

The Mckenzie Methodwith Interferential Therapy on Acute Low Back Pain (Sciatica) Patients: A Randomised Controlled Clinical Trial

Sedhuraja Malaichamy¹, Meghana Palkhade^{2*}, Charusmita Badgular³, Satyajit Kumbhar⁴

¹Professor, SVJCT's BKL Walawalkar College of Physiotherapy, Sawarde, Ratnagiri District, Maharashtra, India

²Associate Professor, SVJCT's BKL Walawalkar College of Physiotherapy, Sawarde, Ratnagiri District, Maharashtra, India, ^{3,4}Assistant Professor, SVJCT's BKL Walawalkar College of Physiotherapy, Sawarde, Ratnagiri District,

Maharashtra, India,

How to cite this article: Malaichamy S, Palkhade M, Badgular C, Kumbhar S. The Mckenzie Methodwith Interferential Therapy on Acute Low Back Pain (Sciatica) Patients: A Randomised Controlled Clinical Trial. 2024;18(1):83-89.

ABSTRACT

Purpose: To investigate the effect of McKenzie method with Interferential therapy (IFT) when compared to IFT alone on acute low back pain (Sciatica) patients in terms of relieving pain, increasing lumbar extension range of motion and speed of walking.

Methods: Randomised controlled clinical trial, fifty seven patients were screened; forty sciatica patients aged from 30 to 60 years with no recent injury were selected through the special tests, after randomisation, the experimental group (n-15) was treated with the McKenzie method and Interferential therapy whereas control group (n-15) was treated with the Interferential therapy alone. The primary outcome was the relief of low back pain and increasing the lumbar extension range of motion. The secondary outcome was the speed of walking by measuring the stride length and cadence for 10 meters.

Result: The study aimed to compare the pain, lumbar extension range of motion (ROM), stride length, and cadence of two different teams before and after physiotherapy. The experimental team had an average pain score of 7.70 VAS, a lumbar extension range of motion of -3.70 degrees, a stride length of 56.70 cms, and a cadence of 115.35 steps. In post-physiotherapy, the team had an average pain score of 2.20 VAS, a lumbar extension range of motion of 24.85 degrees, a stride length of 58.65 cms, and a cadence of 113.15 steps. The mean difference in pain, ROM, stride length, and cadence was statistically significant. The results suggest that physiotherapy can be a valuable tool for improving pain management and reducing back pain.

Conclusion: McKenzie method with Interferential therapy showed greater relief of low back pain, increased lumbar extension range of motion, increased speed of walking in terms of step length and cadence than IFT alone.

Keywords: McKenzie method, Interferential Therapy, Acute Low back pain (Sciatica) Patients.

INTRODUCTION

Sciatica is a chronic condition that results in excruciating low back pain that spreads to the posterior thigh, where the sciatic nerve is innervated. It continues to be a significant global public health issue with serious

socioeconomic, physical, and psychological effects. Due to the lack of agreement on diagnostic and treatment guidelines, studies suggested various diagnostic methods. When it comes to management and treatment, there is conflicting evidence regarding the use of

Corresponding author: Meghana Palkhade, Associate Professor, SVJCT's BKL Walawalkar College of Physiotherapy, Sawarde, Ratnagiri District, Maharashtra, India.

Email: drmeghana4280@gmail.com,

Submission: 21st Oct 2024

Revision: 29th Oct 2023

Publication date: 9th Jan 2024

painkillers, surgical interventions, and alternative options as well as their efficacy, with the majority of studies contrasting one another in addition to the dearth of high-quality trials^[1]. Depending on the population, sciatica is a relatively common musculoskeletal disorder with a prevalence of 2–5%. It results in high societal health-related costs and a high disability burden for people with sciatica^[2]. Lumbar disc herniation (LDH)-related pain is usually more severe than non-specific lumbar pain. Patients with LDH had greater pelvic rotation when walking, and the relative phase of the horizontal rotation of pelvis and thorax decreased compared with healthy persons^[3]. Pain intensity can affect the spatiotemporal gait parameters in patients with Low back pain (LBP). Rehabilitation programs with gait optimization should be considered in the management of patients with LDH and Chronic mechanical low back pain (CMLBP)^[4].

The McKenzie back exercises are a part of an exercise regimen developed in the 1950s by physiotherapist Robin Anthony McKenzie and made well-known around 1985. The Mechanical Diagnosis and Therapy (MDT), also known as the McKenzie method, is a classification system that is frequently used for the diagnosis and treatment of a number of musculoskeletal conditions, including lower back, neck, and extremity pain. The McKenzie method has wide acceptance as an effective program for back pain. It stresses self-treatment through posture correction and repeated exercise movements at end-range performed with high frequency. The McKenzie method emphasizes the centralization phenomenon in the assessment and treatment of spinal pain, in which pain originating from the spine refers distally, and through targeted repetitive movements the pain migrates back toward the spine. The clinician will then use the information obtained from this assessment to prescribe specific exercises and advise on which postures to adopt or avoid^[5].

Short-term treatment of patients with low back pain in **sub-** acute and chronic stage with the McKenzie method is more effective in reducing pain, and is more effective in sub-acute stage, increasing mobility and reducing pain.

Chronic low back pain patients need to be treated for longer periods, with the McKenzie Method.

Short-term treatment of patients with low back pain in sub-acute and chronic stage with the McKenzie method is more effective in reducing pain, and is more effective in sub-acute, increasing mobility and reducing pain. Chronic low back pain patients need to be treated for longer periods, with the McKenzie Method.⁶ McKenzie therapy is an effective method for managing back pain in the short term (<3 months) compared with other therapies, but only through sound randomized controlled trials (RCTs) that will be able to determine the exact efficacy of McKenzie therapy.⁷ In patients with low back pain, a meta-analysis of RCTs had been planned to compare physical therapy interventions with placebo or with no intervention. The primary outcomes would be pain intensity and disability. Finally, in chronic low back pain, the physical therapy exercise approach remains a first-line treatment and should be routinely used^[8]. Within the McKenzie framework, Directional Preference (DP) exercises are commonly utilized in clinical practice for managing LBP. Although underpinned by a modest body of evidence, DP exercises have been shown to have positive effects in the management of LBP. Because the McKenzie method promotes self-management, the use of DP exercises, in conjunction with other common manual therapy treatments, such as mobilization, manipulation, and general exercise, may present a cost-effective and time-efficient approach to managing LBP.⁹

Interferential therapy combined with exercise therapy could help to reduce pain intensity and increase spinal range of motion in patients with low back pain^[10]. Interferential therapy combined with exercise therapy might be useful in treating low back pain.¹¹

The primary outcome was the relief of low back pain and increasing the lumbar extension range of motion. The secondary outcome was the speed of walking by measuring the stride length and cadence for 10 meters. The purpose of this research study was to compare the effectiveness between the McKenzie method with Interferential Therapy group and the Interferential Therapy alone group among Sciatica Patients.

MATERIALS AND METHODS

Study Design

This was a randomized controlled clinical trial conducted among patients with acute discogenic sciatica. Before the commencement of this study, the institutional scientific and ethics committee of SVJCT's BKL Walawalkar College of physiotherapy, Sawarde, Maharashtra approved on September 30, 2022 (EC/NEW/INST/2020/320).

Intervention

The study included patients aged 30-60 with sciatica, positive for Lasegue's Test, Bowstring test, and Slump test. Exclusions included serious spinal pathology, neurological problems, severe osteoporosis, rheumatoid arthritis, anticoagulation therapy, dermatological condi-

tions, epilepsy, patients with pacemakers, advanced cardiovascular conditions, hypotension, pregnant and lactating females, and those with epilepsy conditions.

The study involved 57 patients, with 17 excluded due to non-compliance criteria. The patients were divided into an experimental group and a control group. The experimental group received the McKenzie method with interferential therapy, which included various techniques for lumbar extension range of motion. The patient was then asked to walk on a marked floor for 10 meters to measure stride length and cadence.

The experimental group underwent the McKenzie method for 20 minutes, followed by interferential therapy for 30-40 minutes per day. The patient was asked to relieve pain by

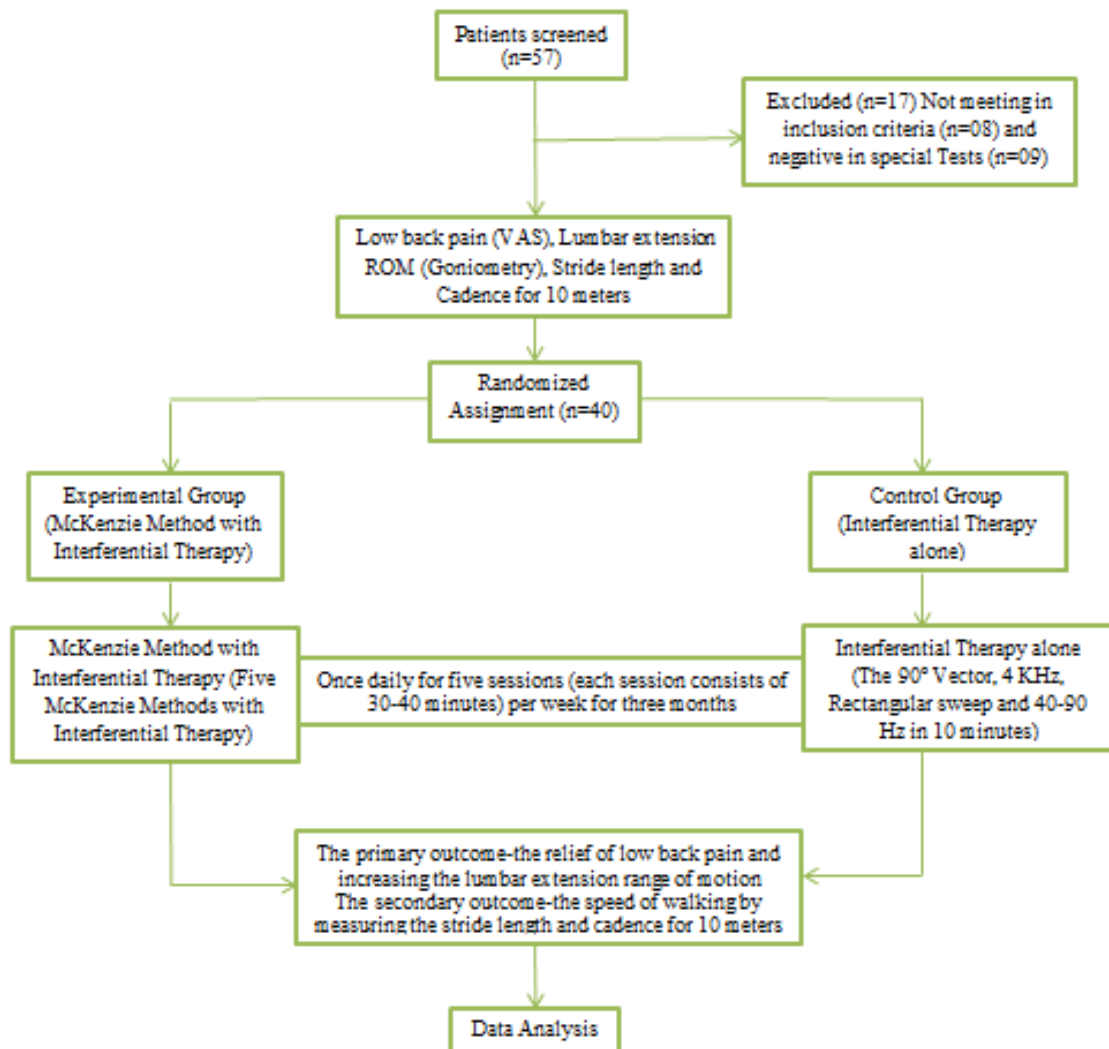


Fig. 1: Consort diagram illustrating the study design

scoring below 3 on the VAS scale. The control group received the conventional method of interferential therapy (IFT) using a BIONICA brand. The IFT consisted of dual channels, 3.4 kg weight, 4000 Hz frequency, and 230 volts. The patient was then asked to walk on the marked 10 meters distance on the floor to measure stride length and cadence. The study highlights the importance of standardized training protocols for both interventions in addressing low back pain.

The treatment lasting 30 to 40 minutes for one patient was given in once daily for five sessions per week. Both groups were taken with two types of treatments simultaneously for three months.

Data analysis

Collected data were entered in excel software and analysed used R software version 4.0.1. Continuous variables were presented as mean and standard deviation and categorical variables were presented as count and per cent. Paired t-test was done to compare the means between without windlass and with windlass. $P < 0.05$ was considered statistically significant.

Results

Out of 40 Patients, 20 (50%) male and 20 (50%) female patients took part in this study. Overall average age was 39.07 years.

The study analyzed patients treated with McKenzie Method with Interferential therapy, with an average age of 40.4 years. The patients experienced pre-physio pain of 7.70 and post-physio pain of 2.20, with a mean p value of 0.000. The average pre-physio extension ROM by Goniometry was -3.70 and 24.85, respectively. The average pre-physio stride length was 56.70 cms, and the average post-physio stride length was 58.65 cms. The average pre-physio cadence

was 115.35 steps, and the average post-physio cadence was 113.15 steps. In contrast, the average age of the patients treated with Interferential therapy alone was 37.75 years. The pre-physio pain was 7.70, post-physio pain was 5.45, and the average pre-physio extension ROM was -3.00. The average pre-physio stride length was 56.75 cms, and the average post-physio stride length was 57.55 cms.

In Pre-Physiotherapy, in the low back pain outcome variable, the average pain for the experimental team was 7.70 VAS Score with a SD of 1.08 and for the control; the team was 7.70VAS Score with a SD of 1.08. The mean difference ($p = 1.000$) was statistically not significant. In the lumbar extension range of motion (ROM) outcome variable, the average extension ROM for the experimental team was -3.70degrees with an SD of 1.17 degrees and -3.00 degrees with an SD of 1.49 for the control team. For extension ROM, the mean difference ($p = 0.107$) was statistically significant. In the stride length variable, the average stride length for the experimental team was 56.70cms with a SD of 1.56 cms and for the control; the team was 56.75 cms with a SD of 1.86 cms. In terms of stride length, the mean difference ($p = 0.927$) was statistically significant. In the cadence outcome variable, the average cadence for the experimental team was 115.35 steps with a SD of 3.95 steps and for the control; team was 114.75 steps with a SD of 4.00 steps. For cadence, the mean difference ($p = 0.636$) was statistically significant.

In Post-Physiotherapy, in the low back pain outcome variable, the average pain for the experimental team was 2.20 VAS Score with a SD of 0.62 and for the control; the team was 5.45 VAS Score with a SD of 0.60. The mean difference ($p = 0.000$) was statistically significant. In the lumbar extension range of motion (ROM) outcome variable, the average extension ROM for the experimental team was 24.85 degrees with an SD of 1.35 degrees and 18.40 degrees with an SD of 1.35 for the control team. For extension ROM, the mean difference ($p = 0.000$) was statistically significant. In the stride length variable, the average stride length for the experimental team was 58.65 cms with a SD of 1.53cms and for the

Table 1: Baseline characteristics of the sciatica patients

Characteristics	Experimental Group		Control Group	
	Average	SD	Average	SD
Age (Years)	40.04	0.41	37.8	0.26
BMI (Kg/m ²)	25.57	2.63	25.38	3.99

control; the team was 57.55 cms with a SD of 1.70 cms. In terms of stride length, the mean difference ($p = 0.038$) was statistically significant. In the cadence outcome variable, the average cadence for the experimental team was 113.15 steps with a SD of 3.82 steps and for the control; team was 113.40 steps with a SD of 4.15 steps. For cadence, the mean difference ($p = 0.844$) was statistically significant.

DISCUSSION

The study was carried out to determine the effectiveness between McKenzie Method with interferential therapy and interferential therapy alone among the sciatica patients. The result of the present study showed that the McKenzie method with Interferential therapy reduced the intensity of low back pain, increased the lumbar extension range of motion and increased the speed of walking in terms of stride length and cadence than interferential therapy alone. The strength of the study was that there were practice sessions and repetitions that were incorporated in the testing procedure.

A study found that comparing exercise prescriptions to patients with disc prolapse significantly decreased pain and medication use, improving overall outcomes, and has significant implications for LBP management^[13]. Neurodynamic exercises to extension-oriented exercises for patients with nerve-related leg pain and a directional preference. As this study has a small and very specific sample, results may be interpreted with caution^[14]. In two differentiated clusters, the two clusters were individualized regarding the temporo-spatial parameters (opposite foot contact, step width) as well as the kinematic parameters (maximum upward rotation in stance of pelvis, maximum adduction of the hip instance, maximum abduction of the hip in swing, maximum plantar flexion angle in swing, total sagittal plane excursion of the ankle)^[15].

Acute low back pain with sciatica is a benign disorder that can be managed with passive physical therapy, medication, and therapeutic injections. Self-management techniques and exercise programs are effective, but the optimal regimen varies. Chronic low back pain requires

aggressive, multidisciplinary management, including self-administered traction, corsets, and medications^[16]. In patients with sciatica, centralization was common and associated with improvement in activity limitation and leg pain. Centralization was very common in ruptured disc therefore the study does not support the theory that centralization only occurs if the intra-discal hydrostatic mechanism was functional.^[17]

For patients with low back pain, the McKenzie method of physical therapy and chiropractic manipulation had similar effects and costs, and patients receiving these treatments had only marginally better outcomes than those receiving the minimal intervention of an educational booklet. Whether the limited benefits of these treatments were worth the additional costs was open to question^[18]. Exercise intervention programmes involving either muscular strength, flexibility or aerobic fitness was beneficial for Non-specific chronic low back pain (NSCLBP) but not acute low back pain. Non-specific acute low back pain patients recovered in 4–6 weeks with or without a treatment, and exercising should be avoided to reduce the swelling of the affected area^[19]. In patients with chronic nonspecific low back pain, both McKenzie and stabilisation exercises reduced functional disability more effectively than traditional exercise programmes.^[20]

The interferential therapy combined with exercise therapy might be useful in treating low back pain.^[21] The interferential therapy along with McKenzie extension bias exercise had been positive impact in reducing pain, disability and spinal extensors muscle strength in patients with chronic low back pain.^[22]

LIMITATIONS

This research study has a few limitations. Only 40 sciatica patients (smaller group) were participated due to time constraints. Only 10 meters distance (shorter distance) was available in outpatient physiotherapy department to measure the walking parameters of patients. Some patients were consumed with medications for low back pain.

CONCLUSION & SUGGESTIONS

This randomized controlled clinical trial demonstrated that the effectiveness of McKenzie method with interferential therapy was superior to that interferential therapy alone in relieving the low back pain, increasing the lumbar extension range of motion and improving the speed of walking in terms of increased step length and decreased cadence for 10 meters. No serious adverse events occurred in either group. This McKenzie method with interferential therapy may help the sciatica patients from unwanted and unnecessary surgeries in their life span. Further studies are needed to examine the effectiveness of McKenzie method relative to various physical therapy methods for patients with discogenic sciatica.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of Interest

There is no conflict of interest among the authors.

References

- Fairag M, Kurdi R, Alkathiry A, Alghamdi N, Alshehri R, Alturkistany FO, Almutairi A, Mansory M, Alhamed M, Alzahrani A, Alhazmi A. Risk Factors, Prevention, and Primary and Secondary Management of Sciatica: An Updated Overview. *Cureus*. 2022 Nov 12;14(11):e31405. doi: 10.7759/cureus.31405. PMID: 36514653; PMCID: PMC9743914.
- Euro U, Heliövaara M, Shiri R, Knekt P, Rissanen H, Aromaa A, Karppinen J. Work-related risk factors for sciatica leading to hospitalization. *Sci Rep*. 2019 Apr 25;9(1):6562. doi: 10.1038/s41598-019-42597-w. PMID: 31024023; PMCID: PMC6484005.
- Lee K, Kim ES, Jung B, Park SW, Ha IH. Association between pain and gait instability in patients with lumbar disc herniation. *J Int Med Res*. 2021 Aug;49(8):3000605211039386.
- Bonab M, Colak TK, Toktas ZO, Konya D. Assessment of Spatiotemporal Gait Parameters in Patients with Lumbar Disc Herniation and Patients with Chronic Mechanical Low Back Pain. *Turk Neurosurg*. 2020;30(2):277-284.
- Mann SJ, Lam JC, Singh P. McKenzie Back Exercises. [Updated 2022 Jul 4]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK539720/>
- Arbnorelbrahimaj, SamireDeliu, SylejmanMiftari. Effectiveness of the mckenzie method in the treatment of low back pain in subacute and chronic stage. *Research in Physical Education, Sport and Health* 2015, Vol. 4, No. 1, pp.79-86.
- Busanich BM, Verscheure SD. Does McKenzie therapy improve outcomes for back pain? *J Athl Train*. 2006 Jan-Mar;41(1):117-9.
- Shipton, E.A. Physical Therapy Approaches in the Treatment of Low Back Pain. *Pain Ther* 7, 127-137 (2018).
- Angela Dunsford and Saravana Kumar and Sara Clarke. Integrating evidence into practice: use of McKenzie-based treatment for mechanical low back pain. *Journal of Multidisciplinary Healthcare*. 2011,Vol-4,393-40212
- Olawale O A, Agudzeamegah C M. The efficacy of interferential therapy and exercise therapy in the treatment of low back pain. *Niger J ExpClinBiosci* 2014;2:10-4
- The efficacy of interferential therapy and exercise therapy in the treatment of low back pain OA Olawale, CM Agudzeamegah, *Nigerian Journal of Experimental and Clinical Biosciences*, Year: 2014, Volume: 2, Issue: 1, Page:10-14
- <https://www.indiamart.com/proddetail/interferential-electrotherapy-comp-ift-physiotherapy-bionics-12547067630.html> (Accessed on 04/01/23)
- Long A, Donelson R, Fung T. Does it matter which exercise? A randomized control trial of exercise for low back pain. *Spine (Phila Pa 1976)*. 2004 Dec 1;29(23):2593-602.
- Sousa Filho LF, Barbosa Santos MM, Matos Vasconcelos DB, Soares EA, Dos Santos GHF, da Silva Júnior WM. Neurodynamic exercises provide no additional benefit to extension-oriented exercises in people with chronic low back-related leg pain and a directional preference: A randomized clinical trial. *J BodywMovTher*. 2022 Apr;30:140-147.
- Tacu C, Rezuş E, Boiculese LV, Stratulat IS, Miu SN. Differentiation of patients with chronic lombosciatica due to disc hernia using gait analysis techniques. *Rev Med ChirSoc Med Nat Iasi*. 2010 Jul-Sep;114(3):694-9. PMID: 21235116.
- Wheeler AH. Diagnosis and management of low back pain and sciatica. *Am Fam Physician*. 1995 Oct;52(5):1333-41, 1347-8. PMID: 7572557.
- Albert HB, Hauge E, Manniche C. Centralization in patients with sciatica: are pain responses to repeated movement and positioning associated with outcome or types of disc lesions? *Eur Spine J*. 2012 Apr;21(4):630-6.
- Cherkin DC, Deyo RA, Battié M, Street J, Barlow W. A comparison of physical therapy, chiropractic manipulation, and provision of an educational booklet for the treatment of patients with low back pain. *N Engl J Med*. 1998 Oct 8;339(15):1021-9.
- Gordon R, Bloxham S. A Systematic Review of the Effects of Exercise and Physical Activity on Non-Specific Chronic Low Back Pain. *Healthcare (Basel)*. 2016 Apr 25;4(2):22.

20. Alhakami AM, Davis S, Qasheesh M, Shaphe A, Chahal A. Effects of McKenzie and stabilization exercises in reducing pain intensity and functional disability in individuals with nonspecific chronic low back pain: a systematic review. *J PhysTher Sci.* 2019 Jul;31(7):590-597. doi: 10.1589/jpts.31.590. Epub 2019 Jul 9. PMID: 31417227; PMCID: PMC6642883.
21. Olawale O A, Agudzeamegah C M. The efficacy of interferential therapy and exercise therapy in the treatment of low back pain. *Niger J ExpClinBiosci* 2014;2: 10-4
22. Anshika Singh¹, SumitRaghav. Effect of Interferential therapy along with McKenzie Extension Bias Exercises on Pain, Disability and Spinal Extensors Muscles Strength among the Patients with Chronic Low Back Pain. *Indian Journal of Public Health Research & Development*, (2020). 11(9), 155-161.