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Research Article

Effectiveness of Alexander Technique and Core Stability Exercises Versus Mckenzie Method in the Treatment of Lumbosacral Radiculopathy: A Randomized Control Trial

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Abstract

Low back pain (LBP) is pain in the lower part of the trunk, a highly prevalent and disabling condition globally. Clinical management for acute LBP and lumbosacral radiculopathy patients recommends first-line treatment consisting of education, support, and simple analgesics. This study evaluated the short-term alexander technique and core stability exercises versus the McKenzie method in treating lumbosacral radiculopathy. A randomized control trial with four weeks of follow-up was conducted from March 2022 to November 2022, consisting of a sample size of 20. Eligible participants were assigned a treatment protocol based on the McKenzie or Alexander technique for four weeks. The p-value was noted as greater than (0.05 non-significant), so the null hypothesis failed to reject it, meaning there was no significant difference between the Alexander technique and McKenzie method in treating lumbosacral radiculopathy. McKenzie was slightly more effective and responded from the first day to the end of the treatment session, but the reoccurrence of LBP was frequent due to weak muscles, poor working posture, and weight lifting in daily life activity. Alexander technique and core stability exercises response was slow in the first two weeks; after two weeks, both Alexander and McKenzie methods showed similar responses but no reoccurrence in Alexander-technique.

Keywords: Alexander technique, low back pain, lumbosacral radiculopathy, McKenzie method

1. Introduction

Low back pain (LBP) is the most common musculoskeletal problem globally. Up to 85% of people will experience LBP throughout their lifespan (Woolf and Pfleger 2003). Generally, three accepted time structure stages used to classify lower back pain are the acute stage (up to four weeks), the sub-acute stage (4-12 weeks), and the chronic stage (>12 weeks). The improvements associated with exercise therapy may be long-lasting (≥1-3 years)(Rainville et al. 2004). Lumbosacral refers to the lumbar and sacral region of the spinal column, whereas radiculopathy means a condition of the nerve root, sometimes mentioned as sciatica and a condition in which a disease progression affects the function of single or more lumbosacral nerve origins. The greatest common origin is physical disc herniation leading to nerve origin compression(Schoenfeld and Weiner 2010). The intervertebral disc absorbs physical shock to the backbone and guards the nerves traveling to the middle of the spine; it is composed of two dissimilar tissue layers, an inner layer called the nucleus pulposus and an external layer called the annulus fibrosis (Guterl et al. 2013). A protruding or herniated inter-vertebral disc can put compression on these nerves generating various symptoms comprising pain, tingling, sensory loss, or incomplete paralysis of affected muscles sideways the dermatome of the compromised nerve (Modic et al. 2005). There

Figure 1: Alexender Technique for LBP.

are two approaches to management for lumbosacral radiculopathy that attract a lot of attention in the therapeutic field, the Alexander performance (figure 1) and the McKenzie technique (figure 2). Lumbosacral radiculopathy is defined as a "disarticulation of disc components nucleus pulpous or annulus fibrosis beyond the intervertebral disc space" (Schoenfeld and Weiner 2010). The Alexander technique helps improve balance, strengthen postural muscles, recover coordination, progress flexibility, minimize back spasms, decompress the vertebral column, and identify the harmful characteristics of muscle use when motionless and in the movement to avoid painful activities (Cranz 2000).

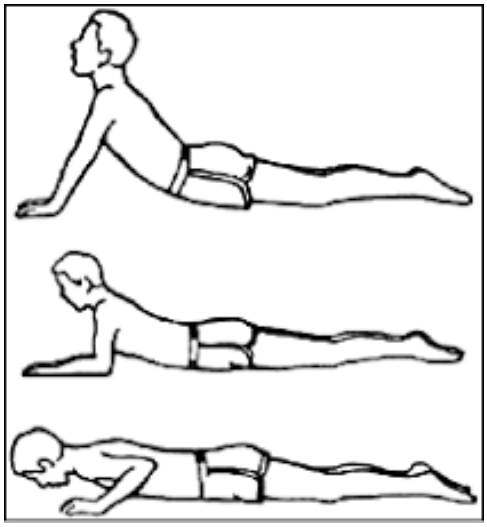

Figure 2: Pictorial representation of the McKenzie extension exercise.

An essential aspect of the Alexander procedure was concentrating on eliminating head, neck, and spine tension in all aspects of daily life through spoken and physical education(Pearce 1992). The McKenzie method for handling lumbosacral radiculopathy triggering lower back pain and reserved movement is grounded on a directional approach in which patients are trained to perform exercises that centralize low back and/or radiating discomfort toward the spinal midline, using repeated activities or sustained postures(Clare, Adams, and Maher 2004). This technique can capably reverse the injury caused by the patient to their inter-vertebral disc and then nerves by simply executing patient-generated forces in the recommended direction (Kibler, Press, and Sciascia 2006). McKenzie first described the centralization of pain in 1980. Centralization of pain is the movement of pain in the buttock, thigh, knee, or foot, eventually transitioning it towards the low back, where it ultimately was eliminated (Donelson et al. 1997). For example, if the individual was experiencing pain in their foot, the pain would move proximally towards their knee after they begin the appropriate exercises". This pain will then continue moving proximally through the thigh, buttock, low back, and eventually, it will be completely eliminated. The extension of the spine from the exercises causes decompression of the spine and a decrease in nerve root impingement. This

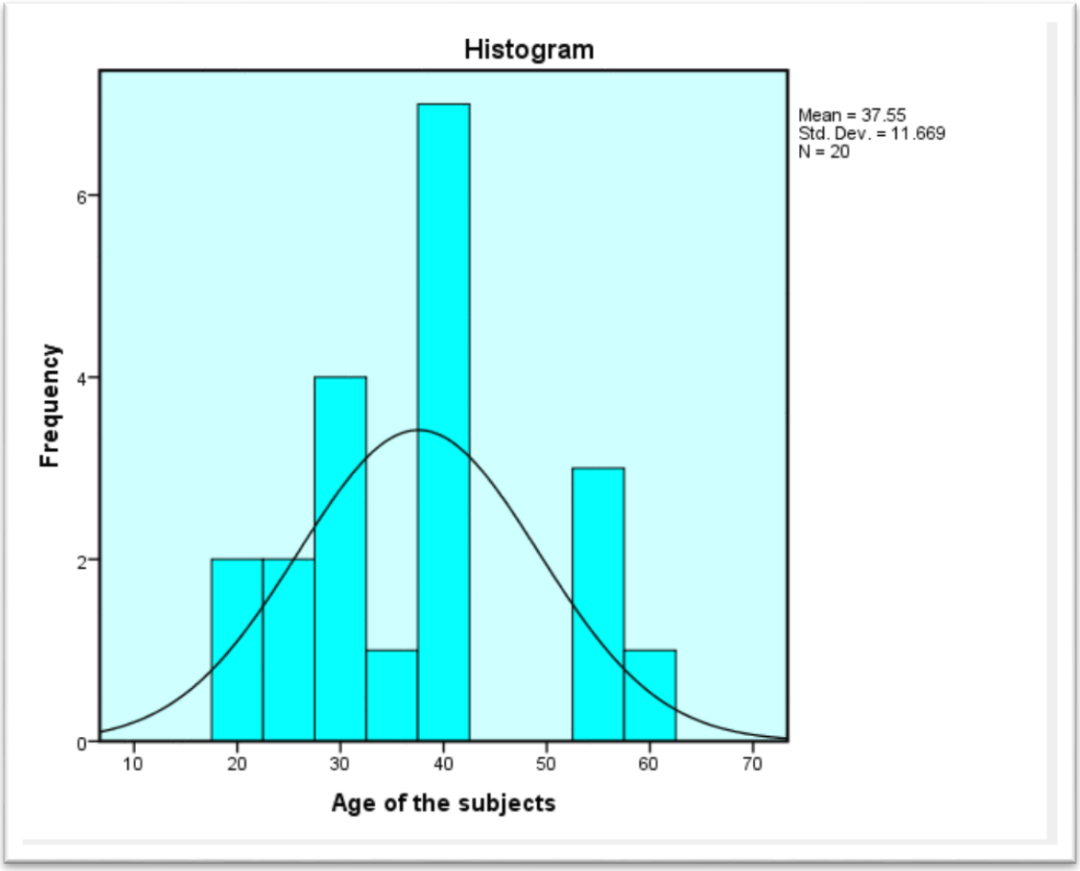

Figure 3: Age of the Participants in both groups.

lessening of impingement allows the affected nerve to progressively return to its normal physiological status (Hollett 2015). As the nerve was healing, the pain the patient was experiencing was gradually moving proximally up their leg. Based on the literature, the purpose of this study is to compare the Alexander technique with the Mckenzie method in patients with lumbosacral radiculopathy (Machado et al. 2010).

2. Materials and Methods

This study was conducted at District Headquarters Hospital Mardan on patients with LBP radiating to the unilateral leg. The research study duration was nine months (from March 2022 to November 2022). The total sample size was 20, with 10 patients in each group. Those patients with spinal tumors, infections, and pregnancy and cord symptoms were excluded. Informed consent was taken from all patients prior to enrolment in either group to ensure their willingness and confidentiality of personal information. Patients received either Mckenzie or Alexender treatment on the basis of the lottery method. These are both standardized techniques for the treatment of LBP. The numerical pain rating scale NPRS was used to assess the pain level before and after the treatment, a gold standard way to measure pain. In the alexander group, we used awareness-building methods to teach participants to reduce habitual tension during everyday activities. In Mckenzie's group, the following exercises were performed by the participants, including Lying on the stomach, lying on a pillow, prone on elbows, prone press-ups, standing extension, lying flexion, sitting flexion, and standing flexion.

Data were analyzed using SPSS version 26. Descriptive analysis was done using percentages and frequencies, while inferential analysis using

Table 1: Baseline characteristics of the subjects in both groups.

Demographic Factors		N	%
Gender of the subjects	Female	9	45.0%
	Male	11	55.0%
Educational status	Illiterate	6	30.0%
	Literate	14	70.0%
Age categories	20 to 40 years	15	75.0%
	40 to 60 years	5	25.0%

an independent T-test between two groups was used.

3. Results

A total of 20 participants were observed, of which 11 (55%) were male, and 09 (45%) were female. Sociodemographic data (Table 1) showed that out of 20 participants, 30% (n = 06) were illiterate, and 70% (n = 14) were literate (Table 1). Furthermore, 75% (n = 15) of participants belonged to the age group of 20-40 years, followed by 25% (n = 5) belonging to 40-60 years age group. The mean age of the participants was 37.55±11.6 years (Figure 3).

The overall score of NPRS for both groups is shown in Table 2. The mean values of NPRS for the Alexander group at pre and post-treatment were 40.10±8.83 and 19.40±5.9, respectively. For the Mc Kenzie, the mean values were 48.20±15.8 at baseline; after treatment, it was 19.70±9.4. This result shows significant improvement in NPRS in both groups (Table 2). Paired T-test showed significant improvement after treatment compared to baseline in both groups. The P-value showed a significant difference between pre and post-treatment in the Alexander group (0.003) and the McKenzie group (0.001) (Table 2). Independent T-test showed a statistically non-significant improvement in NPRS at the post-treatment level in the Alexander group compared with the Mckenzie group with a p-value> 0.05. (Table 3).

4. Discussion

According to (Kibler, Press, and Sciascia 2006), who conducted a study in 2006, core stability was essential in normal athletic activities. It was best understood as a highly integrated activation of multiple segments that provide force generation proximal stability for immobility and generates interactive moments. It was difficult to accurately quantify by isolating individual components, but its function or dysfunction can be approximated by an evaluation that reproduces the core's three-planar motion to accomplish its functions. A better understanding of complex biomechanics, muscle activations, and more specific rehabilitation protocols was provided by Clare and colleagues (Clare, Adams, and Maher 2004).

In the Alexander group, the mean NPRS score of the subject before treatment was 40.10, with a standard deviation of 8.837, and the standard error of the mean was 2.795. After the treatment,

Table 2: This table shows the results of the Berg Balance test.

	Alexander Group		Mc Kenzie Group	
	NPRS			
	Baseline	After Treatment	Baseline	After Treatment
Mean	40.10	19.40	48.20	19.70
S.D	8.83	5.9	15.8	9.4
p-value	0.003		0.001	

Table 3: This table shows the between-group analysis of BBS, TUG, and SWMF.

	GROUP	*p - Value*
Numeric Pain Rating Scale	Alexander Mc Kenzie	*0.314*

the mean score of the subjects was 19.40, with a standard deviation of 5.910 and a standard error of the mean of 1.869. After treatment, the significant difference between the NPRS scores shows the effectiveness of the Alexander technique in subjects. The correlation between pre and post-treatment scores was .876, with a p-value of .001 which was highly significant.

The Alexander technique is a widely used method to reduce pain. According to studies, up to a 42% decrease in the Roland disability score and an 86% decrease in pain compared to the control group has been observed when the Alexander technique is used. In one such study, the group that received six lessons in the Alexander technique experienced a 17% decrease in their Roland disability score and a 48% decrease in days in pain. Exercise resulted in a 17% decrease as well on the Roland disability scale but had no effect on days in pain. The therapeutic massage group had no change in their Roland disability score but had a 33% decrease in days in pain. The group that received 24 lessons in the Alexander technique experienced a significant improvement over others (Machado et al. 2010).

In the McKenzie group, the mean score of the subject before the treatment was 48.20, the standard deviation was 15.859, and the standard error of the mean was 5.015. After treatment, the mean score of the subject was 19.70, the standard deviation was 9.452, and the standard error of the mean was 2.989. The difference shows the effectiveness of McKenzie's method in subjects.

The correlation between pre-and post-treatment was .944, and the p-value was .000. This underscores the fact that the McKenzie method was more effective in lumbosacral radiculopathy.

The McKenzie method produces results immediately and can eliminate the symptoms permanently if the method is continued. With all things being considered, the McKenzie method is superior to the Alexander technique for patients with lumbosacral radiculopathy that would like to avoid invasive treatments in the future. It places the patient in the driver's seat to control his or her quality of life by doing daily stretching in their 'preferred direction' and maintaining healthy back posturing throughout their daily life. Patients committed to healing themselves from lumbosacral radiculopathy will be successful most of the time, and surgery rarely will be required (Hollett 2015).

Clare and colleagues conducted a study in which the lumbar extension was measured in two

positions, standing and prone, with three methods, inclinometer, Schober, and fingertip to the floor, on Day 1 and Day 5 of treatment. Patients completed a global perceived effect (GPE) scale on Day 5. Construct validity was tested by comparing extension improvement and the GPE scores between the two groups The results of this study support the measurement of lumbar extension for patients treated with extension procedures and provide evidence for the construct validity of one aspect of the McKenzie treatment model (Clare, Adams, and Maher 2004).

5. Conclusions

The Alexander technique with core stability exercise and McKenzie method is effective in lumbosacral radiculopathy LBP, but the response was slightly different in each case. McKenzie was slightly more effective and responded from day first to the end of treatment coition, but reoccurrence occurred due to weak muscles, poor working posture, and weight lifting in daily life activity. Alexander's technique was slow in the first two weeks. After two weeks, both Alexander and McKenzie's methods showed similar responses. Reoccurrence was less in the Alexander technique as compared with McKenzie. Finally, we concluded that the combination of the Alexander technique with core stability exercises and the McKenzie method would be more effective in patients with lumbosacral radiculopathy.

Conflict of interest

The authors declare that they have no conflicts of interest to disclose.

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Study Approval

The review board of the Abasyn University Peshawar, Pakistan, approved this study.

Consent Forms

Each participant signed a consent form. These forms are available with the authors.

Authors Contributions

MSS conceptualized the study and wrote the initial manuscript, MWK helped with the literature search analysis and writing the first draft, MWK & MA did the data collection and review of the studies, and MSS supervised the whole project and wrote the final manuscript.

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