

Effect of McKenzie Mechanical Diagnosis and Therapy on Chronic Non-Specific Low Back Pain: A Case Study

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KEYWORDS

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Abstract

Background:

Chronic non-specific low back pain (CLBP) is a common musculoskeletal disorder that affects body's functional ability and quality of daily life. Many types of exercises are used, such as the McKenzie Method of Mechanical Diagnosis and Therapy (MDT), are frequently used in its management.

Objective:

To evaluate the effect of McKenzie exercises on pain severity, body's functional disability, and lumbar range of motion in a patient with chronic non-specific low back pain.

Methods:

A prospective single-subject case study was conducted on a 42-year-old male with a 14-month history of chronic low back pain. Severity of pain, functional disability, and lumbar mobility were assessed using the Visual Analog Scale (VAS), Oswestry Disability Index (ODI), and goniometric measurements at baseline, 6 weeks, and 12 weeks. The intervention includes specific, extension-based McKenzie exercises performed for a period of 12 weeks and postural education was given.

Results:

After intervention, pain intensity decreased from 7/10 to 3/10 on the VAS. Functional disability improved from 48% to 20% on the Oswestry Disability Index. Lumbar flexion improved from 40° to 50°, and lumbar extension improved from 10° to 15°. The patient also reported improvement in daily activities.

Conclusion:

McKenzie Mechanical Diagnosis and Therapy exercises confirmed positive effects on pain reduction, functional improvement, and lumbar mobility in this case. Due to the single-case design, more studies with larger sample sizes are needed to support these findings.

INTRODUCTION

Lower back pain (LBP) is one of the most common musculoskeletal problems which is faced by people of almost all age groups. It can be of two types as acute or chronic depending on severity of pain. Acute low back pain normally lasts for less than 12 weeks, while chronic low back pain continues for more than 12 weeks (1). Acute lower back pain generally improves by itself with normal treatment. Chronic low back pain is more complex because it involves physical problems, functional and psychosocial factors

that can result in long-term disability (2). Acute low back pain is commonly occurred by mechanical strain, normal disc injuries and muscle spasms. On the other side, chronic low back pain is related to conditions such as degenerative disc disease, facet joint arthropathy, spinal stenosis, and muscle imbalance (3). Other than physical causes, psychological and social factors such as stress, depression, and work-related demands can make chronic low back pain severe and prolong the condition (4). The shifting of pain from acute to chronic stages may occur due to

poor posture, abnormal movement patterns, and increased sensitivity of the nervous system to pain signals, which is known as central sensitization (5).

Low back pain (LBP) is one of the main reasons of disability in world, especially in terms of years lived with disability. According to the Global Burden of Disease study, about 9–12% of people in the world have low back pain at any given time, and more than 30% of people develop it at some point in their whole life (6).

Chronic low back pain is reason for most of the healthcare weightage related to spinal problems. It also has a major effect on work productivity and a person's overall quality of life (7).

In India and many other developing countries, the number of people going through low back pain is increasing. This increase is mainly due to sedentary lifestyles, poor posture or ergonomics during work, and limited access to preventive healthcare services (8).

Physiotherapy plays an important role in the management of chronic lower back pain. The main goals of physiotherapy are to decrease pain, gain normal function, and prevent the pain from coming back again. Common proof-based physiotherapy treatments include manual therapy, core strengthening exercises, stabilization exercises, and patient education (9).

Exercise therapy is very important because it helps patients manage their symptoms on their own and improve the movement and mechanics of the spine. Recent clinical guidelines says that exercise programs should be specialised according to each patient's needs, which highlights the importance of classification-based treatment approaches (10).

The McKenzie Method of Mechanical Diagnosis and Therapy (MDT) was developed by Robin McKenzie. It is a classification-based treatment system used for patients with low back pain. In this method, the therapist

identifies the patient's directional preference of pain, which means the specific movement that reduces pain or moves the pain toward the centre of the spine; centralization (11).

The main focus of McKenzie method is on repeated movements and maintained postures most commonly in lumbar extension movements to improve spinal alignment and reduce pain caused by disc problems. One main feature of McKenzie method is that it make patients to know how to treat themselves using specific exercises, which reduces their dependence on passive treatments such as manual therapy or modalities (12).

Many systematic review studies says that McKenzie exercises are effective in reducing pain intensity and disability in people with both acute and chronic low back pain (13,14).

Although many studies support Mechanical Diagnosis and Therapy (MDT), the result can vary in different populations. Because of this variation, more research is needed, specifically in case-based approach where the individual result of a patient can be clearly observed and documented.

Case studies are useful because that shows how McKenzie exercises are applied in real clinical practice and how the treatment can be changed according to the needs of any patient. It also helps in understanding the outcome of treatment in each case.

The aim of this study is to add more proof to the existing literature by examining the effects of McKenzie exercises in a patient with chronic low back pain. This study also supports the role of Mechanical Diagnosis and Therapy (MDT) as a affordable, non-invasive, and treatment mainly focuses on patient for treating chronic low back pain.

METHODOLOGY

Study Design

A prospective single-subject case study was conducted at Pacific College of Physiotherapy, Pacific Medical University,

Udaipur, Rajasthan in duration of 12 weeks to study the effects of McKenzie Mechanical Diagnosis and Therapy exercises on chronic non-specific low back pain.

Written informed consent was taken from the participant before starting the study to ensure confidentiality and proper ethical practice during the research.

Participant Description

The participant was a 42-year-old male. He was suffering from chronic non-specific low back pain from last 14 months. The patient shared that the pain increased during prolonged sitting, standing, and forward bending movements.

The pain intensity was measured using the Visual Analog Scale (VAS) and score was 7 out of 10. The functional disability was measured using the Oswestry Disability Index (ODI), and the score was 48% which indicated moderate level of disability.

Inclusion Criteria

- Age ranging from 30–55 years
- Chronic low back pain for more than 12 weeks
- Mechanical low back pain representing directional preference on repetitive movement testing

Exclusion Criteria

- Previously done spinal surgery or fractures
- Systemic inflammatory conditions
- Progressive neurological deficit
- Contraindications to exercises therapy

Assessment Procedures

Baseline assessment included:

- Pain intensity measured using the Visual Analog Scale (VAS)
 - Functional disability assessed using the Oswestry Disability Index (ODI)
 - Lumbar range of motion measured using a goniometer
 - Postural assessment and repeated movement testing to determine directional preference
- Follow-ups were conducted at 6 weeks and at the end of 12 weeks.

Intervention Protocol

The treatment consist of extension-based McKenzie exercises. Exercises were selected according to the patient's directional preference, which means the exercises were selected based on the movement that helped reduce the patient's pain.

Exercise Program

1. Breathing exercises (Warm up phase) – deep diaphragmatic breathing in crook lying position (10 repetitions × 2 sets).
2. Prone lying – Maintained for 2 minutes, repeated three times.
3. Prone on elbows – 10 repetitions, each held for 5–10 seconds.
4. Prone press-ups – 10 repetitions, each held for 5 seconds.
5. Standing lumbar extension – 10 repetitions, performed hourly during waking hours.
6. Progression to sustained extension in lying, maintained for 30–60 seconds if tolerated.
7. Breathing exercises (Cool-down phase) – Slow diaphragmatic breathing (10 repetitions × 2 sets).

Sessions were conducted five times per week for 30 minutes. The first two weeks were supervised, after that home-based exercises were given with weekly monitoring.

Adjunctive Care

- Postural education and ergonomic advice
- Flexion-based activities during intervention were inhibited
- No analgesics medicines or additional physiotherapy modalities were used

Outcome Measures

Primary Outcome Measure

- Visual Analog Scale (VAS) was used to measure pain intensity .
- The Oswestry Disability Index (ODI) was used to measure Functional Disability , which is expressed in percentage score.
- Standard universal goniometer was used to measure Lumbar Range of Motion (flexion and extension).

Data Analysis

Because single-subject design were used , the

results were analysed descriptively by comparing the baseline values with the follow-up values.

Improvement in patient was analysed by evaluating changes in the pre and post scores and percentages of improvement over time.

RESULTS

After giving 12 weeks of McKenzie intervention, positive and clinically meaningful improvements were detected. The pain intensity decreased from 7/10 to 3/10. On

the Oswestry Disability Index The functional disability score were improved from 48% to 20%.

Lumbar flexion increased from 40° to 50° means range increased by 10 %, and lumbar extension improved from 10° to 15°, range increased by 5%. Overall, the patient reported improvement in pain, better spinal range of motion, and greater easiness in performing activities of daily living.

Table 1. Pain and Disability Outcomes

Outcome	Baseline	6 Weeks	12 Weeks	Changes (Baseline–12 Weeks)
VAS (0–10)	7	5	3	Decreased to 4 points
ODI (%)	48%	30%	20%	Decreased to 28%

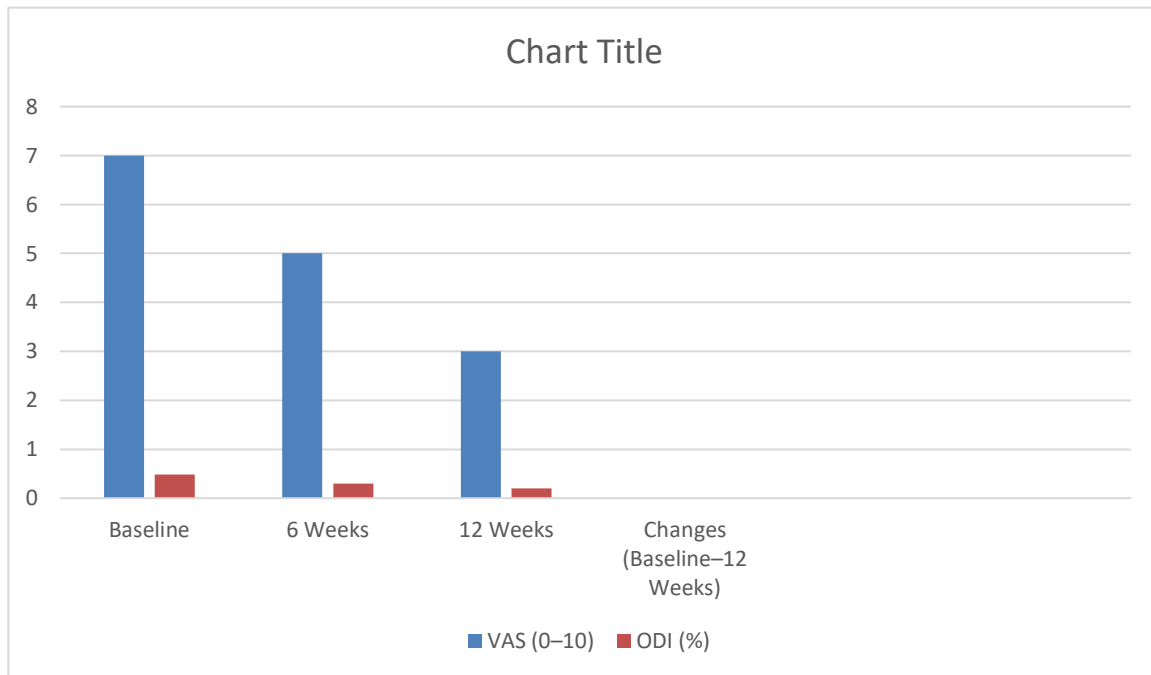


Table 2. Lumbar Range of Motion

Movement	Baseline	12 Weeks	Changes
Flexion	40°	50°	+10°
Extension	10°	15°	+5°

Discussion

This case study presented positive and clear improvement in pain intensity, functional disability, and lumbar mobility after giving 12-week McKenzie Mechanical Diagnosis and Therapy (MDT) program in a patient with chronic non-specific low back pain.

In previously reported research studies same amount and pattern of improvement was seen which supports the clinical benefits of the McKenzie approach for treating low back pain.

Namnaqani et al. gave a systematic review

which reported that Mechanical Diagnosis and Therapy (MDT) is effective in decreasing pain and disability in people with chronic low back pain, particularly when compared with passive treatments and manual therapy techniques (15).

The overall condition of pain and joint range of motion improved in this case are similar to the findings of that review. This suggests that classification-based exercise programs, like the McKenzie method, may play an important role in improving symptoms over the long time.

Similarly, a randomized controlled trial by García et al. showed that the McKenzie method resulted in greater reduction in pain intensity when compared to a placebo intervention in patients with chronic non-specific low back pain (16).

While the improvement in disability was moderate in their study, the better functional improvement observed in the present case may be due to regularity to the exercise program, proper supervision during the starting of treatment, and correct identification of the patient's directional preference.

Long-term comparative studies also support the effectiveness of classification-based exercise approaches. Halliday et al. reported similar improvements in pain and disability when comparing the McKenzie method with motor control exercises at a one-year follow-up (17).

These findings suggest that individualized exercise programs, which are designed according to a patient's specific condition, may be more important for successful rehabilitation than using general exercise programs for all patients.

The better result in lumbar mobility seen in this case may be due to the repeated end-range movements and mechanical correction principles that are an important part of Mechanical Diagnosis and Therapy (MDT). In addition, the focus on self-management and active participation of the patient may have helped in maintaining the clinical improvement over time.

Since this is a single-case report, the results cannot be applied to all patients. While, the improvements seen in this case are similar to findings reported in previous studies, which supports the role of McKenzie Mechanical Diagnosis and Therapy as a structured and clinically useful treatment for chronic non-specific low back pain.

Limitations

There are some limitations of this study. First, this was a single-subject case study, and therefore the findings are not generalisable to all patients with chronic non-specific low back pain. Secondly, the absence of a control group makes it difficult to attribute the observed improvements to the McKenzie Mechanical Diagnosis and Therapy (MDT) intervention alone. Third, the follow-up time of 12 weeks was relatively short and longer-term outcomes were not assessed. Finally, the adherence to the home exercise program was not objectively monitored and this could have influenced the results. More research with larger samples, randomised controlled designs and longer follow-up periods are needed to confirm these findings.

Conclusion-

This case study shows that a 12-week McKenzie Mechanical Diagnosis and Therapy exercise program led to clear improvements in pain intensity, functional disability, and lumbar mobility in a patient with chronic non-specific low back pain. The results support the clinical effectiveness of classification-based McKenzie exercises, especially through repeated end-range movements and active patient participation.

Because this is a single-case study and the results cannot be generalized, the findings suggest that Mechanical Diagnosis and Therapy is a practical, cost-effective, and patient-centred physiotherapy approach for managing chronic non-specific low back pain. Further research with larger sample sizes is needed to confirm these findings.

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Conflict of Interest Statement

The authors declare that they have no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Author Contribution Statement

Conceptualization: Dr. Deepak Lohar, Dr. Jafar Khan. Investigation: Bhumika Lohar. Methodology: Bhumika Lohar, Dr. Deepak Lohar. Formal analysis: Bhumika Lohar, Dr. Deepak Lohar. Supervision: Dr. Deepak Lohar, Dr. Jafar Khan. Writing – original draft: Bhumika Lohar. Writing – review & editing: Bhumika Lohar, Dr. Deepak Lohar, Dr. Jafar Khan. All authors approved the final version of the manuscript and agree to be accountable for all aspects of the work.

Ethics approval

This study was approved by the Institutional Ethics Committee of Pacific Medical University, Udaipur, Rajasthan, India, and was conducted in accordance with the Declaration of Helsinki.

Informed consent

Written informed consent was obtained from all participants prior to their inclusion in the study.

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