OUTPATIENT REHABILITATION FOR A PATIENT WITH CHRONIC LOW BACK PAIN

A Doctoral Project
A Comprehensive Case Analysis

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DOCTOR OF PHYSICAL THERAPY

by

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Abstract

of

OUTPATIENT REHABILITATION FOR A PATIENT WITH CHRONIC LOW BACK PAIN

by

Kenia Saldana

A patient with a 14-month episode of chronic bilateral low back pain was seen for physical therapy treatment for 5 sessions for outpatient physical therapy over a 6-week period. Treatment was provided by a student physical therapist under the supervision of a licensed physical therapist.

The patient was evaluated at the initial encounter with the Patient-Specific Functional Scale, the Oswestry Low Back Pain Disability Questionnaire, the Fear-Avoidance Beliefs Questionnaire, the Numeric Pain Rating Scale, double inclinometery for range of motion of the lumbar spine, the prone lumbar instability test, the straight leg raise for hamstring muscle flexibility, and a plan of care was established. The patient's primary complaints and problems were pain, inability to run or to work out at the gym. At initial evaluation she was found to have aberrant movement during lumbar flexion, with decreased active range of motion, sitting and standing postural impairments, limited ability to sit due to increased pain, tight hamstrings and an increased body mass index. The goals established for this patient included decreasing pain and fear avoidance,

improving lumbar active range of motion, hamstring length, posture, Patient Specific Function Scale, Oswestry Disability Index, sitting tolerance, ability to run, move tables at work, and to increase participation in recreational and traveling activities. The main interventions used were lumbar stabilization exercises, postural reeducation, muscle length interventions (stretching) and education.

The patient achieved the goal of decreased pain by achieving a pain free state. She demonstrated a decrease in fear avoidance as measured by the Fear Avoidance Beliefs Questionnaire. The patient achieved increased active range of motion of the lumbar spine, hamstring length, and improved posture. She achieved her goals in impaired function based on the Oswestry Low Back Pain Disability Questionnaire, the Patient Specific Functional Scale, sitting tolerance, ability to jog, and to move tables at work. The patient met participation goals with the ability to participate in recreational activities including golf, and due to her improved sitting tolerance, was able to participate in travel by the end of her treatment. The patient was discharged to home with a home exercise program that included instructions for progression of exercises.

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Edward Barakatt, PT, PhD

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Chapter 1

General Background

Back pain is one of the most common medical conditions affecting people worldwide; it contributes to social and economic factors including disability and healthcare costs.[1,2] The annual cost of low back pain (LBP) in the United States is estimated to be 100 billion dollars.[3] One study defines LBP as discomfort between the 12th rib and the inferior gluteal fold.[2] Low back pain is diagnosed based on a person's report of symptoms for which there are numerous possible causes, making the condition difficult to treat.[4] Potential causes of LBP include problems with the lumbar vertebrae of the spinal column, dura, nerve roots, muscles, ligaments, annulus fibrosis, thoracolumbar fascia, and zygapophyseal joints.[5] About 15% of those with LBP develop chronicity, resulting in higher costs due to medical attention and sick leave.[6] The current prevalence of chronic LBP in the United States, defined as LBP lasting greater than 3 months, affects 15% to 45% of the middle aged population and the prevalence is increasing.[2] The incidence for chronic LBP for the general population is 35% to 79% at 12 months.[4]

Due to the unknown etiology of symptoms in patients with chronic LBP, many patients do not achieve relief of symptoms even though there are a variety of therapies available.[2] It has been shown that invalidation of people with chronic LBP, especially by their partners, is associated with pain related impairments.[1] Fear avoidance behaviors and distress about pain have also been shown to cause chronicity of LBP through inhibition of certain movements or disuse.[7] Biological, psychological, and social factors must be considered in order to understand and effectively treat chronic LBP.[1]

Non-modifiable risk factors for the development of chronic LBP include the presence of LBP-related genes, a family history, increased age, and a history of back pain.[2,4] Modifiable risk factors for the development of chronic LBP include posture, sedentary lifestyle, lack of education, poor nutrition, low socio-economic level, smoking, high alcohol intake, pregnancy, being over or under weight, heavy physical work or static work posture, chronic exposure to work related whole-body vibration, and psychosocial factors.[2,4]

Negative prognostic factors associated with recovering from chronic LBP include depression, a history of LBP, litigation issues and economic factors.[8] Psychological distress is also a prognostic factor and should be identified and addressed as soon as possible in order to prevent development of chronicity in LBP.[7] Positive prognostic factors include female gender, younger age, shorter symptom duration or acuteness of injury, lower baseline pain, employment status, intermittent pain, and a directional preference for extension.[9]

Drug interventions, exercise therapy, and psychosocial interventions are recommended treatments in various clinical practice guidelines for treating patients with chronic LBP.[3] It has been established that achieving successful outcomes is associated with categorizing patients with chronic LBP in clusters based on their symptoms.[10] This Treatment Based Classification (TBC) approach includes the following clusters: manipulation, stabilization, specific exercise, and traction.[10] Of those with lumbar segmental instability, 33% would benefit from a stabilization intervention.[11]

Chapter 2

Case Background Data

Examination – History

The patient was a 22-year-old female whose chief complaint was bilateral chronic LBP. The pain began over a year prior to her initial evaluation after sitting in a low, soft surface for a prolonged time. Initial pain was described as achy. When the patient woke the next morning, she described a pain intensity of 10/10 on the numeric pain rating scale (NPRS), and she was bed ridden for 2 weeks. The patient reported that ibuprofen, and alternating heat and ice did not ease her pain intensity. She described her constant and variable LBP as stabbing and tight with an intensity that ranged from 1-6/10 on the NPRS depending on aggravating factors. Aggravating activities included sneezing, lying supine, sitting for more than 15 minutes (pain gradually worsened over time), and performing sit-ups, which caused immediate 7/10 pain. The patient reported avoiding running, carrying trays or moving tables at work due to fear of pain onset. Walking and laying prone eased symptoms immediately to 1/10 pain intensity. The patient reported that stretching for the low back helped ease pain minimally; ice and heat for 10 minutes reduced pain to 4/10. The patient reported no trouble sleeping in a prone position.

The patient reported intermittent right posterior shoulder numbness and tingling that began about 6 months prior to her initial evaluation, which did not appear to be associated with her LBP. Onset occurred during sitting and was random in behavior, spontaneously disappearing after 2-5 minutes. Left heel pain, unassociated with LBP, began about 3 months prior to her initial evaluation; she described it as burning and

tender to touch, and reported stiffness after periods of inactivity. She was concerned that her pain was due to weight gain from not being physically active. She described her constant and variable heel pain as a 1-5/10 on the NPRS, with the heel pain worst with walking after immobility.

The patient's previous social history included waitressing, running, and working out at the gym. The patient's goals included reducing pain, and being able to sit, run, and participate in recreational physical activity without pain.

Systems Review

The patient's cardiopulmonary system was impaired by pre-hypertension based on her blood pressure of 135/90 mmHg. Resting heart rate was 72 beats per minute. Body mass index was calculated at 28.3 (height: 5'3" and weight: 160 lbs.), indicating that she was overweight. The patient's integumentary system was unimpaired upon observation. The patient's musculoskeletal system was impaired based on observation and included: increased tightness of the plantar flexors resulting in genu recurvatum in standing, slight anterior pelvic tilt, slight trunk rotation to the right, a patient self-reported diagnosis of scoliosis of the thoracic spine, pain with active motions of the lumbar and thoracic spine, internal rotation of the left hip more than the right during gait and decreased right hip extension during terminal stance. The patient denied recent fever, chills, infections, and changes in weight over the last 3-5 months. She reported a history of allergy-induced vertigo. The patient had age appropriate communication, orientation x3, and demonstrated proper behavioral responses. The patient lived at home with family.

Examination - Medications

Table 1

Medications

MEDICATION	DOSAGE	REASON	SIDE EFFECTS
Ibuprofen	400-600 mg every 4 hours (once per week or less)	Pain relief and inflammation	Constipation, diarrhea, gas or bloating, dizziness, nervousness, ringing in the ears, swelling, difficulty breathing, rash, loss of appetite, flu like symptoms, headache, confusion.[12]
Minocycline	Not available	Acne treatment	Nausea, vomiting, diarrhea, itching of the rectum or vagina, changes in color of skin, scars, nails, teeth or gums. Changes in color of tears or urine, ringing in your ears, hair loss, dry mouth, swollen tongue, sore or irritated throat, inflammation of the end of the penis, muscle pain, mood changes, numbness, tingling, or prickling sensation on skin.[12]

Chapter 3

Examination – Tests and Measures

The patient's deficits were categorized using the International Classification of Functioning, Disability, and Health (ICF) Model.[13] At the body structure and function (BSF) level, the Fear-Avoidance Beliefs Questionnaire (FABQ) was used to assess for fear avoidance, double inclinometry was used to assess active range of motion (AROM) of the lumbar spine; the NPRS was used to assess pain intensity; the straight leg raise (SLR) test was used to measure the flexibility of the hamstring muscles and to diagnose potential radiculopathy. At the activity level the Oswestry Low Back Pain Disability Questionnaire (ODI) and the Patient Specific Functional Scale (PSFS) were used to measure activity limitations. At the participation level, patient report was used to assess participation limitations. A clinical prediction rule (CPR) for stabilization exercise was used as a prognostic measure, and the prone instability test (PIT) was used to diagnose lumbar stability.

The FABQ tests for fear avoidance in patients with chronic LBP and contains a physical activity subscale (FABQ-PA) consisting of 4 items, and a work subscale (FABQ-W) consisting of 7 items. Each item is scored on a scale from 0-6 and the results are summed. Scores can range from 0 to 24 for the FABQ-PA subscale, and from 0-42 for the FABQ- W subscale.[14] An FABQ-PA score greater than 14 and an FABQ-W score greater than 34 are associated with higher likelihood of disability.[15] The minimal detectable changes at a 95% confidence level (MDC_{95}) for FABQ-PA and FABQ-W were

found to be 6.8 and 5.4, respectively.[16] These values indicate whether a true change occurred.

Lumbar flexion and extension AROM were assessed using two inclinometers, one placed at the 12th thoracic spinous process and the other at the 2nd sacral spinous process.[17] The sacral inclinometer value was subtracted from the thoracic inclinometer value to obtain the lumbar AROM.[17] This test has excellent intra-rater reliability with an interclass correlation of 0.87 (95% confidence interval (CI) of 0.74-0.94) for flexion and 0.91 (95% CI of 0.82-0.96) for extension.[18] The MDC_{95} values were calculated at 7.34^{o} for flexion and 6.39^{o} for extension.[18]

The NPRS is a 0-10 numerical scale used to assess pain intensity, with 0 indicating no pain, and 10 indicating the worst pain imaginable. For patients with LBP, the MDC_{95} has been established as a 2-point difference at a 4-week follow-up.[19]

The SLR test is positive when symptoms are reproduced during a passive motion of hip flexion with the knee fully extended. The SLR causes tension of both soft tissue and nervous tissue of the pelvis and lumbar spine. A positive SLR may indicate a radiculopathy in patients with LBP.[20] The MDC_{95} for right sided SLR was found to be 6.6^{o}, and 5.7^{o} for the left side.[21]

The ODI measures the severity of LBP in terms of disablement that is measured with scores ranging from 0-100%, with higher scores indicating worse disability.[22] It is a self-administered questionnaire with an MDC_{90} value of 10 points and a minimal clinical important difference (MCID)of 10.5 points.[22]

The PSFS measures specific activity limitations identified by a patient using a 0-10 numeric scale to indicate self-perceived ability, with a score of 10 meaning that the given activity can be done at the level it was done prior to injury. The MDC_{90} was found to be 3 points for any single activity, and 2 points for the average score (sum of each activity divided by the number of activities).[23]

The authors of a CPR for determining the prognosis of patients with LBP treated with stabilization exercises found that the following clinical characteristics are associated with a successful outcome: less than 40 years old, average SLR > 91º, presence of aberrant movements, and a positive PIT. When at least 3 of these criteria are met, the +LR was calculated to be 4, and the -LR was 0.52. From these values, a likelihood ratio nomogram was used to calculate that with a 33% pretest probability, the patient's posttest probability of success with stabilization intervention was 66%. The 33% pretest probability represents those with lumbar segmental instability that would benefit from stabilization intervention.[11]

The PIT is a diagnostic test for presence of instability in the low back. Hicks et al reports a kappa reliability coefficient of 0.87 (95% CI 0.80-0.94) for identifying patients with lumbar segmental instability.[11] It is considered positive when pain occurs during provocation testing (posterior anterior pressure on the lumbar vertebrae) with the lumbar extensor musculature relaxed, and the pain does not occur with provocation when a person activates the lumbar extensor musculature.[24] The PIT has a 0.61 sensitivity and a 0.57 specificity for identifying presence of instability as determined with radiologic diagnosis; from these values a positive likelihood ratio of 1.41 and a negative likelihood

ratio of 0.69 were calculated. This indicates that there is a negligible shift in posttest probability that the person has spinal instability when the test is positive, and that there is a negligible shift in probability that the person does not have spinal instability if the test is negative.[25]

Table 2

Examination Data

BODY FUNCTION OR STRUCTURE		
Measurement Category	Test/Measure Used	Test/Measure Results
Fear-Avoidance behavior	FABQ	Work subscale: 17 (40.5%) = Moderate fear avoidance Physical activity subscale: 17 (70.8%) = High fear avoidance
AROM: Lumbar flexion Lumbar extension	Double inclinometer	Lumbar flexion: 60º with 2/10 P Lumbar extension: 20º with 3/10 P
Pain intensity: -Best pain -Worst pain	NPRS	1/10 P best pain 6/10 P worst pain
Hamstring length	SLR measured with goniometer	R: 78º limited by onset of LBP L: 102º negative for reproduction of symptoms
Instability of lumbar spine	PIT	Positive
Aberrant motion of lumbar spine	Observation	Presence of aberrant movement in lumbar flexion
Posture- standing and sitting	Observation	FHP, increased tightness of the HS and PF resulting in genu recurvatum, slight anterior pelvic tilt, slight trunk rotation to the right, slight lateral flexion of thoracic spine, increased lumbar lordosis
FUNCTIONAL ACTIVITY		
Measurement Category	Test/Measure Used	Test/Measure Results
Severity of LBP in terms of disablement	ODI	30% = Moderate disability
Functional ability to perform specific activities	PSFS	2.4 (76%) = Impaired function
Limited sitting	NPRS and patient report	Sitting for 15 minutes causes 4/10 P
Ability to run	Patient report	Unable to perform due to fear of symptom onset
Ability to move tables	Patient report	Unable move tables at work due to fear of symptom onset
PARTICIPATION RESTRICTIONS		
Measurement Category	Test/Measure Used	Test/Measure Results
Recreation	Patient report	Inability to work out at the gym
Travel	Patient report	Inability to travel long distances due to amount of time spent in sitting

FABQ – Fear-avoidance Beliefs Questionnaire, AROM – active range of motion, P – pain, NPRS – Numeric Pain Rating Scale, SLR – straight leg raise, R – right, L – left, LBP – low back pain, PIT – prone instability test, FHP – forward head posture, HS – hamstrings, PF – plantar flexors, ODI – Oswestry Low Back Pain Disability Questionnaire, PSFS – Patient Specific Functional Scale

Chapter 4

Evaluation

Evaluation Summary

The patient was a 22-year-old female who presented with severe, constant variable, and irritable chronic LBP that she had experienced for more than one year. The patient complained of a bilateral, central, stabbing and tight pain in her lower back that initially began as an ache. The patient was limited in AROM of the lumbar spine, had impaired motor control, sitting and standing posture, and limited ability to be in sitting. She met 3 of the 4 criteria for the CPR proposed by Hicks et al. indicating that she would benefit from stabilization exercises. Her impairments limited her ability to sit for prolonged periods, run, or move tables, which further limited her ability to participate at work, in recreational physical activities, and to travel long distances.

Diagnostic Impression

The patient's presentation was consistent with the medical diagnosis of chronic LBP, which resulted in problems in all three levels of the ICF model. She fit the criteria for the stabilization in both a CPR and in a broader context, the TBC for stabilization, both of which guided the treatment approach used in this case. In addition to her pain, the patient was limited in lumbar range of motion, right hamstring length, motor control, and posture, which created activity limitations in sitting for more than 15 minutes, running, or moving tables. These BSF impairments and activity limitations contributed to her inability to participate in recreational physical activities (sports/gym), travel long distances, and to work as a waitress at the participation level.

Prognostic Statement

The positive prognostic factors for this patient included that she had a desire to decrease her pain symptoms, she was young, in good general health, and had good adherence to her home exercise program. The patient also met the criteria for a CPR addressing LBP with stabilization interventions indicating that she has a 66% likelihood to have a successful outcome.[11] Her negative prognostic factors included being overweight, a high score on the FABQ, a long duration of symptoms, and her female gender. Overall, the patient was expected to achieve significant improvements in pain and functional ability.

G-Codes

Current with modifier: G8978 CJ (based on ODI of 30%)

Goal with modifier: G8979 CI (based on ODI)

Discharge Plan

The patient was to be discharged to continue living at home independently with a home exercise program.

Chapter 5

Plan of Care-Goals and Interventions

Table 3

Evaluation and Plan of Care

PROBLEM	PLAN OF CARE Short Term Goals (Anticipated Goals) (3 weeks)	Long Term Goals (Expected Outcomes) (6 weeks)	Planned Interventions Interventions are Direct or Procedural unless they are marked: (C) = Coordination of care intervention (E) = Educational intervention
BODY FUNCTION OR STRUCTURE IMPAIRMENTS			
FABQ: (W) = 17 (PA) = 17	FABQ: (W) = 10 (PA) = 12	FABQ: (W) = 4 (MDC = 6.8) (P) = 9 (MDC = 5.4)[16]	• (E): Patient educated on concept of "motion is lotion". • Encouragement to return to activities was gradually provided.
AROM Lumbar flexion = 60º with 2/10 P Lumbar extension = 20º with 3/10 P	AROM Lumbar flexion = 64º with 1/10 P Lumbar extension = 23º with 1/10 P, no clinically meaningful change expected	AROM Lumbar flexion = 68º with 0/10 P (MDC = 7.34º)[18] Lumbar extension = 27º with 0/10 P (MDC = 6.39º)[18]	• Improvement in ROM expected with decrease in P addressed with stabilizing exercises. • R hamstring stretching 3x30 seconds in standing with LE propped up on chair. • Pelvic tilts 2x10 with added progressions including marching, and addition of engaging core with alternating shoulder flexion and extension in combination with marching.
Pain intensity: Best pain and worst pain	NPRS for best pain: 0/10 P; Worst pain 4/10 P	NPRS for best pain: 0/10 P; Worst pain 2/10 P	• Diaphragmatic breathing "calming the NS" • Stabilization exercises including pelvic tilts progressed to adding marches in addition to holding pelvic tilt, quadruped with alternating shoulder flexion with arm reaching ear level and holding 3 seconds, emphasis on slow and control to prevent rotation of the pelvis and engage all core stabilization musculature, progressed to alternate LE's, then UE's in combination with LE's. Dead bug with pelvic tilt progressed

			with light weights in hands. Superman back extension exercise in prone performed by lifting chest and legs up off mat and held for 3 seconds. All performed for 2 sets of 10.
Hamstring length: SLR R: 0-78º with onset of LBP	Hamstring length: SLR R: 0-80º with no onset of LBP, no clinically meaningful change expected	Hamstring length: SLR R: 0-82º with no onset of LBP (MDC = 6.6º)[21]	• Hamstring stretching: 3x30 seconds each side in standing twice per day, using table or chair to rest LE on, and leaning forward and holding, slight increase in stretch with exhalation. (added to HEP for increase in frequency)
Aberrant movement: lumbar flexion	Observation of improved motion during lumbar flexion	Observation of no aberrant motion during lumbar flexion	• See interventions above
Posture- Standing and sitting	Observation of improved sitting posture, and patient report of increased awareness of sitting and standing posture.	Observation of good sitting and standing posture, with patient report of constant awareness of sitting and standing posture.	• (E): Education was provided for posture in standing and sitting, patient made aware of forward head posture, and proper body alignment, hyperextension of LE's, foot pronation and internal rotation, body mechanics during functional tasks, the effects of being overweight, the need for supportive shoe wear, and the importance in adherence to HEP, diet, and stress reduction to address blood pressure. • Adjustment of driver's seat in vehicle to prevent excess hip flexion and forward head posture, small towel roll used to support natural curvature of spine and hip alignment was encouraged with foot placement. • Seated rows with green TheraBand to help with rounded shoulder posture, 3x15 twice per day. Progressed to thicker band, blue then black. • Cervical retractions 3x10 held for 5 seconds twice per day (HEP) • Foot arch exercise to address excess pronation bilaterally performed with towel crunches

			3x10 bilaterally once per day. (HEP) Super feet shoe inserts recommended due to excessive pronation. • Clam shells 3 sets of 10 held for 3 seconds twice per day each to address weak external rotators contributing to poor posture alignment.
ACTIVITY LIMITATIONS			
ODI 30%	Improve ODI to 25%, no clinically meaningful change expected	Improve ODI to 20% (MDC = 10%)[22]	• (E): Education on body mechanics see below. • See above and below.
PSFS 2.4 = impaired function	Improve PSFS to 3.5, no clinically meaningful change expected	Improve PSFS to 5.4 (MDC = 3 points)[23]	• Continuous sitting posture observation and education with driver seat adjustments made addressing limited ability to sit. HEP included instructions to prevent posterior pelvic tilt, rounded shoulders, and forward head. • Shoulder internal and external rotations done with yellow TheraBand for rotator cuff strength, and to help with performance of quadruped exercises. • See above interventions.
Limited sitting (4/10 LBP after 15 minutes)	Limited sitting (2/10 LBP after 30 minutes)	Limited sitting (1/10 LBP after 45 minutes) (MDC for NPRS = 2)[19]	• Sitting posture education with driver seat adjustments. • Posture exercises see above. • Stabilizing interventions see above.
Unable to run	Jog for 3 minutes	Run for 5 minutes	• Encouragement to begin with longer walks, then light jogging, then add 30 seconds of running while respecting pain to work towards goal of running.
Unable to move tables at work	Able to move chairs	Able to move a table short a distance	• (E): Lifting technique addressed with education and training for keeping good posture, using leg strength, bending at the hips, and keeping weight closer to self to enhance body mechanics. • Bridges 2x10 for glute and hamstring strengthening, progressed to single leg, and

			combination with supine clam shell with TheraBand around knees, progress TheraBand thickness.
PARTICIPATION RESTRICTIONS			
Unable to participate in recreational activities	Able to perform seated rows and other HEP exercises	Able to go to the gym or play a sport	• Simulation of favorite gym machines including rows, and shoulder exercises. Added to HEP • Walking program with progression towards running • See interventions above.
Unable to travel long distances	Able to drive 25 minutes to the grocery store with 1/10 LBP	Able to drive 45 minutes to school without pain	• See sitting posture interventions above. • See stabilization exercises above.
ODI: Oswestry Low Back Pain Disability Questionnaire, MDC: minimal detectable change, LE: lower extremity, UE: upper extremity, HEP: home exercise program, AROM: active range of motion, P: pain, SLR: straight leg raise, LBP: low back pain, R: right, L: left, PSFS: Patient Specific Functional Scale, NPRS: Numeric Pain Rating Scale, FABQ: Fear Avoidance Beliefs Questionnaire, (W): work subscale, (PA): physical activity subscale.			

Plan of Care – Interventions

See Table 3.

Overall Approach

The TBC was used to classify this patient into a stabilization approach during this course of physical therapy. Treatments included stabilization exercises, postural reeducation, motor control, and education for improved body mechanics to alleviate pain. An impairment-based approach, with task specific training for posture during functional activities, and education on pain science were used in this course of physical therapy. Stabilization exercises were increased in type, frequency and vigor. There was emphasis on proper sitting posture and body mechanics during functional activities. The patient's functional abilities were to be improved gradually in a weekly physical therapy treatment for 6 weeks.

PICO question

For a woman with chronic low back pain **(P)**, is segmental stabilization **(I)** more effective than strengthening of superficial trunk muscles **(C)** to decrease pain and disability **(O)?**

In a comparative study (Pedro level: 7/10), authors included 30 subjects who were randomly assigned to either a segmental stabilization group, or a superficial trunk muscle strengthening group. Superficial trunk muscles included the rectus abdominus, internal and external obliques and the erector spinae. The segmental stabilization group performed exercises addressing the transverse abdominus and the multifidus. The study was conducted for 6 weeks with 30-minute sessions, twice per week. The study had the following inclusion criteria: chronic LBP, willingness to participate, and no cognitive impairments. The ODI was used as an outcome measure for functional disability, and a pressure biofeedback unit was used to measure transverse abdominus muscle activation capacity.[26]

The authors found that both treatments relieved pain and improved disability, however, the segmental stabilization group showed significantly higher improvements for every variable tested. Limitations of the study included a small sample size, no intermediate or long-term follow up examinations, and psychosocial issues among subjects were not taken into consideration. The characteristics of the patient described in this case study met the inclusion criteria for this study. Due to the success of the segmental stabilization exercises in this study, they were included in this patient's treatment.

Chapter 6

Outcomes

Table 4

Outcomes

OUTCOMES				
BODY FUNCTION OR STRUCTURE IMPAIRMENTS				
Outcome Measure	Initial	Follow-up (DC)	Change	Goal Met? (Y/N)
FABQ	(W) = 17 (PA) = 17	(W) = 12 (MDC= 6.8) (PA) = 5 (MDC= 5.4)[16]	(W) = 5 (PA) = 12	(W) = No (PA) = Yes
AROM	F: 60º with 2/10 P E: 20º with 3/10 P	F: 70º with 0/10 P (MDC = 7.34º)[18] E: 35º with 0/10 P (MDC = 6.39º)[18]	F: 10º E: 15º	Yes Yes
NPRS	Best pain: 1/10 Worst pain: 6/10	Best pain: 0/10 Worst pain: 0/10	Pain free state	Yes
SLR	R: 0-78º with onset of LBP	R: 0-85º with no onset of LBP (MDC = 6.6º)[21]	R: 7º	Yes
Aberrant movement with lumbar flexion	Present upon observation	Not present upon observation	No longer present	Yes
Posture in sitting and standing	Impaired sitting and standing posture upon observation	Improved sitting and standing posture upon observation	Improvement	Yes
ACTIVITY LIMITATIONS				
Outcome Measure	Initial	Follow-up (DC)	Change	Goal Met? (Y/N)
ODI	30%	14% (MDC = 10%)[22]	16%	Yes
PSFS	2.4	6.6 (MDC = 3 points)[23]	4.2	Yes
Limited Sitting (NPRS)	Sitting for 15 minutes causes 4/10 P	Able to sit for 45 minutes with 0/10 P (MDC for NPRS = 2)[19]	4	Yes
Ability to run	Unable to run	Able to jog	Increased ability to run	Yes
Ability to move tables at work	Unable to move tables at work	Able to moves tables at work without pain	Increased ability to move tables at work	Yes
PARTICIPATION RESTRICTIONS				
Outcome Measure	Initial	Follow-up (DC)	Change	Goal Met? (Y/N)
Ability to participate in	Unable to participate in	Able to participate in golfing for 2 hours with no symptoms of LBP	Increased ability to participate in recreational activities.	Yes

recreational activities	recreational activities			
Ability to travel long distances	Unable to travel more than 15 minutes due to onset of LBP	Able to sit through 45-minute car ride with no LBP	Ability to travel longer distances without symptoms	Yes
ODI: Oswestry Low Back Pain Disability Questionnaire, MDC: minimal detectable change, AROM: active range of motion, SLR: straight leg raise, P: pain, LBP: low back pain, R: right, F: flexion, E: extension, PSFS: Patient Specific Functional Scale, NPRS: Numeric Pain Rating Scale, FABQ: Fear Avoidance Beliefs Questionnaire, (W): work subscale, (PA): physical activity subscale				

Discharge Statement:

The patient was seen in an outpatient physical therapy clinic for 5 sessions once a week for 6 weeks. She received stabilization, strengthening, and stretching exercises, motor control training, postural reeducation, education on shoe wear, the benefits of movement, and body mechanics. The patient also received an individualized home exercise program. The patient's chief complaint was LBP that prevented her from being physically active and limited her ability to participate in her normal job demands as a food server. The patient experienced complete relief from LBP. She improved AROM in the lumbar spine with no associated pain, she demonstrated a negative SLR, and she achieved an MDC on every outcome measure performed including the ODI, the FABQ (except for the work subscale), and PSFS. The patient reported being able to jog at 7-minute bouts alternating 3-minute walks for a total of 30 minutes, play golf, and drive (seated) for 45 minutes without any symptoms. The patient was discharged with a progressed HEP addressing stabilization, flexibility, and a jogging program. The patient reported understanding of the importance of continued stabilization exercise and physical activity to prevent recurrence.

DC G-Code with modifier:

G8979 CI (Based on ODI)

Chapter 7

Discussion

In a patient with a similar presentation, a TBC approach should be used given its success in the current patient case. The patient achieved nearly all clinical goals, and more importantly, she achieved her personal goals of reducing her pain, and restoring her participation in recreational physical activities. The patient was able to drive at least 45 minutes without any symptoms, return to limited running, and participate in a full game of golf without any symptoms by the end of her plan of care. She expressed confidence that she would be able to maintain her pain free status with continued exercise, and application of postural reeducation.

Effective interventions were the following: stabilization exercises, postural reeducation, motor control and individualized HEP, and education (including re-teaching of HEP exercises). The patient demonstrated excellent adherence to her HEP and she retained education very well, both of which contributed to her positive outcomes.

The patient did not meet the MDC for the FABQ (W). This may have been attributed to the increased need for reassurance of her ability to work and the need for increased education regarding fear avoidance. The patient had a very busy life at the time of treatment. She was a full-time server and a student; she canceled her sessions twice. The patient may have been able to achieve her outcomes sooner if she had more frequent consecutive visits (2 times per week for 2 or 3 weeks). This may have also made a difference in her perceived ability to work and had an impact on her fear avoidance. Performing exercises in the clinic seemed to help her realize she was capable of more

than she thought. This began happening more as exercises were progressed. If she was seen more frequently she would have been progressed sooner and impacted her perceived ability to participate in work. Due to the nature of her busy schedule, the patient may have also benefitted from further interventions in teachings about mindfulness and self-care. Although the patient was educated with diaphragmatic breathing, she may have benefitted further if more time was spent discussing the importance of application. In the future, spending more time ensuring that the patient understands the nature of chronic LBP, normal tissue healing, and incorporating increased mindfulness in addition to the diaphragmatic breathing techniques should be used when seeing patients with a similar clinical presentation.

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