the lumbar region. The patient rated her pain at a 6/10 for both lumbar flexion and extension. Lateral side bending was more limited on the right compared to the left, but still within functional limits for both motions. Rotation to the right was again less than rotation to the left, but still within functional limits.

The patient's lower extremity strength was tested for bilateral hip flexion, hip abduction, knee flexion and extension, dorsiflexion/plantarflexion, and great toe extension through manual muscle testing. The patient was strong with all motions and scored a 5/5 on each motion tested. There was no pain noted with any of these strength tests. The results are outlined in Table 1 below.

Table 1 Lower Extremity Manual Muscle Testing

Motion	**Left**	**Right**
Hip Flexion	5/5	5/5
Hip Abduction	5/5	5/5
Knee Flexion	5/5	5/5
Knee Extension	5/5	5/5
Dorsiflexion	5/5	5/5
Plantarflexion	5/5	5/5
Great Toe Extension	5/5	5/5

Following range of motion and manual muscle testing, special tests were implemented to identify the underlying cause of her pain. The active straight leg raise test was performed and was negative for the patient for hamstring tightness. The patient did note joint pain in the lumbosacral region after 70 degrees. The five sacroiliac (SI) joint special tests were performed in a cluster to see if there was any SI involvement in the patient's low back pain. These five special tests were: distraction, thigh thrust, Gaenslen, sacral thrust and compression. The patient tested positive due to an increase and reproduction of pain with three tests: distraction, thigh thrust and Gaenslen.

Table 2 Special Tests Outcomes

Special test	**Positive (+) or Negative (-)**
Active SLR	-
Distraction	+
Thigh Thrust	+
Gaenslen	+
Sacral Thrust	-
Compression	-

According to Laslett et al, if patients test positive twice for distraction, thigh thrust, compression and sacral thrust, there is (0.88) sensitivity and (0.78) specificity with these tests.[10] Furthermore, if distraction and thigh thrust are positive, no other tests are needed due to the high specificity and sensitivity of these two tests.[10]

The initial evaluation indicated that the patient would benefit from physical therapy to help decrease her pain while exercising and sitting for long periods of time. Since she tested positive for three of the five SI special tests, this indicated some type of SI involvement. The extent of SI involvement was unknown. She also had limited forward flexion and extension in her lumbar range of motion. The patient had an increase in pain while performing both forward flexion and extension exercises.

Goals for this patient were to decrease pain in the lumbar area, which would allow her to exercise and play with her children without pain. The patient's next goal was to be able to sit for longer than 30 minutes at a time. This would allow her to be comfortable while sitting down instead of having to constantly reposition herself. She would also be able to travel longer distances with her family and not have to stop multiple times to take a standing break.

Evaluation, Diagnosis, and Prognosis

The physical examination revealed sacroiliac joint (SIJ) involvement due to three of the five special test for the sacroiliac joint being positive. The patient also had decreased lumbar flexion and lumbar extension range of motion, which were both limited due to pain. Although the patient tested strong in response to all the lower extremity manual muscle testing, the patient did have decreased strength in her abdominal musculature. This was observed while performing supine pelvic tilts during the initial treatment session. The decreased strength in her abdominals could also have been contributing to her low back pain.

The PT diagnosis was low back pain consisting of sacroiliac involvement, along with weak abdominal muscles. After follow up in later treatment sessions for this patient, she demonstrated weak abdominal musculature due to lack of endurance with abdominal

strengthening exercises including supine pelvic tilts. The patient also had psoas muscle tightness, as the psoas muscle was sensitive upon palpation and was tight during stretching of the muscle.

This patient had a good prognosis upon initial evaluation, she was willing to put time into her therapy to be able to reduce her pain and symptoms. She was motivated to get back to her everyday activities, especially being able to play with her children again without a significant increase in pain in her low back. The patient was appropriate for physical therapy due to the chronicity of her low back pain. Stretching, strengthening through therapeutic exercise, and recruitment strategies would be utilized to help decrease the patient's low back pain.

CHAPTER III

INTERVENTIONS

The patient was seen twice a week for a total of four weeks. The first week's treatment included working on activating the transverse abdominus (TA). This was done by having the patient in a supine position, performing pelvic tilts. After her successful completion of this initial activity a blood pressure cuff was added under her lumbar spine region. She was instructed to lift one bent leg at a time and to not allow the blood pressure cuff to rise or fall more than five mmHg. She was instructed to contract her TA muscle and was cued to bring her belly button to her spine. The patient worked on these pelvic tilts for two sets of ten repetitions on each leg. When this was easy enough for the patient, she progressed to pelvic tilts on the physio ball. With this exercise, the patient was instructed to sit up straight with good posture, facing a mirror. The mirror allowed her to observe herself performing the activity and correct her posture as needed. The patient performed pelvic tilts on the physio ball for three sets of ten repetitions.

During the first and second week of treatment, it was apparent the patient's abdominal musculature was very weak compared to her extensor muscles. This could have been a result of diastasis recti from her previous pregnancies, which will be examined further in the discussion section. The next two treatment sessions were geared toward strengthening and targeting her abdominal muscles. Many of the abdominal exercises the patient would do at the gym were too painful on her back, so she ended up eliminating strengthening her abdominals completely. The patient had performed many abdominal exercises that involved flexing the lumbar spine and this

placed too much strain on her low back. She wanted to be able to work on strengthening her abdominals pain free. For therapy, exercises that did not increase pain for the patient in her low back area were found and added to her therapy session. A biofeedback machine on an iPad was utilized on the patient's abdominal region. The iPad was used to show the patient how much she was firing her abdominals compared to how much she should be firing the abdominals. The exercises that were used to strengthen abdominal musculature were hanging knees to chest and toe touches. Hanging knees to chest consists of hanging from a pull-up bar. This exercise is performed by an individual slowly bringing their knees to a 90/90 position, needing to contract the abdominals to complete this exercise. The individual will then lower their legs slowly back down until their legs are straight in the starting position. The next exercise the patient completed was toe touches. This exercise was performed by having the patient lay on her back with a physio ball between her arms and legs, with her legs in a 90/90 position. She then slowly reached up toward the ceiling with both arms. The repetitions and sets of these two exercises are outlined in Table 3 below.

Table 3. Abdominal Exercises Reps and Sets.

Exercise	**Repetitions**	**Sets**
Hanging Knees to Chest	30	5
Toe Touches	30	3

During this second week of treatment the patient was encouraged to try an SI Loc, due to the positive signs of SI involvement with her low back pain. The SI Loc is a type of pelvic belt that is used to treat SI pain. According to Niels Hammer et al, they performed a research study that consisted of 17 patients with SIJ and 17 patients without SIJ involvement.[11] Through their research, they found that the SI or pelvic belt was beneficial in decreasing pain and improved

quality of life in the patients with SIJ pain.[11] The outcomes of their study were determined by having each patient complete an outcome form called the short-form 36. In the beginning of the 6-week time period the individuals with SIJ pain had lower physical scores compared to the non-SIJ individuals.[11] After the six-week follow-up of wearing a pelvic belt for at least three hours a day, every day, the patients with SIJ improved their scores and were closer in the physical category to the non-SIJ participants.[11] Unfortunately this was not the case for this patient, as the following week she reported back that the SI Loc had not helped much, and it only relieved some pain in the short-term. The patient reported that she still felt a pull and had the same type of pain in her low back region. Since it was such a short relief and the patient did not feel she was getting anything out of wearing the SI Loc, this was discontinued.

During the third week of treatment, a psoas release technique was performed on this patient. This technique was performed with the patient in supine with her knees bent. The physical therapist palpated halfway between the anterior superior iliac spine (ASIS) and the umbilicus. Then worked through tissue within this area until the psoas muscle was reached. The patient reported an increase in discomfort upon palpation of this muscle but did not aggravate symptoms in her back at all. The patient was then asked to flex her thigh. She had an increase in pain and discomfort on the initial raising of her leg, but after a few repetitions it started to feel better. Ten repetitions of the patient raising her leg was performed bilaterally. The physical therapist continued to palpate the psoas musculature throughout the whole set of ten repetitions on each leg. The patient tolerated this psoas release exercise well.

Stretches for the psoas muscle were given to the patient to try at home. These stretches included the goalie stretch, the couch stretch, and the warrior pose. For the goalie stretch a patient is kneeling with knees resting on sliders so they can slide freely; the patient then moves

knees outward as far as able. The patient is then instructed to gently rock forward and backward to feel more of a stretch. For the couch stretch, a patient is in a lunge position with their back knee on the ground and their front knee is bent to 90 degrees in front. The patient's back foot is positioned onto a chair behind them and is instructed to settle into the stretch. A patient is to find the best position that will give the most stretch on the anterior portion of the thigh. The final stretch given in this home exercise program was the warrior pose, which is performed in yoga classes. The patient is standing with one leg in front and one leg behind. A patient is then instructed to put both arms up overhead and lean forward, keeping the back leg straight and again find the right place to settle into the stretch. The patient was instructed to hold each of the stretches for 60-90 seconds at a time and to do two sets at a time. She was encouraged to go through these three stretches twice a day. The patient tolerated her home exercise program and said she was feeling some relief of pain. During this third week of treatment the patient really started to respond well to therapy and reported she had decreased pain and was able to tolerate exercising on her own. The patient reported how she completed her stretches twice a day. Performing the stretches along with being able to strengthen her abdominals at the gym, she noted a significant improvement in her low back pain.

The fourth and final week of therapy included instructing this patient on how to perform a self psoas release. She was instructed to palpate halfway between her ASIS and her umbilicus, then to slowly move hands deeper until she found the sensitive muscle. Once the patient was on the sensitive portion, she was instructed to slowly flex her right leg and slowly bring it back to the starting position, performing ten repetitions of this exercise. The patient was then instructed to perform this same exercise on her left leg. After this fourth week of treatment the patient was

discharged due to an overall improvement in symptoms, which will be explored in the following section.

CHAPTER IV

OUTCOMES

Following the one week of treating the psoas muscle, the patient was able to find relief in her back and her pain was decreasing to a 2-3/10, compared to constantly being at a 4/10 pain in her low back region. She was discharged from therapy after the fourth week of treatment and her pain was at a 1/10. It was reported by the patient that exercising and sitting for long periods of time did not increase her pain, unlike it had when she first came for physical therapy.

At discharge, the patient was instructed to continue stretching twice a day and holding the stretches for 60-90 seconds. She was also shown how to palpate psoas muscle on herself in case her low back pain was to flare up again. The patient was encouraged to call back to schedule another appointment if the pain or discomfort in her low back returned. At discharge, the patient's range of motion had improved, as forward flexion and extension were no longer painful for this patient. She was able to reach forward touching her toes, which she was unable to perform upon initial evaluation.

CHAPTER V

DISCUSSION

Throughout the four weeks of therapy sessions the patient went through a variety of interventions. She was highly motivated to eliminate the pain in her low back and wanted to return to daily exercise. Her willingness to participate was very helpful for this patient's rehabilitation and contributed to her quick return to her everyday activities. Her everyday activities included playing with her children, aerobic exercise, weight training, and other household duties. She was discharged from outpatient physical therapy with a decrease in her pain, which upon initial evaluation was a 6-7/10 and at discharge her pain was rated at 1/10 in her low back.

Non-specific, chronic low back pain makes it difficult to pinpoint a cause for an individual's pain. There are many different causes that could be contributing to a person's symptoms, such as; occupation, sex, age, education, physical strength, anatomical build and flexibility.[1] Of these factors this patient fell into the higher risk category based on her age, since women between the ages of 30-60 are more likely to have chronic low back pain. (Meuci)

Following four weeks of treatment sessions, the patient was able to work out again; completing high intensity interval training classes, and her own weightlifting routine consisting of kettlebells, dumbbells and resistance bands. There is evidence that shows exercise after treatment of low back pain can be used to reduce recurrences of low back pain in the future.[12] According to Murtezani A, et al they found that high intensity aerobic exercise programs are

helpful in reducing chronic low back pain.[13] In this research study there were two groups consisting of 50 people each, who had chronic low back pain. This study consisted of treatment that lasted for a period of 12 weeks.[13] The first group was the exercise group and each aerobic exercise program was geared to that individual's abilities. Each session started with a 10-15 minute warm-up followed by 30 to 45 minutes of aerobic exercise.[13] The individual worked at 70-85% of their age predicted heart rate max. The second group in this study was the control group and consisted of passive modalities. Some examples of the passive modalities used are: infrared lamp, continuous ultrasound, and standard TENS (transcutaneous electrical nerve stimulator) therapy.[13] These modalities were performed for 45 minutes during each treatment session. At the 12-week follow-up it was found that the participants in the exercise group had significant decrease in symptoms.[13] The baseline average pain for the exercise group was a 6/10 and at the 12 week follow-up the average pain was a 2/10. Whereas the control or passive modalities group had an average pain level at baseline of 6/10 and at the 12 week follow-up had a mean pain level of 6/10.[13] The results of the Oswestry disability questionnaire were also improved in the exercise group, but showed no change in the control group. At baseline the exercise group had a mean score of 31.0 and at the follow-up was at a 15.8. The control group at baseline had a score of 30.7 and at the 12-week follow-up had a mean score of 30.6.[13] This study is helpful in showing how aerobic exercise is beneficial for patients with chronic low back pain.

At discharge the patient was finally able to strengthen her abdominal muscles on her own without an increase in pain, as this was a complaint of the patient at the beginning of treatment. She was unable to perform abdominal strengthening before she came to therapy, because it caused too much pain for her in the low back region. A meta-analysis was performed in regards to core stability strength for decreasing chronic, non-specific low back pain vs using general

exercise to decrease low back pain.[14] Through the study the researchers found that core stability exercise was more beneficial in decreasing pain for individuals with chronic low back pain, compared to general exercise, but only in the short term. The long term effects of core stability exercises vs general exercises is still unknown.[14] Another systematic review found that segmental stabilization exercises were more beneficial in decreasing chronic low back pain compared to general practitioner (GP) treatment.[15] Although these segmental stabilization exercises were not found to be superior to other types of physiotherapy treatments. One example of GP treatment was instructing the patient to be on bed rest for 1-3 days to try and help decrease their low back pain.[15]

The next area where additional research is needed is the possible correlation of low back pain to psoas major muscle tightness. According to Ranger et al, they found conflicting evidence that the psoas muscle had a correlation to chronic low back pain.[16] Eight of the studies that were included in the systematic review found an association between the psoas major muscle and low back pain, whereas seven of the other studies found there was no association between the psoas muscle and low back pain.[16] There appears to be muscle atrophy or a decrease in the cross sectional measurement of the psoas major muscle in the patients who have chronic low back pain.[17,18] The patients who had degenerative changes in the spine also showed a decrease in the cross sectional measurements in the psoas major muscle. This was hypothesized to be a result of a decrease in activity and a fear avoidance behavior due to pain in the patient's low back region.[17]

The patient had decreased abdominal strength upon evaluation, it has been theorized throughout research for this paper the cause may be due to potential diastasis recti from the patient's previous pregnancy. Especially since the patient's pain began about one year after the

birth of her third child. A research study conducted by Hills N, et al looked at women one year following their first pregnancy with diastasis recti abdominis (DRA) whom also had an interrectus distance (IRD) greater than 2.2 cm.[19] This was then compared to women following their first pregnancy without DRA.[19] The women with DRA had decreased strength, which was demonstrated through lower scores on the Sit-Up Test. The lower scores on the Sit-Up Test in women who had DRA may have been due to the inability of these women to stabilize the lumbopelvic region while sitting up.[19] Next, these women had statistically significant lower trunk rotation torque. These women with DRA also had delivered on average heavier babies compared to the women who did not have DRA.[19] Surprisingly, the trunk flexor endurance test results were the same in the women who had DRA and the group of women who did not have DRA.[19] It was concluded that women with DRA following their first pregnancy have difficulty performing a sit-up and decreased trunk rotational strength.[19] Another article found that women both during their pregnancy and after giving birth to their child, have a decrease in ability of their trunk muscles to stabilize their pelvis against resistance.[20] DRA could have been a possibility for the patient in this case study as she had decreased abdominal strength, especially with sit-ups and rotation from side to side.

Reflection

The first limitation to this study is that the exact cause of the patient's low back pain is unknown; most likely, it was due to a variety of contributing factors. The second limitation to this study is there were many objective factors that were not recorded. Range of motion was performed in the initial evaluation, but no measurements were taken. This would have given better objective evidence of improvement in lumbar spine range of motion at discharge. The patient did improve her range of motion from initial evaluation to discharge, but the exact

numerical measurements are unknown. Another limitation of this study is that a functional assessment was not completed with this patient. An Oswestry Questionnaire would have been beneficial to see where this individual's limitations were upon initial evaluation. This would have shown the patient's improvement over the four-week therapy duration, as she stated her daily activities were improving, but did not have an objective form to collect this data. According to Fairbank J, the Oswestry Disability Index is a reliable measure of functional activities in people suffering from low back pain.[21]

Overall this patient was satisfied with physical therapy upon discharge as she had decreased pain and was able to get back to her everyday activities of playing with her children, exercising consistently, and other household duties.

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