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USE OF FUNCTIONAL MANUAL THERAPY AND A STRENGTHENING PROGRAM IN THE TREATMENT OF A 41-YEAR-OLD FEMALE WITH LOW BACK AND SCIATICA PAIN: A CASE REPORT

By

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ABSTRACT

Background and Purpose: Although low back pain is a common diagnosis treated in physical therapy clinics, there is disagreement in the literature as to the preferred interventions for this patient population. The purpose of this case report is to describe the outcome of a patient with acute onset of low back and sciatica pain with a treatment directed towards Functional Manual Therapy and a strengthening program based on initial examination findings.

Case Description: The patient was a 41 year-old female secretary with four day history of low back and sciatica pain that initiated after straining during a bowel movement. The client presented with pain, decreased ROM, decreased strength, and functional disability. Intervention was directed by initial examination findings and consisted of components including Functional Manual Therapy and a strengthening program.

Outcomes: All of the patient's impairments improved and she was able to return to work at the beginning of the final week of treatment without any functional difficulties.

Discussion: Use of Functional Manual Therapy and a strengthening program may result in positive outcomes related to pain and functional disability in patients with acute onset of low back and sciatica pain.

BACKGROUND AND PURPOSE

Previous research demonstrates that approximately 60-80% of the Western world's population will experience low back pain (LBP) at some point in their lives.[1] In addition, nearly 50% of all patients presenting to outpatient physical therapy clinics present with LBP of some kind.[2] Despite the great number of LBP cases treated by physical therapists every year, there is still controversy as to which treatments are most effective for this patient population.[1]

This controversy is compounded by the lack of consensus found in the literature. In a randomized, controlled trial comparing the effectiveness of manual therapy to exercise therapy in patients with chronic LBP, Aure *et al* notes that although a number of conservative treatment methods for LBP have been studied, wide disagreement still remains as to the preferred treatment.[1] Cherkin *et al* also reports that although there are many non-surgical treatments for LBP, there is little evidence that any are effective.[3] In addition, Fritz *et al* has concluded that although a variety of interventions are accepted as standard care for patients with LBP, there is a lack of high-quality evidence from randomized clinical trials that offers conclusive support for most interventions.[2]

The debate as to which interventions are most successful in LBP patients is made even more unclear by studies that have found success with

treatments in this patient population. Petersen *et al* concluded that the McKenzie Method and intensive dynamic strengthening training seem to be equally effective in the treatment of patients with LBP, while Unlu *et al* found traction, ultrasound, and low-power laser therapies to all be effective in a group of patients with acute lumbar disc herniation.[4, 5]

Despite the abundance of research regarding conservative management of LBP, the evidence remains inconsistent and inconclusive.[6] A possible explanation for the insufficient evidence for commonly accepted interventions involves study designs with broad inclusion criteria, resulting in diverse samples.[7] It is also possible that research attempting to identify the best interventions for patients with LBP does not take into account a common belief amongst clinicians: that it is unreasonable to expect all patients with LBP to respond to any single treatment approach.[8] This school of thought has prompted researchers to investigate methods to place patients into groups to be matched to interventions that will produce positive outcomes.[9]

In an attempt to rectify the discrepancy noted in the research, Delitto *et al* presented a treatment-based classification approach to the conservative management of LBP.[10] This study was one of the first to give physical therapists a working framework to classify patients with LBP into different categories based on evaluation findings in order to direct treatment. Three categories were proposed: (1) patients in the acute phase

with the goal of symptom relief, (2) patients in the subacute phase where symptom relief and a quick return to function are the focus, and (3) patients who must return to participation in activities that are highly physically demanding. Furthermore, once the phase of a patient's condition was determined, patients were then placed in treatment categories based on evaluative data. These treatment categories included manipulation, stabilization, specific exercise, and traction. Delitto *et al* concludes that the classification of patients into different categories and matching treatments to those patients that fall into a certain treatment category will result in faster, more efficient, and more cost-effective care.[10]

A common impairment that often accompanies LBP is that of lumbosacral radicular syndrome, also called sciatica.[11] Characteristics of sciatica include radiating pain in the lower extremities with related disabilities.[12] Sciatica can often be accompanied by nerve root tension or neurological deficits. Sciatica is frequently caused by spinal stenosis, tumors, and/or radiculitis, but caused by herniated disc with nerve root compression in 90% of cases.[11, 12]

A consensus between research and clinical practice determined the management of sciatica should be conservative in the first 6-8 weeks of onset.[12] In fact, most cases of acute sciatica have displayed a favorable prognosis with resolution of symptoms in two weeks. However, up to 20-30% of patients with sciatica have been shown to have pain for one year or

longer. Despite a generally favorable prognosis with this condition, it is still unclear in the literature as to what conservative management of sciatica should consist of.[12] In a systematic review of conservative treatments of sciatica, Luijsterburg *et al* evaluated injections, traction, physical therapy, bed rest, manipulation, medication, and acupuncture as treatments for sciatica.[13] After examining the evidence, the researchers concluded there was no conclusive data indicating one type of conservative treatment was superior to the others.[13]

Given the disparity found in the literature there is a need for continued research investigating preferred treatments for patients presenting to physical therapy with LBP and also those presenting with symptoms of sciatica. Continued research to contribute to the literature on categorizing LBP patients in order to direct treatment will only lead to more positive outcomes. Thus, the purpose of this case report is to describe the outcome of a patient referred to physical therapy with acute onset of low back and sciatica pain with a treatment directed towards functional manual therapy and a strengthening program based on initial examination findings.

CASE DESCRIPTION

Subject

LD was a 41 year-old Caucasian female employed as a secretary with a four day history of severe LBP with painful symptoms radiating down her left buttock and posterior thigh to just above the knee. LD was referred to physical therapy with a medical diagnosis of lumbar radiculopathy. The patient reported she was using the restroom and "pushed too hard" during a bowel movement. This resulted in immediate sharp pain in her lower back, left buttock, and posterior thigh region. LD reported experiencing almost constant pain that was interfering with her ability to perform daily tasks such as sitting, bending forward, lifting, standing, walking, going to the bathroom, and sleeping. The client was able to get some relief from lying in supine and applying ice to her low back region. LD reported her pain was intensified during sitting and forward bending.

Relevant medical history included a diagnoses of herniated discs at L3-L4 discovered after LD received an MRI after experiencing mild LBP over one year prior to the current episode. The symptoms from the previous episode resolved without requiring the patient to seek any physical therapy treatment. Ibuprofen was the only medication the client was taking during the current onset of LBP. LD reported she hoped physical therapy would help her to be able to return to living without constantly being in pain. The client

had taken the previous three days off of work due to inability to sit for long periods of time and hoped to return as soon as possible.

Systems Review

Through a combination of the subjective examination and the primary physician's report, the client's integumentary and cardiovascular systems were found to be unimpaired.

Impairments were noted in LD's musculoskeletal system including elevated left shoulder, rounded shoulder posture, anterior pelvic shear, a shift of the upper thorax to the right, and a leg length discrepancy noted in supine with left leg found to be shorter than right leg. Tenderness was detected in the patient's bilateral lumbar paraspinal muscles, left posterior superior iliac spine (PSIS), bilateral sacroiliac (SI) joints, coccyx, and bilateral ischial tuberosities. Hypomobility was noted in the client's lumbar spine, SI joints, and sacrococcygeal symphysis through manual spring testing. LD ambulated with an antalgic gait displaying decreased weight-bearing of the left lower extremity, decreased bilateral lower extremity push-off, and decreased trunk reciprocation. LD also presented with decreased range of motion of lumbar spine and left hip with decreased strength noted of core and bilateral hip musculature.

Neuromuscular impairments included radicular symptoms into the patient's left buttock and posterior thigh intensified with lumbar flexion, lumbar extension, sitting, lifting, walking, and standing.

Clinical Impression #1

Based upon data from the subjective examination and systems review, relevant tests and measures were selected to attain a more complete understanding of LD's clinical picture. Due to the client's report of intense pain, the Numerical Pain Rating Scale (NPRS) was selected to obtain a baseline pain level.

Decreased active range of motion (AROM) was assessed through standard goniometric measurement to assess baseline lumbar spine and bilateral hip AROM. Passive range of motion (PROM) was not taken in this case based on the treating clinician's clinical judgment that AROM measurements would be a better measure of function than PROM measurements.

Decreased muscle strength was assessed through manual muscle testing to find baseline data on the strength of LD's core and hip musculature.

Special tests were selected to objectify ROM limitations and identify the source of radicular symptoms. The Straight Leg Raising Test and Thomas Test were used to ascertain measurements of hamstring flexibility and hip

flexor flexibility, respectively. The Extension-Rotation Test was used to identify zygapophyseal joint pain, and the Slump Test was used to assist in the identification of lower extremity radicular symptom patterns.

LD was also given the Oswestry Disability Index (ODI) to fill out in order to attain an objective measure of the degree of disability her LBP was causing at initial examination.

Tests and Measures

Numerical Pain Rating Scale

The first test and measure used in this case was the Numerical Pain Rating Scale (NPRS) in order to give an objective measure of LD's pain. The client was asked to rate her current pain level, best pain level, and worst pain level since the onset of the episode on a 0-10 scale. A score of 0 indicates the subject was in no pain and a score of 10 indicates the subject is in need of emergency medical attention. Williamson and Hoggart report the NPRS is valid, reliable, and appropriate for use in clinical practice.[14] For general purposes, the NPRS has good sensitivity and generates data that can be statistically analyzed for audit purposes.[14] LD's NPRS ratings at initial evaluation can be found in Table 3 below.

Range of Motion

The positions used for measuring active range of motion (AROM) in this case are as described in Reese and Bandy.[15] The AROM of LD's lumbar

spine and bilateral hips were measured in this case with decreased ROM noted in lumbar spine and left hip ROM. Nussbaumer *et al* described goniometric measurement of hip ROM to have good concurrent validity for hip abduction and internal rotation with intraclass correlation coefficients (ICC) of 0.94 and 0.88, respectively.[16] Test-retest reliability was found to be good with ICCs above 0.90 in all planes, except for hip adduction (0.82-0.84). Fitzgerald *et* al found standard goniometry of thoracolumbar extension and lateral flexion to be reliable.[17] Specific goniometric measurements taken at initial evaluation can be found in Table 3 below.

Muscle Strength

Muscle strength was measured through manual muscle testing (MMT) with techniques as described in Hislop and Montgomery.[18] MMT was performed on LD's core and hip musculature with strength deficits noted in core and bilateral hip muscles. Fan *et al* found MMT to have excellent inter-rater reliability in trained examiners and to be a reliable method of comprehensively assessing muscle strength.[19] Results from MMT at initial examination can be found in Table 3 below.

Special Tests

In order to attain a more complete clinical picture, special orthopedic tests were used to identify impairments in muscle length and get a better idea of the nature of the subject's symptoms. Special test positions and

procedures are as described in Cook and Hegedus.[20] The Thomas Test was used as a test of muscle length in this case, while the Slump Test and Extension-Rotation Test were used to identify the nature of the LD's lumbar radiculopathy. The Straight Leg Raising (SLR) Test was used as both a muscle length test and a test for lumbar radiculopathy. Results from special testing can be found in Table 3 below. Psychometric data for special tests used in this case can be found in Table 1 below:

Table 1: Special Test Psychometric Data

(NR=Not reported; NA= Not applicable)

Test	Reliability	Sensitivity	Specificity	LR+	LR-
Thomas Test[20]	NR	NR	NR	NA	NA
SLR Test[21]	NR	.52	.89	4.72	0.53
Slump Test[21]	NR	.84	.83	4.94	0.19
Ext.-Rot. Test[20]	NR	1.00	.22	1.28	0.00

Oswestry Disability Index

The Oswestry Disability Index (ODI) was used to quantify LD's LBP and how her pain was restricting her function. The ODI is one of the most commonly recommended condition specific outcome measures for spinal disorders used to track patient progress.[22] This questionnaire asks the patient to rate his/her disability on 10 function-related topics on a 0-5 scale for each topic. A score is determined as a percentage with 0% meaning no

disability and 100% indicating maximal disability.[22] LD's ODI score at initial examination can be seen in Table 3 below. Psychometric data on the ODI can be found in Table 2 below:

Table 2: ODI Psychometric Data

Minimally Clinical Important Difference[23]	Minimal Detectable Change[23]	Test-Retest Reliability[24]	Criterion Validity[23]	Construct Validity[24]
12.8	11.67	Excellent (ICC=0.97; 95% CI)	r=0.11 rho=0.35 rho=0.46	(r = 0.607, p < 0.001); (r = 0.56, p < 0.001)

Table 3: Initial Examination Tests and Measures

Pain (NPRS) (0-10)	AROM (degrees)	MMT (0-5)	Special Tests	ODI
Pain at Initial Exam: 8/10 Worst Pain Since Onset: 8/10 Best Pain Since Onset: 5/10 Location: Low back, (L) buttock, and (L) posterior thigh	Lumbar- Flexion: 70 Extension: 10 Side Bending: 20 Hips- (L) Hip- Flexion: 100 External Rotation: 45 Internal Rotation: 5 Extension: 0 (R) Hip- Flexion: 120 Extension: 10 Internal rotation: 25 All Other Planes: WNL	Upper Abs: 3+/5 Low Abs: 3-/5 Back Ext: 3+/5 Bilateral Hips- Flexion: 3+/5 Abduction: 4/5 Adduction: 4/5 External Rotation: 4/5 Internal Rotation: 3+/5 Extension: 3+/5	SLR: (L) 45 degrees (R) 80 degrees (+) (L) for lumbar radiculopathy Thomas Test: (+) bilaterally Extension-Rotation Test: (+) (L) Slump Test: (+) for lumbar radiculopathy	68% (Crippling Back Pain)

Clinical Impression #2

The initial evaluation showed the patient to be in severe pain, with limited ROM in the lumbar spine and bilateral hips.[14, 15] LD was also found to have weakness of core and bilateral hip musculature.[18] Positive findings were found for the Thomas Test, SLR Test, Extension-Rotation Test, and Slump Test indicating decreased muscle length and signs of lumbar radiculopathy.[20] The client's ODI score indicated she was experiencing back pain that could be considered crippling in severity.[22]

Due to objective findings from the initial examination, LD's plan of care included a variety of interventions designed to reduce pain, increase ROM of the lumbar spine and bilateral hips, strengthen core and hip musculature, decrease lower extremity radicular symptoms, and improve the patient's ability to perform daily tasks as measured by patient report and the ODI.

LD's symptoms were found to be intensified with lumbar flexion and lumbar extension movements. A directional preference is defined as a situation in which movement in one direction improves pain and limitation of ROM, and movement in the opposite direction causes signs and symptoms to worsen.[2] Since there was no particular movement that brought on an improvement in pain and ROM, a directional preference could not be identified in this case.

Client outcomes were determined through a physical therapy re-evaluation that was taken three weeks after the initial evaluation. All tests and measures performed at the initial evaluation were tested again at the re-evaluation with the most important measures being those related to pain and patient ability to perform daily tasks.

PT Diagnosis

After the initial evaluation, LD's condition was found to be best categorized into Preferred Physical Therapist Practice Pattern 4F: Impaired Joint Mobility, Motor Function, Muscle Performance, Range of Motion, and Reflex Integrity Associated with Spinal Disorders.[25]

Prognosis

Past research has found the prognosis for patients with acute LBP to be generally good. Aure *et al* concluded that clients with LBP who seek treatment in the acute stages enjoy a favorable prognosis with 80%-90% of patients improving considerably within six to eight weeks.[1] In a systematic review, Pengel *et al* found most patients with acute LBP to have rapid improvements in pain and disability within one month with a return to work within that same one month period.[26] However, it is not uncommon for low levels of persisting pain and disability to persist from three to at least 12 months.[26]

In this case, LD was determined to have a good prognosis based on the literature and past clinical experience of the treating clinician. LD was expected to display decreased symptoms and improved function within four to eight weeks.

Plan of Care

LD's plan of care was designed to include evidence-based interventions to improve deficits noted in the initial evaluation and improve functional limitations. The treating clinicians planned to employ a variety of interventions and use patient response to guide treatment. For example, if the client reported a certain manual technique provided pain relief, the treating clinician would make this intervention a regular part of the patient's plan of care.

Based on objective findings, past clinical experience, and support in the literature, a variety of interventions were included in the plan for this case including: AROM, strengthening, stretching, stabilization activities, patient education, joint mobilization, therapeutic exercise, functional activities, manual therapy, neuromuscular re-education, gait training, cardiovascular exercise, modalities, and a home exercise program (HEP). The patient planned to attend physical therapy treatment sessions of one to two hours duration three times per week for at least three weeks.

Goals

Physical therapy goals for this case were as follows:

Short-Term (2 weeks):

1. Client will learn HEP and perform HEP independently.
2. Client will restore functional ROM and mobility in lumbar, sacrum, and coccyx area.
3. Client will restore functional sitting postural control with no symptoms.

Long-Term (4 weeks):

1. Client will restore core and leg muscle strength to at least 4+/5.
2. Client will restore functional standing postural control.
3. Client will restore functional gait pattern.
4. Client will be able to perform all daily activities including: transferring, sitting, standing, lifting, and sleeping at night with no symptoms.

Interventions

In accordance with normal protocol at the outpatient clinic at which LD received her physical therapy treatment, the patient received treatment from one physical therapist, one physical therapist assistant, and one student physical therapist over the course of her eight PT visits. The physical therapist involved in this case was extensively trained in Functional Manual Therapy (FMT) techniques.[27] FMT is described as an integrated treatment

system which couples mechanical treatment of the joints, soft tissues, visceral, and neurovascular systems with manual neuromuscular facilitation to enhance optimum motor control and human function. The Institute of Physical Art offers a variety of continuing education courses, certifications, and fellowship programs for clinicians to gain competency in FMT.[27]

In this case, FMT techniques were applied to LD's lumbar spine, sacral, and coccygeal region in order to decrease pain noted upon palpation, improve joint hypomobility detected with spring testing, and lead to an improvement of poor movement patterns found upon observation of the patient. FMT was typically used near the beginning of a treatment session to decrease pain and allow the subject to perform more functional interventions to the best of her ability.

An example of an FMT technique utilized in this case includes a hold-relax proprioceptive neuromuscular facilitation technique designed to increase mobility of the bilateral sacroiliac joints and decrease pain in the region. The subject was placed in prone while the therapist used one hand to apply pressure to block the mobile sacroiliac joint segment. The therapist's other hand is used to provide resistance to the patient's ankle joint with the patient's knee bent to 90 degrees to employ the hold-relax portion of the technique. The patient's lower extremity is moved through different hip internal/external ranges of motion as the client is instructed to resist the therapist's manual force at different points. By using manual force to block

the mobile SI joint, the PT hoped to improve joint mobility of the SI joint lacking mobility and reduce the patient's pain.

Other manual techniques utilized during the client's plan of care included soft tissue mobilization (STM) in order to relieve symptoms through the breaking up of soft tissue restrictions and improve movement patterns. STM was performed to this subject's lumbar paraspinal and gluteal musculature to improve range of motion, relieve symptoms, and break up any soft tissue restrictions to facilitate full participation in activities.

An STM technique utilized in this case involved application of STM to the sciatic nerve as it passes through the gluteal region. With the patient in side-lying, STM was applied to the sciatic nerve as the patient performed an active-assisted straight leg raise. The patient was instructed to repeatedly raise and lower the leg as the therapist provided STM to the sciatic nerve in a longitudinal manner. The performance of this technique is as described in Cleland *et al.*[28] The other STM techniques utilized in this case that were applied to the lumbar and gluteal regions are as described in Kisner and Colby.[29]

Many of LD's treatment sessions began with a 10 minute warm-up period on the NuStep T4 recumbent cross trainer in order to increase blood flow to lower extremity musculature and incorporate cardiovascular exercise into the patient's program. NuStep cross trainers are manufactured by the

NuStep Corporation out of Ann Arbor, Michigan. LD used the Nu-Step for the first time during her third visit and reported discomfort after two minutes, thus the intervention was discontinued at that session. LD was able to complete the full 10 minutes on the Nu-Step during treatments 4-8.

Stretching of the patient's bilateral hip flexors, hamstrings, quadriceps, hip internal/external rotators, and low back musculature was included using manual, passive, active, and active-assisted methods. An example of a stretching exercise utilized in this case is that of prone press-ups in order to improve lumbar extension ROM. Prone press-ups were only utilized after lumbar extension was found to not provoke painful symptoms. Stretching to increase range of motion was included in every treatment session and included in the client's home exercise program using methods as described in Kisner and Colby.[29] Stretching activities were typically utilized after the client completed a warm-up session on the Nu-Step machine and typically 5 repetitions of 15-20 seconds were completed for each stretch.

Strengthening of core stabilizers, low back musculature, and hip musculature was included in every treatment session and included in the client's home exercise program. Strengthening exercises varied and began with basic table exercises near the beginning of treatment that progressed to more functional activities in standing as the patient progressed. For example, early in treatment, the client would perform the side-lying clamshell exercise with an exercise band around her knees to provide

resistance. This exercise was progressed to standing hip abduction with an exercise band around the patient's ankles. LD typically completed 2 sets of 15 repetitions for each strengthening exercise. Strengthening exercises utilized in this case are as described in Kisner and Colby.[29]

Neuromuscular re-education exercises were considered functional exercises designed to retrain the subject to perform daily activities with improved movement patterns. A variety of neuromuscular re-education exercises were performed with this subject focusing on retraining of musculature to restore more functional postural control, body mechanics, and gait biomechanics. An example of a neuromuscular re-education exercise used in this case involved the client performing sit-to-stand transfers while holding a dowel to her back using her upper extremities. The goal was for the patient to maintain the dowel's contact with the back of the patient's head, thoracic spine, and lumbar spine throughout the transfer in order to teach the patient how to transfer sit-to-stand while maintaining a neutral spine. Maintaining a neutral spine allowed this client to avoid the movements of lumbar flexion and lumbar extension that increased her symptoms. Other exercises of this nature performed by LD are as described in Kisner and Colby.[29] Neuromuscular re-education exercises were typically utilized near the end of a treatment session.

Every treatment session in this case ended with the application of an ice pack and interferential current (IFC) electrical stimulation to the subject's

lower back region for 15 minutes in order to provide LD with further pain relief.[30]

Patient education was provided throughout each physical therapy session. Education topics included disc herniation pathology, postural education, proper body mechanics training, gait training, and HEP instruction. The client's HEP was added to as LD progressed. Appropriate exercises performed during therapy sessions were often added to the patient's HEP throughout the course of treatment. Exercises included in LD's HEP included stretching exercises of the lower back/hips, core/hip/lower back strengthening exercises, and neuromuscular re-education exercises. Any questions the patient had were answered in full to provide the best comprehensive care possible. Types of interventions employed in a particular session can be seen in Table 4 below:

Table 4: Interventions- (Recorded per session)

Session #	Intervention 1	Intervention 2	Intervention 3	Intervention 4	Intervention 5	Intervention 6	Intervention 7
1	1	2	3	4	7		
2	1	2	3	4	5	6	7
3	1	2	3	4	6	6	7
4	1	2	3	4	6	7	
5	1	2	3	5	6	7	
6	1	2	3	4	5	6	7
7	1	2	3	5	6	7	
8	1	2	3	6	7		

1=patient education
2=stretching
3=strengthening
4=FMT
5=STM
6=neuromuscular re-education
7=Ice/Electrical stimulation (IFC)

OUTCOMES

After attending eight total physical therapy sessions over three weeks, LD was re-evaluated with all the tests and measures used at the initial evaluation. Observation found the patient to have improved sitting and standing postural control, no leg length discrepancy in supine, and no tenderness noted in the client's lumbar and pelvic regions. Improved mobility of LD's lumbar spine, SI joints, and sacrococcygeal symphysis was found upon spring testing. The patient's gait pattern was found to be

improved with equal weight distribution, improved bilateral lower extremity push-off, and improved trunk reciprocation.

Subjectively, LD reported no LBP, no radicular symptoms, and no problems with daily tasks. LD reported she was able to return to work at the beginning of the third week of treatment without any difficulty. In addition, improved range of motion of the lumbar spine and the patient's left hip was noted with improvements in strength of core and hip musculature. All special tests were found to be negative and the client showed improvement on her ODI outcome measure.

The client was discharged from physical therapy treatment after re-evaluation due to the completion of all functional therapy goals, improvement of Oswestry Disability Index score, no reported difficulty with any daily activities, and reported relief of all symptoms. The client was given a home exercise program to continue to follow upon discharge. Specific measurements taken at re-evaluation can be found in Table 5 below. A comparison of measures taken at the initial examination and re-evaluation can be found in Tables 6A-6D.

Table 5: Re-Evaluation Tests and Measures

Pain (NPRS) (0-10)	AROM (degrees)	MMT (0-5)	Special Tests	ODI
Pain at Re-evaluation: 0/10 Worst Pain in Previous Week: 0/10 Best Pain in Previous Week: 0/10	Lumbar- Flexion: 90 Extension: 15 Side Bending: 30 Hips- (L) Hip- Flexion: 115 External Rotation: 45 Internal Rotation: 45 Extension: 10 (R) Hip- Flexion: 120 Extension: 10 Internal rotation: 45 All Other Planes: WNL	Upper Abs: 4/5 Low Abs: 4-/5 Back Ext: 4/5 Bilateral Hips- Flexion: 4+/5 Abduction: 4+/5 Adduction: 5/5 External Rotation: 4+/5 Internal Rotation: 4+/5 Extension: 4+/5	SLR: (L) 73 degrees (R) 80 degrees Thomas Test: (-) bilaterally Extension-Rotation Test: (-) Slump Test: (-)	2% (Minimal Disability)

Table 6A: Pain Level at Initial Examination Compared to Re-Evaluation as Measured by NPRS

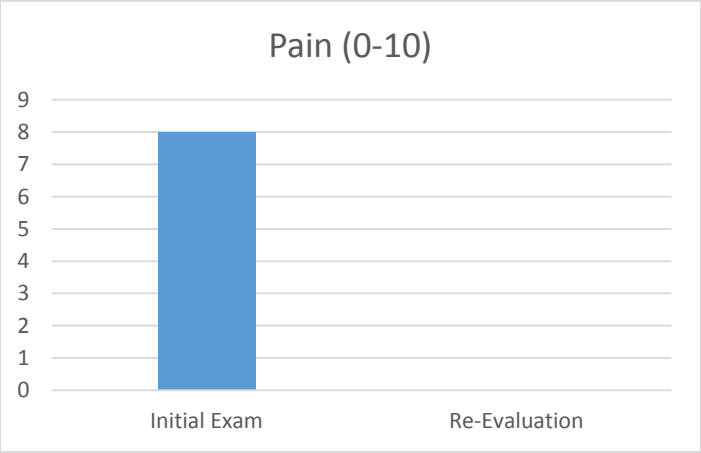

Table 6B: ODI Score at Initial Examination Compared to Re-Evaluation

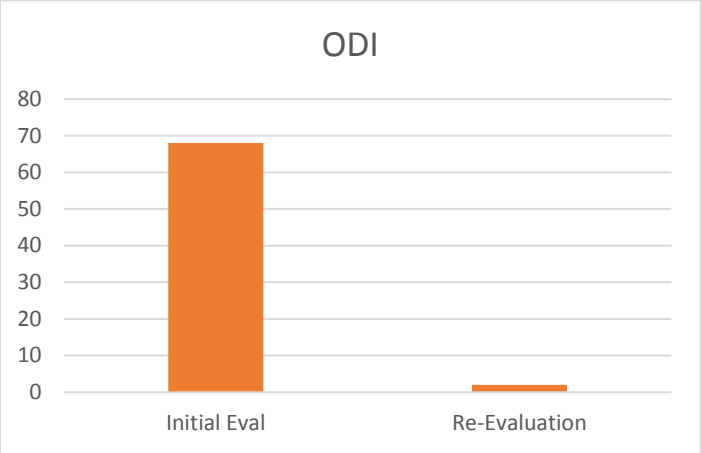

Table 6C: Lumbar and Hip AROM Measures at Initial Examination Compared to Re-Evaluation

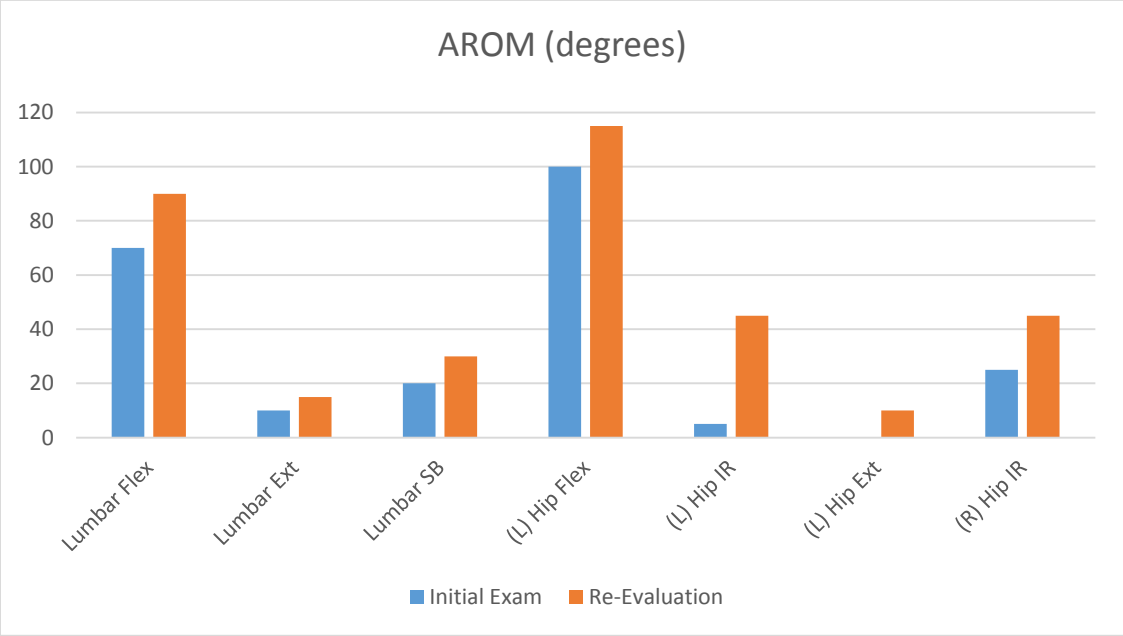

Table 6D: MMT at Initial Examination Compared to Re-Evaluation

Area Tested	Initial Examination	Re-Evaluation
Upper Abs	3+/5	4/5
Lower Abs	3-/5	4-/5
Back Ext	3+/5	4/5
Hip Flexion	3+/5	4+/5
Hip Extension	4/5	4+/5
Hip Abduction	4/5	5/5
Hip Adduction	4/5	4+/5
Hip ER	3+/5	4+/5
Hip IR	3+/5	4+/5

DISCUSSION AND CONCLUSION

This case report demonstrated how Functional Manual Therapy and a strengthening program can be utilized to treat a 41 year-old female with a four day history of acute low back and sciatica pain. Although previous studies found a variety of treatments to be effective in the treatment of patients with acute LBP and sciatica symptoms, there is still a disparity in the research as to which treatments are the most effective.[1, 6] Due to this disparity, researchers have found that the classification of patients into treatment categories based on examination findings may help to direct treatment and lead to more positive outcomes.[2, 10] The positive outcomes found in this case report could be helpful in adding to the current literature on effective interventions for patients with similar diagnoses. In addition,

this case report may prove beneficial in the treatment of LBP clients based on categorization of symptoms.

The categorization of patients to direct LBP treatment was first described by Delitto *et al* and expanded upon by Fritz *et al*.[2, 10] Based on the work of Fritz *et al*, the symptoms displayed by LD would lead to this client falling into the manipulation category of treatment.[2] In the creation of LD's plan of care, the treating clinicians decided to incorporate interventions from this category and assess patient response to these interventions.

FMT to the client's lumbar and pelvic regions was chosen as the intervention to address the manipulation categorization of LD's treatment with the purpose of decreasing pain, restoring proper joint mobility, and improving movement patterns.[27] Although the degree of effectiveness of FMT on the outcomes of this case is unknown, LD repeatedly reported decreased pain after the application of FMT. Utilization of these pain-reducing manual techniques near the beginning of a treatment session may have allowed LD to more fully participate in strengthening and neuromuscular re-education interventions typically performed later in a treatment session.

According to the Fear-Avoidance Model of Pain, a patient's interpretation of their acute pain may lead to avoidance behaviors that may, in turn, lead to greater disability.[31] Reduction of a client's pain early in

treatment is essential in the facilitation of functional movement patterns leading to more positive outcomes.[31] The utilization of FMT in LD's plan of care proved effective in the reduction of the patient's pain and may have led to improved movement patterns leading to improvement after three weeks of treatment.

In order to directly address the symptoms of sciatica displayed in this case, a technique that involved STM to the sciatic nerve with a straight leg raising component was utilized, as described previously. Past research suggests that improving the range of SLR has a beneficial effect in restoring normal movement and reducing the degree of impairment due to low back dysfunction.[32] On several occasions, LD reported decreased radicular symptoms after the performance of this manual technique and was found to have improved SLR range of motion of the left lower extremity at re-evaluation compared to initial examination. Thus, this manual technique may have been an important component in the relief of LD's radicular symptoms.

Strengthening exercises were another large component of LD's plan of care. These exercises included various core stabilization and hip strengthening exercises designed to address muscular weaknesses found in the patient's core and hip muscles. Although strength training has shown to be no more effective than other interventions in the treatment of LBP, strengthening exercises were made a priority in this case to improve significant muscular weaknesses in LD's hips leading to non-functional gait

biomechanics.[4, 29] Previous studies have shown core and hip musculature weaknesses to be a contributor to gait deformities and a cause of LBP.[29, 33] Thus, strengthening of the hip and core musculature may have been an important factor in LD's rehabilitation.

Although a positive outcome was seen in LD's case with the utilization of FMT and a strengthening program, other factors and limitations in this study may have contributed to the patient's outcome. LD reported a previous episode of acute LBP that had resolved without treatment. It is unknown whether the current episode of LBP would have healed without physical therapy intervention. In addition, this patient responded well to the interventions selected in this case report, however, the client may have responded better to another set of interventions. Finally, with the use of several interventions in this case, it is uncertain which interventions may have actually been effective and which interventions were ineffective.

This case report also identified several topics for future studies. Although different aspects of the techniques of FMT are supported in the literature, there have been no studies that have looked specifically at the effects of FMT as a physical therapy intervention. Also, the use of FMT and a strengthening program in this case led to a positive outcome, but future studies are obviously needed to assess these interventions in larger samples. Follow-ups at six and 12 months after discharge should also be included to assess the long-term effectiveness of these interventions.

In conclusion, this case report described the successful treatment of a 41 year-old female with a four day history of acute low back and sciatica pain utilizing FMT and a strengthening program to lead to a resolution of symptoms in three weeks. The use of FMT and a strengthening program may result in positive outcomes related to pain and functional disability in this patient population.

REFERENCES

1. Aure OF, Nilsen JH, Vaseljen O. Manual therapy and exercise therapy in patients with chronic low back pain: A randomized, controlled trial with 1-year follow-up. *Spine*. 2003;28(6):525-532.
2. Fritz JM, Cleland JA, Childs JD. Subgrouping patients with low back pain: Evolution of a classification approach to physical therapy. *J Orthop Sports Phys Ther*. 2007;37(6):290-302.
3. Cherkin DC, Deyo RA, Battie M, Street J, Barlow W. A comparison of physical therapy, chiropractic manipulation, and provision of an educational booklet for the treatment of patients with low back pain. *The New England Journal of Medicine*. 1998;339:1021-1029.
4. Petersen T, Kryger P, Ekdahl C, Olsen S, Jacobsen S. The effect of McKenzie therapy as compared with that of intensive strengthening training for the treatment of patients with subacute or chronic low back pain: A randomized controlled trial. *Spine*. 2002;27(16):1702-1708.
5. Unlu Z, Tasci S, Tarhan S, Pabuscu Y, Islak S. Comparison of 3 physical therapy modalities for acute pain in lumbar disc herniation measured by clinical evaluation and magnetic resonance imaging. *Journal of Manipulative and Physiological Therapeutics*. 2008;31(3):191-198.

6. Hayden JA, van Tulder MW, Tomlinson G. Systematic review: strategies for using exercise therapy to improve outcomes in chronic low back pain. *Ann Intern Med*. 2005;142:776-785.
7. Delitto A. Research in low back pain: time to stop seeking the elusive "magic bullet". *Phys Ther*. 2005;85:206-208.
8. Kent P, Keating J. Do primary-care clinicians think that nonspecific low back pain is one condition? *Spine*. 2004;29:1022-1031.
9. Koes BW, van Tulder MW, Thomas S. Diagnosis and treatment of low back pain. *BMJ*. 2006;332:1430-1434.
10. Delitto A, Erhard RE, Bowling RW. A treatment-based classification approach to low back syndrome: Identifying and staging patients for conservative treatment. *Phys Ther*. 1995;75:470-485.
11. Luijsterburg PA, Verhagen AP, Ostelo RW, et al. Physical therapy plus general practitioners' care versus general practitioners' care alone for sciatica: A randomised clinical trial with a 12-month follow-up. *European Spine Journal*. 2008;17(4):509-517.
12. Koes BW, van Tulder MW, Peul WC. Diagnosis and treatment of sciatica. *BMJ*. 2007;334:1313–1317.
13. Luijsterburg PAJ, Verhagen AP, Ostelo RWJG, van Os TA, Peul WC, Koes BW. Effectiveness of conservative treatments for the lumbosacral radicular syndrome: a systematic review. *Eur Spine J*. 2007;16:881–899.

14. Williamson A, Hoggart B. Pain: a review of three commonly used pain rating scales. *Journal of Clinical Nursing*. 2005;14(7): 798–804.

15. Reese NR, Bandy WD. *Joint Range of Motion and Muscle Length Testing. 2nd ed*. St.Louis: Saunders; 2012.

16. Nussbaumer S, Leunig M, Glatthorn JF, Stauffacher S, Gerber H, Maffiuletti NA. Validity and test-retest reliability of manual goniometers for measuring passive hip range of motion in femoroacetabular impingement patients. *BMC Musculoskeletal Disorders*. 2010;11:194.

17. Fitzgerald GK, Wynveen KJ, Rheault W, et al. Objective assessment with establishment of normal values for lumbar spinal range of motion. *Phys Ther*. 1983;63:1776-1781.

18. Hislop HJ, Montgomery J. *Daniels and Worthingham's Muscle Testing: Techniques of Manual Examination. 8th ed*. St. Louis: Saunders; 2007.

19. Fan E, Ciesla ND, Truong AD, Bhoopathi V, Zeger SL, Needham DM. Inter-rater reliability of manual muscle strength testing in ICU survivors and simulated patients. *Intensive Care Medicine*. 2010;36(6):1038-1043.

20. Cook CE, Hegedus EJ. *Orthopedic Physical Examination Tests: An Evidence-Based Approach. 2nd ed*. New Jersey: Pearson; 2013.

21. Majlesi J, Togay H, Unalan H, Toprak S. The sensitivity and specificity of the Slump and the Straight Leg Raising tests in patients with lumbar disc herniation. *J Clin Rheumatol*. 2008;14:87-91.

22. Fairbank JC, Pynsent PB. The oswestry disability index. *Spine*. 2000;25(22):2940-2953.

23. Copay AG, Glassman SD, et al. Minimum clinically important difference in lumbar spine surgery patients: a choice of methods using the Oswestry Disability Index, Medical Outcomes Study questionnaire Short Form 36, and pain scales. *Spine*. 2008;8(6):968-974.

24. Miekisiak G, Kollataj M, et al. Validation and cross-cultural adaptation of the Polish version of the Oswestry Disability Index. *Spine*. 2013;38(4):237-243.

25. Guide to Physical Therapist Practice. 2nd ed. *Phys Ther.* 2001;81:9-744.

26. Pengel LH, Herbert RD, Maher CG, Refshauge KM. Acute low back pain: systematic review of its prognosis. BMJ. 2003;327:323.

27. Institute of Physical Art. Welcome to the Institute of Physical Art. 2011. Available at: http://www.instituteofphysicalart.com/. Accessed November 11, 2014.

28. Cleland J, Hunt GC, Palmer J. Effectiveness of neural mobilization in the treatment of a patient with lower extremity neurogenic pain: A

single-case design. *The Journal of Manual & Manipulative Therapy*. 2004;12(3):143-152.

29. Kisner C, Colby LA. *Therapeutic Exercise: Foundations and Techniques. 6th ed*. Philadelphia: F.A. Davis Company; 2012.

30. Prentice WE. *Therapeutic Modalities in Rehabilitation*. *3rd ed.* New York: McGraw-Hill; 2005.

31. Leeuw M, Goossens ME, Linton SJ, Crombez G, Boersma K, Vlaeyen JW. The fear-avoidance model of musculoskeletal pain: Current state of scientific evidence. *Journal of Behavioral Medicine*. 2007;30(1):77-94.

32. Adel SM. Efficacy of neural mobilization in treatment of low back dysfunctions. *Journal of American Science*. 2011;7(4):566-573.

33. Leinonen V, Kankaanpää M, Airaksinen O, Hänninen O. Back and hip extensor activities during trunk flexion/extension: Effects of low back pain and rehabilitation. *Archives of Physical Medicine and Rehabilitation*. 2000;81(1):32-37.