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Conservative Physical Therapy Treatment for Posterolateral Derangement of the Lumbar Spine: A Case Report

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CONSERVATIVE PHYSICAL THERAPY TREATMENT FOR
POSTEROLATERAL DERANGEMENT OF THE LUMBAR SPINE: A CASE
REPORT

by

James Muir

A Scholarly Project Submitted to the Graduate Faculty of the
Department of Physical Therapy
School of Medicine
University of North Dakota
in partial fulfillment of the requirements for the degree of
Doctor of Physical Therapy

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

(Graduate School Advisor)

(Chairperson, Physical Therapy)

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Title Conservative Physical Therapy Treatment for Posterolateral
Derangement of the Lumbar Spine: A Case Report

Department Physical Therapy

Degree Doctor of Physical Therapy

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ABSTRACT

Background and Purpose: The McKenzie approach to the treatment of low back pain has been shown to be an effective tool in reducing disc derangements. The purpose of this study was to demonstrate the effectiveness of stabilization exercises in conjunction with McKenzie techniques for the treatment and management of a patient with posterior lumbar disc derangement.

Case Description: A 25-year-old male suffered acute low back pain with intermittent leg pain radiating down to the dorsum of his right foot. After the assessment using McKenzie principles was performed, it was determined that the patient's directional preference was with extension. The patient was seen a total of 13 visits which included repeated lumbar extension with hips shifted to the left, lumbar stabilization exercises, and patient education.

Outcomes: The patient showed increased range of motion with extension in prone with hips shifted to the left, decreased pain, he returned to prior level of function, and was able to meet all of his short-term and long-term goals within 4 weeks.

Discussion: The patient demonstrated how individuals with low back pain can decrease their symptoms rapidly if a directional preference can be determined and proper physical therapy exercises are given for the patient's exercise program. This case study adds to the growing body of literature that supports the

use of McKenzie principles and lumbar spinal stabilization exercises for the treatment and management of low back pain caused by lumbar disc herniations.

CHAPTER I

BACKGROUND AND PURPOSE

It is reported that 5.6% of US adults experience low back pain every day, with 60-70% of all US adults experiencing low back pain at some point in their lives.¹ The total societal cost of back pain in the US was estimated to be at \$75 to \$100 billion in 1990.¹ Low back pain is an ever present problem in the US, making it difficult to diagnose and to treat effectively. There are many structures within the low back that can contribute to low back pain. The structures included are the ligaments, fascia, muscles, intervertebral discs, facet joints, and nerve root dura. All of these structures work together to maintain posture and allow for mobility. Schwarzer et al^{2,3,4} found that in people with low back pain, 39% of the cases were attributed to intervertebral discs, 15% to 40% from facet joints, and 30% to the sacroiliac joint. Due to the amount of structures within the low back that could contribute to low back pain, it makes it difficult to determine exactly the cause of many patients' low back pain.

Low back pain can originate from all of the structures that were mentioned above because of the presence of nociceptors. It was found that a tear in the annulus of the disc produces vascularized granular tissue with an increase in nerve fibers. With an increased amount of granular tissue, it was found that an increase in pressure within the disc caused pain.⁵

McKenzie classified 3 different classifications of low back pain: derangement, dysfunction, and postural. A derangement can occur from a malalignment of intervertebral discs, facet joints, or joint surfaces. McKenzie classified 7 different types of derangements. Table 1 shows the 7 different classifications of a derangement. Repeated movements are used to determine a directional preference, which is the direction in which the patient moves that decreases symptoms.⁶ The repeated movement into the direction of preference is thought to reduce the pain because of the realignment of structures back to their normal physiological state.⁶ If the patient's symptoms are decreased when they are performing repeated movements in their direction of preference, it is thought that they are reducing the derangement, thus decreasing pain. This is called centralization, which occurs when pain that is traveling down the extremity goes back towards the midline or proximally towards the low back. Centralization was correlated with good overall outcomes, greater reduction in pain intensity, higher return to work rates, greater functional improvement, and less continued healthcare usage.^{7,8,9} If the repeated movement performed by the patient makes their symptoms worse by traveling into the extremity or going further down the extremity, this is called peripheralization. If peripheralization occurs, that movement needs to be stopped and avoided because the movements that are being performed are causing further herniation of the disc, which in turn increases the symptoms that are traveling down the lower extremity. A study by Albert et al⁹ found that subjects who shown signs of peripheralization and centralization during the use of McKenzie exercises had good outcomes. The

patient population in this study had considerable current leg pain at baseline and 65% had 3 or 4 out of 4 positive root compression signs; 84.8% were able to centralize there pain.

A dysfunction occurs when there is a stress put on shortened structures. For example, overstretching of the low back extensors can cause some microtearing of the muscle fibers causing back pain, a classification known as dysfunction. With a dysfunction there is some loss in range of motion (ROM) into the direction that puts a stress on the injured tissue. The reason this can become a chronic issue is that people who have injured their low back tend to guard against movements that cause them pain, resulting in a shortening of the tissue and also the accumulation of scar tissue. The treatment of a dysfunction starts with determining the direction which has a limitation in ROM. From there the focus is on performing repeated movements and stretching of the tissue into the direction of limitation. The goal is to restore the normal length of the tissue and also to breakdown the scar tissue and to re-align back to a normal configuration.

A postural classification can be defined as a prolonged stress and overstretching of normal tissues. This will cause pain when a person is in a posture that puts stress on tissues surrounding the spine for a prolonged amount of time. The pain is typically resolved once the person is back in normal postural position, where there is a normal stress on the normal tissue. See Table 1.

Table 1. Classification of Lumbar Derangements. ⁶			
Classification	Area of Back Pain	Buttock and Thigh Pain	Deformity and Leg Pain
Derangement one	Central or symmetrical pain across L4-5	Rarely buttock or thigh pain	No deformity
Derangement two	Central or symmetrical pain across L4-5	With or without buttock and/or thigh pain	With deformity of Lumbar kyphosis
Derangement three	Unilateral or symmetrical pain across L4-5	With or without buttock and/or thigh pain	No deformity
Derangement four	Unilateral or asymmetrical pain across L4-5	With or without buttock and/or thigh pain	With deformity of Lumbar scoliosis
Derangement five	Unilateral or asymmetrical pain across L4-5	With or without buttock and/or thigh pain	With leg pain extending below the knee
Derangement six	Unilateral or asymmetrical pain across L4-5	With or without buttock and/or thigh pain	With leg pain extending below the knee and scoliosis
Derangement seven (anterior derangement)	Symmetrical or asymmetrical pain across L-4-5	With or without buttock and/or thigh pain	With deformation of accentuated Lumbar lordosis

Low back pain can present as many different types of pain, or signs and symptoms, ranging from mild to severe back pain or sharp shooting pain radiating into the lower extremities. In the clinical setting, proper interventions based on the patient's directional preference must be used by the physical therapist based on the signs and symptoms of the patient.

The McKenzie method of treatment for low back pain is based on repeated movements in specific directions to determine a specific direction in which symptoms are decreased. This is called directional preference. McKenzie exercises can reduce low back pain in just a few treatment sessions; but without other interventions, long-term maintenance can easily be ruined from utilizing bad posture and poor body mechanics, which can lead to the recurrence of low back pain. Research has found that when there is an injury to the low back, the multifidus will shrink by 25% and not activate normally.¹⁰ The multifidus is a key player spinal stability. For proper activation of the multifidus, stabilization exercises are used. To help prevent further injury of the low back, lumbar stabilization exercises are thought to be effective in conjunction with the use of McKenzie principles. A study by Miller et al¹¹ concluded that patients who were given only stabilization exercises showed statistically significant decreases in pain scores, along with an increase in the SLR range of motion on the involved lower extremity. The patients who received only McKenzie exercises showed a statistically significant decrease in pain scores only. These results show that it may be beneficial to use both McKenzie methods along with a stabilization exercise program.

A randomized controlled trial¹² looked at 230 subjects with low back pain that demonstrated directional preference. Subjects were arranged into groups that either were given exercises that matched the subjects direction of preference or exercises that were opposite of direction of preference. It was found that exercises in concordance with subjects' direction of preference significantly

improved outcomes compared to exercises not in concordance to direction of preference. In addition, a systematic review¹³ of the efficacy of McKenzie therapy for subjects with low back pain had shown that subjects receiving McKenzie-based therapy resulted in a greater decrease in pain and disability in the short term when compared to other conservative interventions.

Research has shown that the proper activation of the transverse abdominis and multifidus muscles are key players in the stabilization of the lumbar spine.¹⁰ If these muscles are injured, there is a delay in the activation of these muscles. In a person without injury, these muscles activate before other muscles in the back providing adequate stabilization of the spine. Research has also shown that exercises focused on properly activating the transverse abdominis and multifidus increase spine stability, reduce pain, and disability in patients.¹⁰

The purpose of this case report is to show the effectiveness of spinal stabilization exercises along with the use of McKenzie principles in the treatment of a posteriolateral lumbar disc herniation with radicular symptoms.

CHAPTER II

CASE DESCRIPTION

A 25-year-old male received physical therapy for low back pain which spread from his low back into his right buttock with radiating pain that traveled down to the anterolateral part of his leg and the dorsum of his foot. His injury occurred while at work as a beverage distributor. The patient's job required a lot of heavy lifting. He had stated that he injured his back when he was lifting a heavy keg. He immediately had pain in his back along with shooting pain down his leg. Before coming to therapy he had been taking some over-the-counter pain medication, used ice on his low back, and refrained from activities that increased his symptoms. His back pain limited some activities of daily living such as performing his job, bending forward to try to pick up objects, getting out of bed in the morning, and sitting for long periods of time. He described his pain as shooting down his leg along with tingling in his anterolateral thigh, leg, and dorsum of his foot. Pain was rated using a 0 to 10 pain scale (0=no pain, 10=excruciating pain). The patient rated his pain at a 3 to 4/10 upon entering therapy with intense pain as high as 10/10 with movements such as flexing forward and lifting objects. He also stated that his pain is 2/10 at its best. This occurs when he is lying down on his back; lying on his stomach also provides him relief of his pain.

Examination, Evaluation, and Diagnosis

At the time of the initial evaluation the patient filled out a modified Oswestry Low Back Pain and Disability Index questionnaire in which the patient scores 10 sections regarding pain with functional movements, daily activities, sleep behavior, and leisure pursuits. The reliability and validity (90% and 83%) of the Oswestry Low Back Pain and Disability Index questionnaire has been demonstrated in a 2001 study by Fritz.¹⁴ The 10 sections have 5 possible answers with each answer option assigned to a given point value from 0 to 5. The points from each section are tallied and then divided by the maximum number of points possible for the number of questions answered by the patient. The resulting number is then multiplied by 100 to give the percentage of disability. On the initial evaluation, the patient's Oswestry score was 36% disability, which indicated moderate level of disability.

The patient's medical history revealed no relevant concerns or previous episodes of back pain. There were no significant findings from family medical history. The patient was single and lives by himself. The patient states that he was fairly healthy, yet that he did smoke cigarettes. The patient was fairly active, most of his activity being done at work as a beverage distributor. As a beverage distributor, the patient was very active for at least 8 hours per day for 5 days per week. The activities that he is to perform during work are mostly lifting and carrying of kegs and cases of beverages. The patient was very motivated to be able to return back to being able to perform all functional activities and also to return back to work.

On observation, no swelling or erythema was noted in the lumbar region. He had a good sitting posture with normal lumbar lordotic curve. On palpation, no pain was noted on lumbar region bilaterally. Range of motion was tested for lumbar flexion, left and right rotation, and left and right side-bending. Formal measurements were not taken while testing the patient's range of motion. On examination, the active range of motion test of lumbar spine revealed pain, increase in peripheral symptoms, and a minimal loss of range of motion in flexion, while in the standing position. When measuring the patient's forward flexion I measured the distance of the patient's fingers from the floor. After examination of the finger-to-floor test, it was found that his fingers were 4 inches from touching the floor. Finger-to-floor distance test was found to have sensitivity and specificity of (45% and 74%, respectively) according to study from Vroomen et al.¹⁵ There was also a minimal loss in extension in standing with an increase in right low back pain. There was no loss of motion or pain with left side-glide and an increase in left low back pain with minimal loss of motion when the patient performed the right side-glide. Lumbar lower extremity myotomes (L1 to S2) were assessed bilaterally and revealed weakness with dorsiflexion and great toe extension on the right. All other myotomes measured normal. Manual muscle testing revealed a 4-/5 grade for tibialis anterior and extensor hallucis longus on the right side. Patellar and Achilles reflexes were normal bilaterally. The patient was also tested using the slump test, which was positive for neural tension bilaterally, but the pain was more intense in the right lower extremity. One study had shown that the slump test has a sensitivity and specificity of (84% and 83%,

respectively).¹⁶ In this same study the straight leg raise test was found to be useful in differential diagnosis and in the diagnosis of larger herniations that may require surgery with a sensitivity and specificity of (52% and 89%, respectively).

The McKenzie principles were then applied to the patient to determine what motion would produce an improvement of his symptoms. The first thing that I had the patient perform was 10 repetitions of prone press-ups. After the patient completed the 10 repetitions he stated that his symptoms had decreased slightly. The pain that was shooting all the way down to his foot had moved up only into his thigh. This was a good sign, indicating that extension of the lumbar spine was reducing the patient's lumbar derangement. Since, I had a good response with prone press-ups, but not a really drastic change in symptoms I decided to try having the patient perform prone press-ups with his hips shifted to the left. When the patient completed the 10 repetitions in prone with hips shifted to the left, he had more of a decrease in peripheral symptoms and a slight increase in central low back pain. According to McKenzie⁶ there can be an increase in central back pain during the centralization of distal symptoms, which is an indication to continue with the selected treatment. This again was a good sign since the peripheral symptoms were centralizing. Even though there was an increase in central low back pain, this does not signify a need to stop the activity. The fact that there is centralization of symptoms means that I was having the patient perform the correct movements to reduce the derangement. From this assessment it was found that extension with hips shifted to the left (shoulders to the right) was the direction of preference. It was found that the patient required

frontal plane interventions to completely alleviate symptoms. This means that there is a relevant lateral component. Santolin¹⁷ was able to achieve an Oswestry score of 0% disability by using the extension directional preferences principles.

From the examination findings, the patient's symptoms were consistent with a posterolateral lumbar derangement with radicular symptoms. The practice patterns that were determined for this patient were 4D: Impaired Joint Mobility, Motor Function, Muscle Performance, and Range of Motion Associated With Connective Tissue Dysfunction and 4F: Impaired Joint Mobility, Motor Function, Muscle Performance, Range of Motion, and Reflex Integrity Associated with Spinal Disorders.

Prognosis and Plan of Care

The prognosis of this patient was good due to his young age, motivation level, and the lack of any significant past medical history. Initially the fact that his pain was radiating below the knee would be an indicator of possibly having a poorer outcome. Kilpikoski²¹ found that leg pain at the onset is associated with poorer outcomes and greater likelihood of developing chronic symptoms. During the initial evaluation he was very attentive asking many questions about his condition. He seemed very motivated and eager to start therapy. At the end of the initial evaluation he seemed to have a good understanding of the information that I had given him. The short-term goals for the patient were to decrease Oswestry questionnaire score from 36% to 20% disability, have full AROM, pain of only 2/10 or less in 6 visits, to be able to perform home exercise program

(HEP) for pain relief and understand precautions in 4 visits, and to have the ability to bend forward and lift more than 10 lbs without symptoms. Long-term goals for the patient were to return to full unrestricted activities without symptoms in 6 weeks, be able to complete ADL's pain free in 6 weeks, and be able to lift a full keg with no pain reproduction in 6 weeks.

The plan of care for this patient was to treat according to McKenzie principles for lumbar derangement. From what was found during the initial evaluation, it was determined that there was a directional preference of lumbar extension in lying with hips shifted to the left. Since a directional preference was found, a continuation of extension in lying with hips shifted to the left until symptoms no longer show any improvement was instituted. When extension in lying with hips shifted to the left ceased to improve symptoms, manual overpressure was provided while patient performed repeated movements and symptoms began to centralize. Lumbar stabilization exercises were added along with McKenzie exercises. Additional interventions included cold packs for inflammation and electrical stimulation to decrease pain after each session. Patient education was also given during each visit to make any changes to the HEP. For any questions the patient may have had, he was given a phone number of the clinic.

CHAPTER III

INTERVENTION

Treatment began after the initial evaluation. Following the examination and evaluation, the patient was instructed to perform 10 repetitions of prone pressups with hips shifted to the left. This was to be done every 2 hours throughout the day. Patient education was another important piece to the treatment of the patient. Education was given for proper posture and lifting techniques, as well as improper techniques, to minimize the risk of further injury. After the first treatment the patient was set up on electrical stimulation to help alleviate back pain. Four electrodes were placed on the patient's low back on each side of the spine, covering the erector spinal muscles. Two electrodes were placed at the level of the posterior superior iliac spine (PSIS) and the other two were placed approximately 6 to 7 inches above the other electrodes. The electrodes were aligned as to produce a crossing effect, covering a greater area. The top two electrodes were negative and positive and the bottom two were also negative and positively charged. With this orientation the electricity will travel in a crossing pattern. The electrical stimulation was applied for 15 minutes. Patient

education was given again to perform 10 repetitions of prone pressups with hips shifted to the left every 2 hours while at home. If there were any increases in pain, the exercises were to be stopped until further evaluation at the next therapy visit.

In the second session, the patient reported a decrease in his radicular symptoms with the current protocol and was instructed to continue performing prone pressups with hips shifted to the left. In addition to repeated movements, the patient was given therapeutic exercises for lumbar stabilization to help strengthen the core muscles. The lumbar stabilization exercises consisted of light resistance training that targeted the multifidus, transverse abdominis, and other abdominal muscles. Since it has been found that a disc herniation injury causes atrophy and inactivity of the multifidus muscle, it's beneficial to incorporate stabilization exercises to reactivate the multifidus to its normal function.¹⁰ The beginning of the session started with a re-evaluation of AROM. Prone pressups were performed to make sure there was no recurrence of disc herniation. Also, questions on the level of pain and overall function were asked. The patient reported some mild muscle fatigue due to the spinal stabilization exercises. After that the patient would ride the stationary bike as a warmup for 10 minutes and then performed 2 sets of prone pressups with hips shifted to the left. Lumbar stabilization exercises performed during the second session included bridging, straight arm pull downs (SAPD), push pulls, and proprioceptive neuromuscular facilitation exercises (PNF). The push pull exercise involves using reciprocal arm movements in a push and pull fashion. The purpose is to

try to keep the core from moving during the exercise. This exercise works on core stabilization. The last three exercises were performed using the Paramount machine. The Paramount (Paramount, Los Angeles CA) is a brand of exercise equipment. It consists of two cables attached to a stack of adjustable weights. I had the patient start with 3 sets of 10 repetitions with each exercise. All exercises that were performed using the Paramount machine were performed for 3 sets of 10 repetitions using 7.5 lbs. At the end of the session electrical stimulation was used for 15 minutes along with an ice pack applied to lower back.

On visit 3, the patient said that he was doing better and feels that his back was almost 70% improved compared to when he entered therapy. A progression of sustained extension in lying was used to fully reduce the derangement. I found that performing the same prone pressups with hips shifted to the left was no longer fully reducing the symptoms. By following the principles of progression of forces, I chose to have the patient perform sustained lumbar extension in a prone position with hips shifted to the left. This seemed to reduce the symptoms after 3 to 5 minutes of this sustained position. The patient was able to perform higher level stabilization exercises on the Paramount machine and bridges with knee extension. During this session I decided to increase the weight used to 10 lbs for the exercises used on the Paramount machine. For each exercise, 3 sets of 15 repetitions were performed. Electrical stimulation and ice were used at the end of the session to help relieve any pain and inflammation.

On visit 4, the patient entered with only stiffness in the low back and no pain. He had no pain after performing his duties at his job. He was not currently

working full time at his job because of his condition. I continue to progress with higher level stabilization exercises on the Paramount. The Med-x lumbar (Med-X, Ocala FL) strengthening machine was introduced during this session to really target the low back musculature. I started the patient with 120 lbs performed for 20 repetitions for one set. I also increased the amount of weight to 15 lbs on the Paramount exercises and had him perform 3 sets of 15 repetitions. Again, electrical stimulation and ice were used at end of the session.

Over the course of the remaining visits 4 through 12 the patient entered therapy with no pain. The patient continued to perform his HEP when he had any increase in low back pain or radicular symptoms. Over the last few sessions I advanced the lumbar stabilization/strengthening program. The only complaint by the patient was some muscle fatigue experienced during exercises, which was not of any concern because this was expected from performing the lumbar stabilization exercises. During the last few sessions he is able to get back on his regular work schedule and has no pain while he worked. At the end of his therapy, before being discharged, the patient's MMT was tested to be 5/5 bilaterally, he had no neural tension, and he was able to touch the floor with his fingers when forward flexing. He was also asked to fill out another Oswestry questionnaire, which he had previously been scored at having 36% disability and now had been scored at having 0% disability at the end of his therapy. He was also provided with a home exercise program to follow in order to prevent any recurrence of a derangement. Contact information was given for the clinic for any questions or concerns that he may have.

CHAPTER IV

OUTCOMES

The patient was seen for a total of 12 visits over the course of 4 weeks. At the initial examination, the patient displayed limitations with being able to perform his duties during his job, and leisure activities and with being able to sit for longer periods of time. The main positions and postures that seemed to cause him the most pain were bending forward, lifting objects, and sitting. When evaluating his sitting posture and lifting techniques, it was clear that a good amount of education on proper lifting techniques and posture was important because of the poor posture that was displayed by the patient. At discharge, the patient demonstrated good sitting posture as well as good body mechanics while lifting objects. Instead of lifting objects using mostly his back, he was now keeping his back straight lifting mostly with his legs. He also displayed proper techniques, keeping the back straight and not bending down at the waist while picking up the weights. These techniques were maintained while performing the exercises during his therapy sessions, a very important concept in preventing any further injury to the low back. He was also able to return to his job full time without any back pain and also returned to having full function in all other activities.

During the initial examination it was found that there were some limitations in lumbar flexion, extension, and right side bending. The limiting factor causing these limitations in range of motion was pain. There were no formal measurements for lumbar extension or right side bending. For lumbar flexion, I used the finger-to-floor- measurement. From this measurement I found that his fingers were 4 inches from touching the floor. At discharge, the findings of my re-evaluation found that he had restored normal range of motion in lumbar extension, right side bending, and lumbar flexion. With the finger-to-floor test he was able to touch the floor with ease and no low back pain.

Through the course of treatment, the patient successfully completed his short term and long term goals. The first short term goal was to reduce the score of his Oswestry Low Back Pain and Disability Index score to 20%. At discharge, the patient surpassed that goal by scoring 0% disability. The next short term goal was to decrease his pain during AROM to 2/10 within 6 visits. The patient reported having no pain during AROM after just 5 visits. The long term goals were to return to full unrestricted activities without symptoms in 6 weeks, be able to complete ADLs pain free in 6 weeks and be able to lift a full keg with no pain reproduction in 6 weeks. At discharge, he had met all of his long term goals within only 4 weeks. Even though he has no pain or limitations at the time of discharge, I educated him on the importance of following what I had taught him during his time in therapy. If he would return to his bad postural and lifting habits he would likely reinjure his back and end up back in therapy.

The cost of therapy for the patient was \$0, since it was a workers' compensation case. The charges for the 13 sessions were therapeutic exercises at \$40 per unit, a physical therapy evaluation for \$125, and one unit of electrical stimulation for \$15. Total charges were \$2,349 or \$180.69 per visit.

CHAPTER V

DISCUSSION

This case report found a positive therapeutic result with use of McKenzie principles along with spinal stabilization exercises in the treatment and management of low back pain resulting from posterior derangement of the lumbar spine. There have been many studies looking at the effectiveness of McKenzie principles in the treatment of lumbar derangements. In my searching, I was unable to find many studies using McKenzie exercises in conjunction with lumbar spinal stabilization exercises to treat and manage back pain from a lumbar derangement. One study¹⁸ I found using these two methods concluded that there was a significant decrease in pain, disability, and a significant increase in lumbar extension strength. They believe that the cause of the increase in strength was due to the decrease in pain from the reduction in the derangement from the McKenzie exercises. This case also had shown that the patients, themselves, are able to manage their back pain. The ability of the patient to treat themselves with the therapists' guidance is what McKenzie was striving for with his treatment methods.⁶

These results are similar to a case study by Santolin¹⁷ in 2003 in which a patient was treated for an acute bout of low back pain. Following the McKenzie evaluation, the patient was diagnosed with posterior derangement of her lumbar

spine that also displayed a posterolateral component. The patient was treated with repeated side-gliding in the direction of the movement restriction.

Improvements in her symptoms continued for the next 2 weeks however no further improvements were noted after that with the same protocol. Repeated sagittal movements were assessed and the patient then responded to repeated extension with further decrease in symptoms. .

Petersen et al¹⁹ showed that the McKenzie method and intensive dynamic strengthening training seem to be equally effective in the treatment of patients with subacute or chronic low back pain. In addition to repeated flexion movements, the patient was also given lumbar stabilization exercises to strengthen the lumbar multifidus, as it has been shown to decrease size, decrease activation, and cross-sectional area following acute low back pain.¹⁰ One study²⁰ conducted to contrast the efficacy of two exercise programs, segmental stabilization and strengthening of abdominal and trunk muscles, on pain, functional disability, and activation of the transversus abdominis muscle, in individuals with chronic low back pain found that segmental stabilization was superior to superficial strengthening in relieving pain and improving disability. Superficial strengthening did not improve transversus abdominis activation. This supports the decision in using lumbar stabilization exercises to help restore normal function of the deep core muscles. This case report was similar to many studies that have used McKenzie principles; there were no complications during therapy. There are a good number of studies that look at the efficacy of McKenzie principles and exercise programs, compared to studies using only

strengthening exercises, for the treatment of posterior lateral lumbar derangements. Further research is needed to look at younger patients in their 20s that have experienced a lumbar derangement from lifting heavy objects repeatedly. Also, these studies could benefit by incorporating specific lumbar stabilization exercises along with McKenzie exercises. I would like to see more studies using both methods together rather than just one or the other.

Limitations to this report include not obtaining more objective measurements of range of motion and not having a long term follow up with the patient because my clinical affiliation was finished soon after the patient's discharge. A follow up would state whether the patient remained pain free and was able to effectively manage his low back pain in the long term with the interventions that were used. It's not completely certain whether or not it was the McKenzie exercises or lumbar stabilization exercises that contributed to the outcomes of the this case. There were also other factors that I believe that contributed to his positive outcomes. These would be his young age and his compliance to the specific therapy program that was used.

Reflective Practice

This case report was really a textbook case of a lumbar disc herniation. Fortunately, the patient responded with a directional preference on the very first visit which allowed the therapist to initiate the proper treatment immediately. Because the patient wanted to find a solution to manage his low back pain as soon as possible, I was able to start a fairly aggressive lumbar stabilization exercise program as well as using McKenzie principles to eliminate the chance of

re-derangement. Although successful, future patients may not respond as well as this patient did to McKenzie principles applied as well as to the stabilization exercises used. This tells me that one really cannot approach each patient with the thinking that they will and should respond positively with the same treatment that worked for other patients. It is important not to take shortcuts when treating a patient. This can lead to misdiagnosis, which will be costly to the patient and the ability to return to prior level of function. If I was to see another patient like this one, I would change a few things. I would have conducted a more thorough history. I would have asked more about the patient's prior level of function. In my examination I should have measured the patient's range of motion to have an objective measurement. Additionally, a proper follow up should be obtained to ascertain the long-term effectiveness of the treatments and home exercise program. This was difficult to do since my student clinical affiliation here was limited to nine weeks.

Through the course of this case study, I have learned many things about the effective management for low back pain. The McKenzie approach can be an effective tool in treating low back pain if done correctly. This system requires the clinician to analyze responses to specific movements in which an intervention strategy must be chosen for each patient. Based on observations and presentation of symptoms, this patient responded with a directional preference for extension with hips shifted to the left. This case study has shown that each patient is unique and that the same techniques may not work for everyone.

One of the nice features of the McKenzie approach is that it allows the patient to become autonomous with the management of their back pain. If directional preference can be established with patient-generated movements, this reduces the need for expensive equipment or numerous appointments and the patient can be discharged to a home exercise program. With so many options for the treatment of low back pain, a gold standard has yet to emerge. Instead of focusing on the structures involved in causing an individual's pain, the McKenzie approach focuses on finding immediate resolution of symptoms. Although this treatment is not appropriate for everyone with back pain, its effectiveness has been demonstrated in prior research. Through my experience working with back pain patients and using McKenzie principles along with stabilization exercises, I have developed a real interest in treating patients with back pain. Back pain is a highly prevalent issue in today's world and can cause major functional issues, facilitating my desire to treat these kinds of patients. In future practice, I plan to become certified in McKenzie Mechanical Diagnosis and Treatment and hope to effectively treat many patients that are suffering from back pain.

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