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Effectiveness Of Core Stabilization Exercise With Stretching Exercises Vs Mckenzie Method With Muscle Energy Technique Exercise In Case Of Chronic Lower Lumbar Pain. A Comparative With RCT Study.

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ABSTRACT

Objective: to examine how patients with persistent chronic lower lumbar pain respond to McKenzie mobilization using muscle energy techniques or core stability exercises combined with stretching. to assess both approaches' efficacy in treating persistent chronic lower lumbar pain.

Summary of Background Data: According to these recommendations, manipulation combined with muscle energy method treatment seems to be successful in reducing pain and enhancing function for individuals with persistent chronic lower lumbar pain. For chronic lower lumbar pain, exercises for core stability are growing in popularity. However, it is still uncertain if individuals with persistent chronic lower lumbar pain benefit more from core stability exercises than from muscular energy exercises.

Methods: Two reviewers individually chose pertinent RCTs (randomized controlled trials), comparing the McKenzie method with muscular energy approach exercise vs core stability exercise with back stretching for the care of patients with persistent chronic lower lumbar pain for this meta-analysis. The two groups that chose the studies separately gathered the data.

Results: The present analysis includes 60 individuals in total from the possibly relevant experiment. Using the confidence interval of 95% at the time of the temporary follow-up, the analysis showed that McKenzie mobilization combined with MET training was superior than core stability exercise combined with stretching regimens for lowering pain and impairment. At six months [mean difference (20.50); 95% confidence range (21.36, 0.36); P = 0.26] and twelve months [mean variance (20.32); 95% confidence interval (20.87, 0.23); P = 0.25], there were no discernible differences compared core stability exercise and general exercise in terms of pain reduction.

Conclusions: Core stability exercises might temporarily enhance physical function in people with persistent chronic lower lumbar pain, but they are less successful in reducing pain than McKenzie exercises. Nevertheless, there were no appreciable long-term variations in the degree of discomfort between individuals who performed McKenzie exercise and those who performed core stability exercise.

Key words: lower backache, centralization, diagnosis, core stabilization, McKenzie Method, lower back stretching exercises, muscle energy techniques.

INTRODUCTION

A terrible cognitive and tactile sensation that may or may not be connected to real injury to tissue is what is meant by pain. Lower backache constitutes one of the most common types of pain, and its nature is subjective and unique due to sensitivity and cultural traits as well as environmental influences (1). Up to 70% of people experience back pain as a result of gradual changes. This soreness persists in 20–60% of these people. It results in chronic illness, therefore dramatically increases the cost of therapy for the public budget(3). One significant feature of long-term sacro-lumbar disorders is the onset of specific, neuropathic pain. It is caused by either pathological alterations in synapses themselves or injury and compaction of neurons. Even once the reasons are eliminated, the discomfort could persist (4). Pain caused by neurons is still very difficult to cure. Thirty percent of all both immediate and long-term disability in Poland, are caused by chronic back pain disorders (5). This issue is becoming prevalent especially young people who are actively engaged in the workforce. Many rehabilitation techniques are available to treat chronic lower lumbar pain, including manual therapy, chiropractic manipulation, massage, physical therapy modalities, McKenzie Method, classical physical therapy focused on therapeutic exercises, and back school. It is crucial to carry out clinical research on the efficacy of the treatments taking into consideration many characteristics of a person's medical condition and level of fitness since finding a successful type of therapy is quite tough. Exercises that improve the strength and communication of the group of trunk muscles surrounding the spine are known as core stabilization exercises. These exercises mainly involve the co-activation of the transversus abdominis, quadratus lumborum, and lumbar multifidus, with extra assistance from the internal and external obliques, rectus abdominis, pelvic floor, iliac psoas, and diaphragm. Patients are advised to perform core stabilization exercises since they have been shown to be an effective way to manage chronic lower lumbar pain by preserving and enhancing neuromuscular coordination as well as positional and spinal stability. Despite the fact that multi-week intervention trials have demonstrated the excellent efficacy of this method of instruction (6,7,8). Medication, physical therapy, and, as a last option, surgery may be used to address chronic chronic lower lumbar pain. There is theoretical evidence that supports that stretching methods are a useful option for medical management of persistent chronic lower lumbar pain, even in the absence of clinical studies (9,10). Although there are studies that demonstrate the beneficial effects of stretching techniques on chronic lower lumbar pain, the majority of these research paired stretching procedures with other treatment options, and very few of them examined stretching activities on their own. Research that examine the psychological information on the physiological processes that would account for how stretching routines alone could lessen are necessary in this regard(11,12,13). Stretching may also lengthen nerve fibers, which would improve intrafascicular gliding and intraneural water pumping and drainage, reduce tissue fibrosis and adherence between adjacent tissue layers and neural tissues, facilitate axoplasmic flow, lessen the accumulation of chemical sensitizers, and alleviate pain. When combined, these neurophysiological processes may help figure out how stretching exercises might enhance performance and lessen chronic lower lumbar pain. Stretching exercises may therefore reduce chronic lower lumbar pain through mechanical and neurophysiological techniques, which should also be examined jointly, as biomechanical modifications in muscle characteristics can affect the amount of tension that the connective tissue transmits to the nervous tissues and sensory neurons(14,15). Brian McKenzie created the widely utilized exercise regimen for chronic lower lumbar pain, known as the McKenzie approach. Lumbar extension motions

are the primary emphasis of the McKenzie technique, which aims to enhance spinal alignment, concentrate complaints (pain that travels from the leg to the back), and lessen discomfort. These exercises are particularly helpful for chronic lower lumbar pain caused by discs. According to a comprehensive review research, McKenzie therapy is superior to the comparative remedies for spinal pain at the initial follow-up. The McKenzie technique is an established approach that most physical therapists utilize to address lower lumbar discomfort(16). Fred and Mitchell created the manual medicine soft tissue method known as muscle energy technique (MET). Controlled purposeful contraction, such as isometric or isotonic contractions in a certain location and direction, is a feature of the METs. Following METs, muscular extensibility increases due to viscoelastic changes in the muscle. Myofibrils make up muscles, which is why there is resting tension. A elastomeric component found in connective tissue causes a reduction in the joint's range of motion when a muscle is strained. When the viscoelastic material is continuously stretched, the impact on the viscoelastic component will eventually decrease(17,18,19).

MATERIAL & METHOD

Study design: The current investigation was a controlled, randomized experiment with double blinding. The ANS Hospital in Jaipur promoted the approval to the clinical study plan.

Participants: A total sample size of thirty people each set (N=60) with 80% power (α=0.05) and a 10% attrition rate was determined using a Minimal Clinically Relevant Variation of 16.55 and a standard deviation of 17.53 for the VAS. After receiving thorough details regarding the study in their native tongue, each willing subject was obliged to give authorization in writing. For the study, 60 men and women between the ages of 30 and 50, who had been diagnosed with persistent lower lumbar discomfort (pain lasting more than two months) were enlisted. The existence of anomalies in lumbosacral posture and movement, as determined by the SLR and crossed SLR Test, supported the recognition of lower lumbar discomfort. These evaluations were carried out by a registered general practitioner. The study was conducted at the ANS hospital in Jaipur, Department of Physiotherapy. The standards for exclusion were: 1) Any neurological or psycho-neurological condition; 2) Any cardiovascular condition; 3) Any history of spine surgery; 4) Uncooperative people; 5) Individuals over 50; 6) Individuals under thirty. All participants gave written permission to participate in compliance with ethical standards before to participation. A blinding process was used to anonymize respondents in order to preserve confidentiality and reduce prejudice. The approach being utilized was not disclosed to the respondents, but they were told that they had been given therapy for their problem. Participants were made aware of their freedom to leave the research at any moment and without repercussions. Two intervention groups were created from the enrolled participants: the McKenzie with MET Exercises group and the Stretching with Core Stabilization Exercise group. Every session, each group receives a 20-minute intervention, such as 10 minutes of core strengthening, 10 minutes of stretching, 10 minutes of McKenzie, or 10 minutes of MET.

Procedure: All subjects with a lower lumbar pain diagnosis who met the study's inclusion/exclusion criteria participated. Data on demographic (gender, age, employment status, marital status) and clinical (education level) were collected from a standardized intake form. Two treatment modalities were provided as part of the intervention protocol: Muscle Energy Technique combined with McKenzie; Core Stabilization combined with Muscle Stretching Exercises. The physiotherapist delivered treatment via an individual daily basis over 40 days (40 sessions averaging 20 minutes each). Outcome measures were evaluated on 3 occasions throughout the intervention period (Baseline at Day 0; Midterm at Day 20; Final at Day 40). There were no reported adverse events (e.g., mild bruising, additional stiffness, muscle strain) experienced by either group in during this study intervention. This suggests both treatment conditions have a favorable safety profile in relation to this study.

Outcome measures: The Visual Analogue Scale (VAS), which assesses pain, was the main outcome measure used in this study. In a variety of adult groups, especially those with ongoing pain, the VAS is a commonly used, validated, unidirectional measure of pain severity. The three time periods for evaluating these outcome measures were the pre-intervention baseline, the midline on day 20, and the end of the intervention period on day 40. Oswestry disability index: ODI (Oswestry Disability Index) is one of the most commonly used outcome measures to assess functional disability in patients with low back pain and sciatica**.** ODI helps to Measure functional disability, Assess severity of low back pain, Evaluate treatment outcomes, Compare pre- and post-treatment improvement.

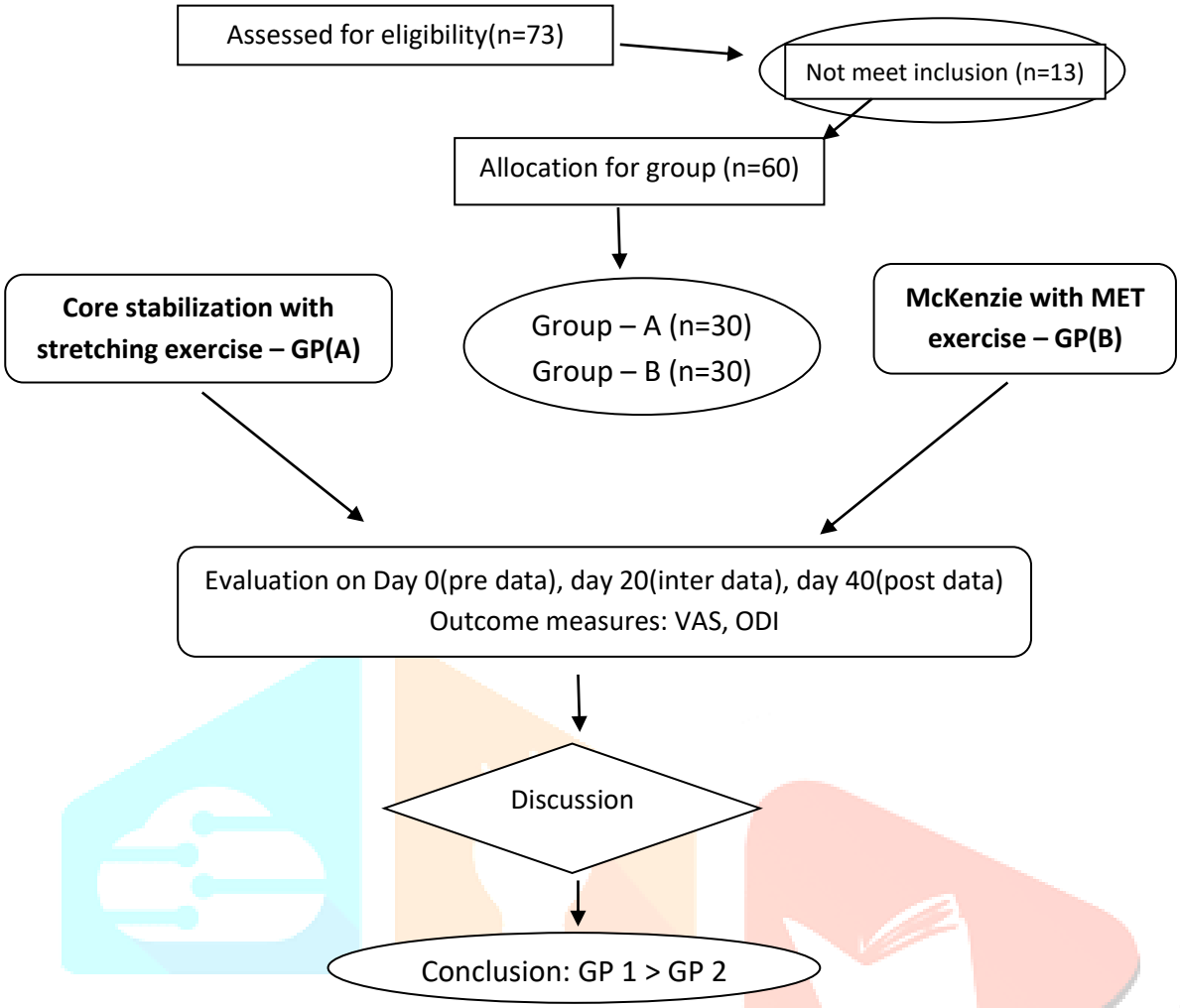
Statistical analysis: JASP software was utilized to evaluate the data, and values that deviated from the mean by more than three standard deviations were considered outliers. At 0.05, the alpha threshold for statistical significance was established. For demographic data, descriptive statistics were computed, and means ± standard deviations were used to report continuous variables.

RESULTS

Base comparision: In this study, 60 individuals were randomly assigned to one of two intervention groups: group-A received core stabilization and hamstring stretching, while group-B received Muscle Energy Technique (MET) using the Mckienze approach. Each of the 60 individuals finished the 40 therapy sessions that were recommended. According to outcome measures, pre-intervention data were gathered and compared between the groups. The recruiting, allocation, follow-up, and analysis of the participants were all recorded in compliance with the Consolidated Standards of Reporting Trials (CONSORT) standards.

Intermediate comparision: on the mid of the intervention i.e, day 20th the data were collected through outcome measures, as pain and functional scores. Then data analysis was done between the groups as well as within the goup.

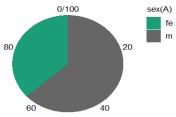
Final comparision: on the post of the intervention i.e, day 40th the data were collected through outcome measures, as pain and functional scores. Then data analysis was done between the groups as well as within the group. After comparison the significance was being find out, hence conclusion evaluated.



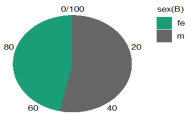
Data analysis:

Descriptive Statistics

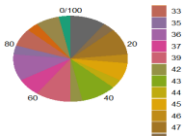
	age(A)	age(B)	sex(A)	sex(B)
Valid	30	30	30	30
Missing	0	0	0	0
Mean	40.467	40.900		
Std. Deviation	6.312	6.483		
Minimum	30.000	30.000		
Maximum	50.000	50.000		



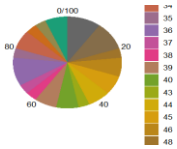
sex(A)



sex(B)



age(A)

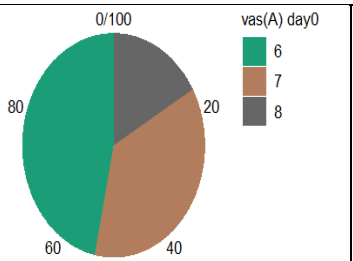


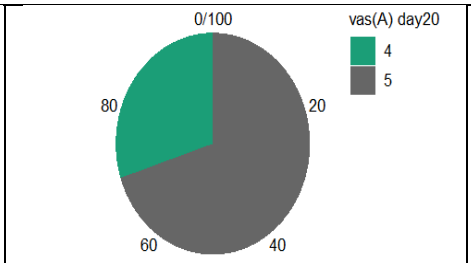
age(B)

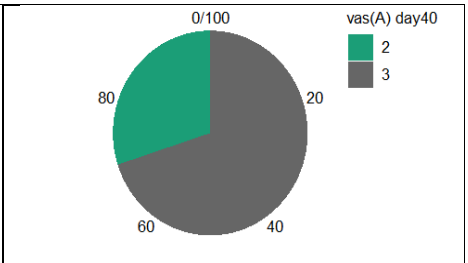
Descriptive Statistics

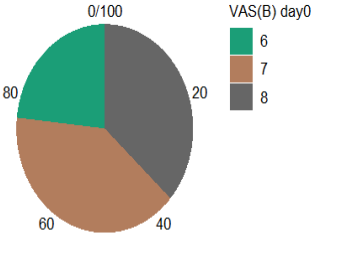
	vas(A) day0	VAS(B) day0	vas(A) day20	VAS(B) day20	vas(A) day40	VAS(B) day40
Valid	30	30	30	30	30	30
Missing	0	0	0	0	0	0
Mean	6.700	7.133	4.700	4.167	2.700	1.467
Std. Deviation	0.750	0.776	0.466	0.648	0.466	0.776
Minimum	6.000	6.000	4.000	3.000	2.000	0.000
Maximum	8.000	8.000	5.000	5.000	3.000	3.000

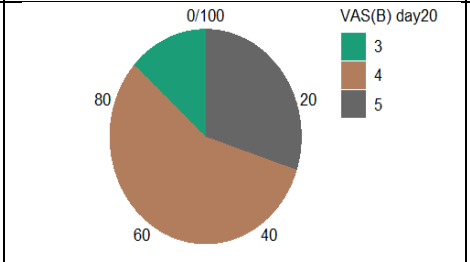
Pie charts

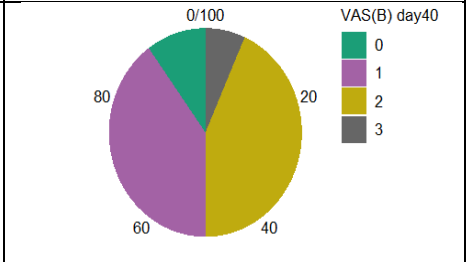






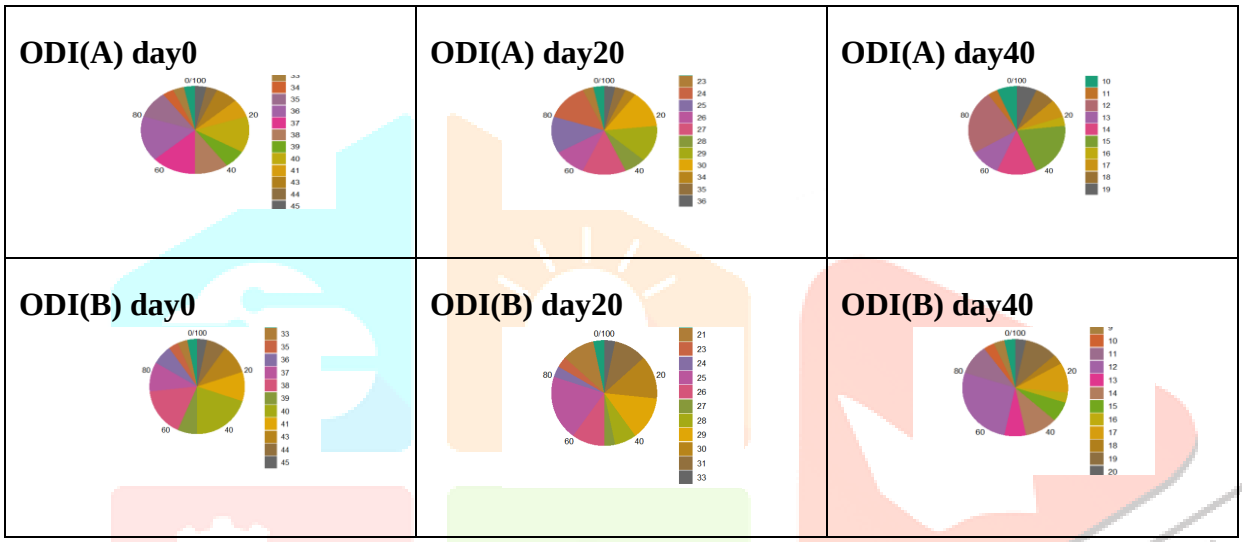






Descriptive Statistics

	ODI(A) day0	ODI(B) day0	ODI(A) day20	ODI(B) day20	ODI(A) day40	ODI(B) day40
Valid	30	30	30	30	30	30
Missing	0	0	0	0	0	0
Mean	37.967	39.133	27.400	26.767	14.133	13.867
Std. Deviation	3.358	3.319	3.539	3.451	2.501	3.203
Minimum	30.000	30.000	20.000	20.000	10.000	8.000
Maximum	45.000	45.000	36.000	33.000	19.000	20.000



Paired sample t-test

Measure 1	Measure 2	t	df	p	Mean Difference	SE Difference	Cohen's d
age(A)	age(B)	-0.425	29	0.674	-0.433	1.020	-0.078
vas(A) day0	VAS(B) day0	-2.213	29	0.035	-0.433	0.196	-0.404
vas(A) day20	VAS(B) day20	4.000	29	0.046	0.533	0.133	0.730
vas(A) day40	VAS(B) day40	7.870	29	0.023	1.233	0.157	1.437
ODI(A) day0	ODI(B) day0	-2.457	29	0.020	-1.167	0.475	-0.449
ODI(A) day20	ODI(B) day20	0.057	29	0.0426	0.633	0.633	0.183
ODI(A) day40	ODI(B) day40	0.026	29	0.0325	0.267	0.507	0.096

From the above statistical analysis the “p” value indicates as significance through out both outcome measures. The significance of “p” high lighted the better performance of group B. Hence McKenzie with MET exercise is more effective than core strengthening with stretching exercise.

DISCUSSION

Core Strengthening with Stretching

Components

Core strengthening: Transversus abdominis, multifidus, pelvic floor, diaphragm Exercises: abdominal bracing, bridges, planks, bird-dog, dead bug

Stretching: Hamstrings, hip flexors, piriformis, lumbar extensors

- **Mechanism of Action**
- Improves spinal stability
- Enhances neuromuscular control
- Reduces segmental instability
- Corrects muscle imbalance and flexibility deficits
- Decreases mechanical load on lumbar spine
- **Effects**
- Gradual reduction in pain
- Improved functional capacity
- Better posture and movement control
- Long-term prevention of recurrence

McKenzie Exercises with MET

Components

McKenzie Method (MDT): Repeated movements (especially extension or flexion) Emphasis on centralization phenomenon

Muscle Energy Technique (MET): Isometric contraction followed by relaxation and stretch, Used for tight muscles or joint dysfunction

- **Mechanism of Action**
- Reduces disc derangement
- Promotes centralization of symptoms
- Improves joint mobility
- Decreases muscle spasm and pain via neurophysiological effects
- **Effects**
- Faster pain reduction
- Improved lumbar ROM
- Reduction of radicular symptoms
- Improved mechanical alignment

CONCLUSION

For individuals with lower backaches, McKenzie exercises with MET and core stability training with muscle stretching both work well to improve function and lessen discomfort. For acute mechanical lower backache, McKenzie exercises in conjunction with MET give quicker pain relief and centralization; however, for chronic and recurring lower backache, core stabilization with stretching provides greater long-term enhancement of function and spine stability.

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