

Comparison of the Effectiveness of Core Strengthening Exercise and McKenzie Extension Exercise on the Pain Functional Disability in Lumbar PIVD Condition

Jyoti Sharma¹, Niraj Kumar², Shashank Kumar³

Abstract

Introduction: The term prolapsed disc means the protrusion or extrusion of the nucleus. It is not a onetime phenomenon rather it is a sequence of change in the disc which ultimately leads to its prolapsed. It is a spinal condition that can cause lower back pain as well as numbness, tightness of muscle, pins and needles sensation, and feeling of muscle weakness in the lower body. **Need for Study:** There are many researches being done on the effects of core strengthening exercises and McKenzie extension exercise on low back pain separately. I want to compare both of them to derive a better and effective exercise plan for low back pain of lumbar prolapsed intervertebral disc condition. **Methods:** 30 subjects were selected and divided into 2 groups randomly. The Group A subject received McKenzie extension exercise The group B subject received Core strengthening exercise. Both the group were treated for 2 weeks. The patients were treated for 6 sessions on a week. Pre intervention measurements for pain intensity using VAS, and functional disability using ODI for low back pain (both groups). **Result:** Student t test was used to compare the data of the two groups. The subject's conditions were similar between the groups, with regard to all variables selected. There was significant difference observed with respect to V.A.S. and O.D.I between McKenzie extension exercise and Core strengthening exercise. Hence McKenzie extension exercise were found to be more effective in comparison to core strengthening. **Conclusion:** The present study concluded that McKenzie extension exercise protocol was more effective in comparison to core strengthening in low back pain with PIVD condition.

Keywords: Visual Analogue Scale; Prolapsed Lumbar Intervertebral Disc; Oswestry Disability Index; Short Wave Diathermy; Transcutaneous Electrical Nerve Stimulation.

Introduction

The intervertebral disc is the main joint between two consecutive vertebrae in the vertebral column. Each disc consists of three different structures: an inner gelatinous nucleus pulposus, an outer annulus fibrosus that surrounds the nucleus pulposus, and two cartilage endplates that cover the upper and lower surfaces of vertebral body [2] (Fig. 1A).

The intervertebral discs lie between the vertebral bodies, linking them together They are the main surrounds a more gelatinous core known as the

nucleus pulposus; the nucleus pulposus is sandwiched inferiorly and superiorly by cartilage endplates [3] (Fig. 1A).

The term prolapsed disc means the protrusion or extrusion of the nucleus. It is not a onetime phenomenon rather it is a sequence of change in the disc which ultimately leads to its prolapsed. It is a spinal condition that can cause lower back pain as well as numbness, tightness of muscle, pins and needles sensation, and feeling of muscle weakness in the lower body. This is also referred as a herniated or ruptured disc and is usually caused by normal age related deterioration [1] (Fig. 1B).

Degeneration of the lumbar intervertebral disc is a major factor associated with low back pain. In fact, the risk of developing low back pain increases with the severity of degenerative disc changes. [4].

Core stability' is defined as the ability to control the position and motion of the trunk over the pelvis to allow optimum production, transfer and control of force and motion.

Author Affiliation: ¹Assistant Professor, Shree Sahajanand Institute of Management, Bhavnagar, Gujarat 364002, India. ²Associate Professor ³Lecturer, Shri Guru Ram Rai Institute of Medical & Health Sciences, Patel Nagar, Dehradun, Uttarakhand 248001, India.

Reprint Request: Jyoti Sharma, Assistant Professor, Shree Sahajanand Institute of Management, Bhavnagar, Gujarat 364002, India.

E-mail: drjyotisharmapt@gmail.com

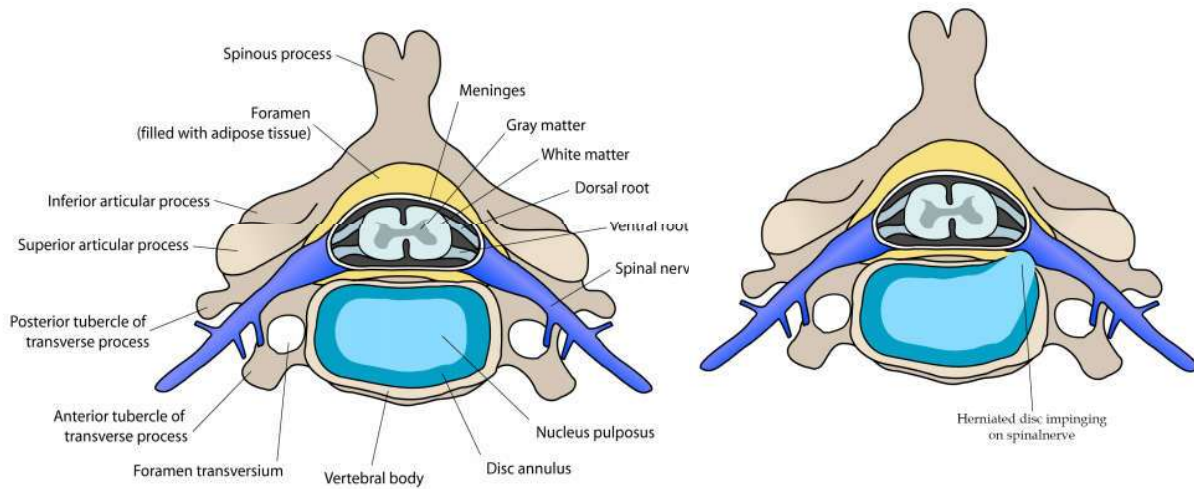


Fig. 1a: vertebral structure and b: herniated disc

Core strengthening has become a major trend in rehabilitation. The term has been used to lumbar stabilization, motor control training, and other regimens. Core strengthening is, in essence, a description of the muscular control required around the lumbar spine to maintain functional stability [5].

The most significant biochemical change to occur in disc degeneration is loss of proteoglycan the osmotic pressure of the disc matrix and therefore a loss of hydration [3].

The major player in the stabilizing role for the posterior elements in the lumbar spine is the facet joint. This is an important point in all type of stability evaluation.

Need for Study

There are many researches being done on the effects of core strengthening exercises and McKenzie extension exercise on low back pain separately. I want to compare both of them to derive a better and effective exercise plan for low back pain of lumbar prolapsed intervertebral disc condition.

Aim and Objective of the Study

To compare the effectiveness of Core strengthening versus McKenzie Extension Exercises on pain for Low Back Pain of lumbar prolapsed intervertebral disc condition.

To evaluate the effectiveness of McKenzie extension exercise of low back pain, and reducing pain.

To evaluate the effectiveness of Core strengthening exercise of low back pain and reducing pain.

Research Question

Is Core strengthening exercise or McKenzie extension exercise more effective on Pain & functional disability in PIVD?

Hypothesis

Null hypothesis

There will be no significant effect of core strengthening exercise and McKenzie extension exercise on the pain & functional disability in low back pain of lumbar prolapsed disc condition.

Alternative Hypothesis

1. There would be a significant effect of the core strengthening exercise Or McKenzie extension exercise on the pain & functional disability in low back pain of lumbar prolapsed intervertebral disc condition.
2. There will be significant correlation between pain value of (VAS) group A McKenzie extension exercise and group B core strengthening exercise.

Operational Definitions

Prolapsed Intervertebral Disc problems: The term prolapsed disc means the protrusion or extrusion of the nucleus. It is not a onetime phenomenon rather

it is a sequence of change in the disc which ultimately leads to its prolapsed. It is a spinal condition that can cause lower back pain as well as numbness, tightness of muscle, pins and needles sensation, feeling of muscle weakness in the lower body [1].

McKenzie- McKenzie extension exercises restore or maintain the lumbar lordosis or decrease low back pain [6] and their aim is centralizing pain, pain relief and regaining functionality [7].

VAS- Visual analogue scale is a psychometric response scale which can be used in questionnaires. It is a measurement instrument for subjective characteristics or attitudes that cannot be directly measured.

1RM (Repetition maximum)-purposes: to provide maximum strength of various muscle and muscle group.

TENS- (Transcutaneous Electrical Nerve Stimulation) TENS is devices used by physiotherapy to aid the management of pain, delivered a low voltage electrical current to nerves via conductive pads called electrodes which are placed over specific area of the skin.

SWD- (Short wave diathermy) The use of high – frequency electromagnetic currents as a form of physical therapy.

Review of Literature

Gillan M.G.C, Ross J.C, McLean I.P, Porter R.W, (1998) [8]. The study has showed Lumbosacral list is a clinical sign that is frequently associated with low back pain and intervertebral disc lesions. Trunk list was measured over a period of 90 days and patients completed Oswestry Disability Questionnaires. There was a significantly greater resolution of list after 90 days in the group receiving McKenzie treatment compared to the control group.

Moldovan M, (2012) [7]. This is comparative study and the aim of the present study is to compare these two protocols, McKenzie and Williams, in terms of principles and exercises, in order to reveal which one is more suitable in LBP. They found McKenzie protocol is more efficient than the Williams one in terms of pain relief, pain occurrence while sitting, lumbar mobility.

Gupta S, (2015) [9]. Study is designed to compare the effectiveness of McKenzie Extension Exercises versus William's flexion Exercises for reducing Low Back Pain in B.PT. Students. this is conducted Experimental study, Randomized Control Trial. 30

Low Back Pain subjects were recruited into two groups, outcome measure using NPRS Scale. They found the McKenzie extension exercise group was more effective in reducing low back pain for B.PT. Students as compared to William's Flexion Exercises group.

Roy M. H, Anap D, (2015) [10]. Analysis of this study combined effect of Core Strengthening exercise and McKenzie exercise on PIVD. They found McKenzie and core strengthening exercise is improving the range of motion and reducing pain on PIVD.

Szulc P, Wendt M, Waszak M, Tomczak M, Ciećlik K, Trzaska T, (2015) [11]. The aim of this study was to analyze the efficacy of combined treatment with McKenzie method and Muscle Energy Technique (MET), and to compare it with the outcomes of treatment with McKenzie method or standard physiotherapy in specific chronic lumbar pain. The study included 60 men and women with LBP DATA was analyzed with the using of VAS They found combined method can be effectively used in the treatment of chronic LBP.

Ferreira P. H, Ferreira M. L, Christopher G Maher C. G, Robert D Herbert R. D, and Kathryn Refshauge (2006) [12]. This study has showed systematic review of the efficacy of specific stabilization exercise for spinal and pelvic pain. They found that The available evidence suggests that specific stabilization exercise is effective in reducing pain and disability in chronic but not acute low back pain.

Warude T, S. Shanmugam S, (2012) [13]. The aim of this study was to analyze the efficacy of combined treatment with McKenzie and mobilization SNAGS. They found that effectiveness in improving pain, functional ability & ROM in prolapsed intervertebral disc with unilateral radiculopathy, later is more effective.

Brian M. Busanich; Susan D. Verscheure (2006) [14]. Analysis the study McKenzie Therapy Improve Outcomes for Back Pain. The study has showed the reliability of McKenzie with the using of Pedro scale. They found that review provides evidence that McKenzie therapy results in a decrease in short-term pain and disability for low back pain patients compared with other standard treatments, such as no steroidal anti-inflammatory drugs.

Hauggaard A, Persson A.L, (2007) [15]. Analysis of this study was to evaluate the effects of specific spinal stabilization exercises in patients with low back pain The intervention method should have

included specific spinal stabilization exercises including co-contraction of multifidus muscles and transverses abdominal muscles. Ten relevant randomized controlled trials with a study population of patients with acute, sub-acute or chronic LBP Seven were high quality and three were low quality. They were found moderate evidence of improved disability and/or pain level, increased multifidi cross-sectional area.

Ponte D. J, Jensen G. J, Kent B. E, (1984) [16]. A comparative study they were randomly assigned to determine whether the Williams or McKenzie protocol of treatment was more effective in both decreasing pain. Subjects required to perform Williams and Mckenzie protocol were assigned accordingly. Twenty-two subjects underwent an initial evaluation which involved six measurements: subjective pain, comfortable sitting time, forward flexion, right and left lateral flexion, and straight leg raise Following the completion of treatment, a second evaluation was performed taking the same six. They found that improvement scores of the two groups indicated that those receiving the McKenzie protocol improved to a significantly.

Audrey L. (1995) [17]. The study was conducted 243 patients with CLBP to determine centralization phenomena They found can help identify sub group within the population with CLBP, could be useful goal tool rehabilitation of low back pain.

Choi G, Raiturker P. P, Kim M. J, Jin C. D, Chae Y. S, Lee S.H, (2005) [18]. The study has showed to determine the effects of a postoperative early isolated lumbar extension muscle-strengthening program on pain, the Seventy-five patients were randomized into an exercise group 20 men, 15 women and a control group 18 men, 22 women . All patients completed the visual analog scale and the Oswestry disability index to assess pain and disability, respectively. Return to work data were also investigated.

Rackwitz B, Bie R.D, Ewert T, Stucki G,(2006) [19]. Analysis to systematic review of randomized controlled trials To evaluate the effectiveness of segmental stabilizing exercises for acute, sub acute and chronic low back pain with regard to pain, recurrence of pain, disability and return to work. Four comparisons were foreseen, 1 effectiveness of segmental stabilizing exercises versus treatment by general practitioner 2 effectiveness of segmental stabilizing exercises versus other physiotherapy treatment,3 effectiveness of segmental stabilizing exercises combined with other physiotherapy treatment versus treatment by GP 4 effectiveness of segmental stabilizing exercises combined with other physiotherapy treatment versus other

physiotherapy treatment. They found that segmental stabilizing exercises are more effective than treatment by GP but they are not more effective than other physiotherapy interventions.

Hoy D., Brooks P., Blyth F and Buchbinder R et al. (2010) [20]. Studies cleared that low back pain is an extremely common problem, which most people experience at some point in their life. Most cases, run a chronic-episodic course. It has a huge impact on individuals, families, communities, governments and businesses throughout the world.

Ehrlich G.,(2003) [21]. The incidence and prevalence of low back pain are roughly the same world over- wherever epidemiological data have been gathered or estimates made - but such pains rank high (often first) as a cause of disability and inability to work, as an interference to the quality of life, and as a reason for medical consultation.

Jayaram M., Kumar M, R. Raja, Prashantha S, Rajeeva A, Veena J, Rajini S. Rao.(20 15)[22]. The aim of this study was to assess the effectiveness of abdominal strengthening and spinal extensors strengthening along with SWD in reducing pain, disability and improving range of motion in subjects with chronic low back ache, and to compare this effectiveness between the two groups. Treatment outcomes were assessed using VAS for pain intensity, Modified-Modified Schober's Test for range of motion, and Modified Oswestry Disability Questionnaire (MODQ) for functional disability. Shortwave diathermy with abdominal strengthening exercises is more effective than with spinal extensor strengthening exercises in reducing pain and enhancing functional performance in subjects with chronic low back ache.

Brumitt j.,Matheson]W., Erik P. Meira,(2013) [23]. The study has showed to evaluate common conservative treatment is therapeutic core stabilization exercises, which can address pain and musculoskeletal dysfunction in patients with low back pathology rehabilitation strategies to assess core function and promote core stabilization. Each has been developed based on biomechanical models of lumbar segmental stability and observed motor control dysfunction in patients with low back pain.

Research Methodology

This is a comparative study. Thirty (30) subjects participated in this study with prolapsed disc condition and study was done in SGRRIMHS department of physiotherapy at Patel Nagar Dehradun.

The duration of study 2 weeks. Random Sampling was done. Subjects were randomly divided into 2 groups.

Inclusion criteria, Subjects between age 20-50 years, both males and females, Duration of low back pain more than 15 Days, Prolapsed disc with radiating or not radiating pain.

Subjects were excluded if they had any recent spinal surgery or advised for surgery, Subjects with L.B.P of duration less than 15 days, Subjects with any renal diseases, Subjects with spinal conditions like, Tumors, Spondylolsthesis, infection and spinal fracture, Systemic disease- spinal tuberculosis.

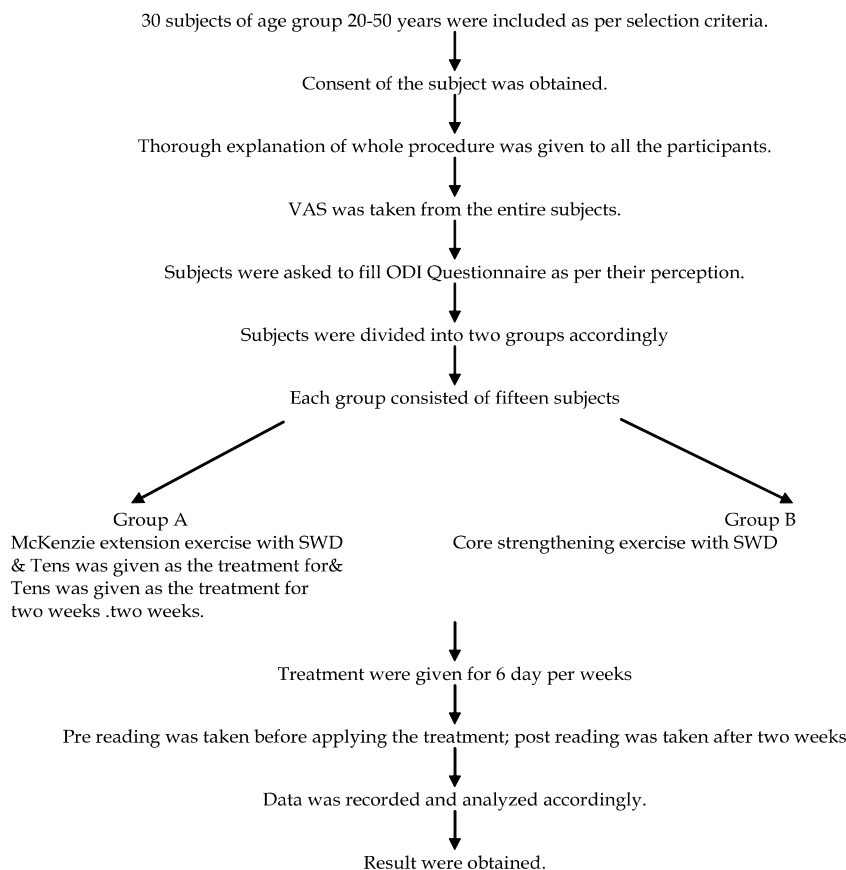
All subjects were given verbal instructions for the procedure and consent form was obtained from each one of them, prior to participation in the study.

Subjects were assessed for prolapsed disc condition. All subjects were given verbal instructions for the procedure and consent form was obtained from each one of them, prior to participation in the study. VAS score and ODI score was measured in each & every patients. Instrumentation for data collection includes Treatment couch, Pain scale visual analog scale, Short wave diathermy, TENS machine, Cotton, MAT, VAS, ODI scale & physioball.

Procedure

Informed consent and pre test data collection: The subjects with PIVD low back pain were assigned into two groups via. Group A& group B. The Group A subject received McKenzie extension exercise The group B subject received Core strengthening

Protocol



exercise both the group were treated for 2 weeks. 30 volunteers between 20 -50years of ages were volunteered to participate in the study after signing an informed consent statement. A complete clinical assessment was done on all the patients satisfying inclusion criteria. Subjects then divided into 2 groups based on random sampling. The patients were treated for 6 sessions on a week. Pre intervention measurements for pain intensity using Visual Analog Scale, and functional disability using ODI for low back pain (both groups) VAS was used to evaluate and quantify the perceived pain by the subjects. Origin of the scale is indicated as "NO PAIN" and the terminal end as "MOST SEVERE PAIN". The patient was instructed to move the indicator to represent his/her pain perceived. At the back of the scale 0 to 10 numerical with a distance of 1cm between them were marked.

1. Testing procedure and intervention

Group A: In this group, subject was allowed to perform the McKenzie exercise for low back pain.

SWD applied on radiating pain area for 20 to 30 minute.

TENS applied on radiating pain area for 20 to 30 minute.

Group B: In this group, subject was allowed to perform the Core strengthening exercise for low back pain.

SWD applied on radiating pain area for 20 to 30 minute.

TENS applied on radiating pain area for 20 to 30 minute

Treatment

Exercise protocol for Group A

1. *Prone Lying*: The patient adopts the prone lying position with the arms alongside the trunk and the head turned to one side. This position is maintained for 20 second repeat 10 times.
2. *Prone on Elbows*: The patient, already lying prone, places the elbows under the shoulders and raises the top half of his body so that he comes to lean on elbows and forearms while pelvis and thighs remain on the couch [Fig. 2.2].
3. *Prone press-ups*- Lie on your stomach with palms near your shoulders. Slowly push your shoulders up, keeping your hips on the surface and letting your back, Repeat 10 -20 times [Fig. 2.3].

4. *Prone Arm/Leg Raises* - Lie on stomach on the mat keeping neck in line with straight legs, and arms outstretched overhead. Slowly raise and lower each arm and leg, one at a time 5 repetitions on each limb Work alternate limbs by lifting right arm and left leg at the same time 5 repetitions; change to work reverse pair [Fig. 2.4].
5. *Standing Extension* - While standing, place your hands on your back and lean backward. Hold for 20 seconds and repeat 10 times [Fig. 2.5].
6. *Prone Lying Superman's Extension exercise* - Lie on your stomach on mat with arms and legs extended; retract shoulder blades down and in towards the midline of your spine and maintaining this position, lift opposite arm and opposite leg ensuring that your hips stay in contact with the floor; hold for 5- 10 seconds and reverse sides. Repeat 10-20 times [Fig. 2.1].

Exercise protocol for Group B

The "core" is comprised of several groups of muscles including the transverses abdominus, multifidus, diaphragm and pelvic floor muscles. These muscles work together to produce maximum stability in the abdominal and lumbar (lower) back region.



Fig. 2.1: Prone Lying Superman's Extension exercise



Fig. 2.2: Prone on Elbows



Fig. 2.3: Prone press-ups



Fig. 2.4: Prone Arm/Leg Raises



Fig. 2.5: Standing Extension

1. *Supine Bridging on Physioball*: Lie facing upward on floor with knees straight, feet resting on physioball, arms at sides; draw in abdominal muscles and maintain throughout exercise; slowly lift your butt off floor until trunk is parallel to thighs; hold for 15 seconds; slowly return to starting position. Repeat 10-20 times (Fig. 3.1).
2. *Cat & Camel exercise*: Exhale as you sit back onto heels, lower head, tuck chin and reach arms out. Cat- Inhale as you arch the back up and hollow

out abdominals while head remains tucked. Camel- Exhale and lower abdominal and reach chin towards ceiling. Tuck chin and sit back into Prayer position. Repeat 10 times (Fig. 3.2).

3. *Bridging exercise*: Lie in the supine position on mat with hips and knees bent to 90 degrees with feet flat on floor and arms palm-down at sides; draw in abdominal muscles and maintain throughout exercise; slowly raise your butt off the table/mat by using your gluteus and hamstrings until your torso is in line with thighs; hold for 15 seconds. Repeat 10 - 20 times (Fig. 3.3).
4. *The Wall Squat*- Strengthening exercise for back, hips and quads in PIVD patients. Stand with your back against a wall, heels about 18 inches from the wall, feet shoulder-width apart. Tighten abs. Slide slowly down the wall into a crouch with knees bent to about 90 degrees. If this is too difficult, bend knees to 45 degrees and gradually build up from there. Count to five and slide back up the wall. Repeat 5 -10 times (Fig. 3.4).
5. *Supine Twist*- Lie on your back on mat with hips and knees bent to 90 degrees with feet flat on floor; draw in abdominal muscles and



Fig. 3.1: Supine Bridging on Physioball- Lie



Fig. 3.2: Cat & Camel exercise



Fig. 3.3: Bridging exercise



Fig. 3.4: The Wall Squat



Fig. 3.5: Supine twist



Fig. 3.6: Isometric exercise

maintain throughout exercise; slowly and with control, rotate knees to one side keeping hips in contact with the floor; engage obliques to pull knees back to center and repeat on opposite side; Repeat 10-20 times (Fig. 3.5).

6. Isometric of back- Supine Abdominal Draw In Lie on your back on mat, knees up with feet flat on mat; pull the abs in and push your low back to the mat. Repeat 20 times (Fig. 3.6).

Data Analysis

This function gives two samples Student test with a confidence interval for the difference between the means. The student 't' method the null hypothesis that the population means related to two independent, random samples from an approximately normal distribution are equal.

Using statistical formula for the mean for a given mean for the mean for a given number of subject, mean of different variable were calculated by-

Assuming equal variances, the test statistic is calculated as:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{s^2 \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

$$s^2 = \frac{\sum_{j=1}^{n_1} (x_j - \bar{x}_1)^2 + \sum_{i=1}^{n_2} (x_i - \bar{x}_2)^2}{n_1 + n_2 - 2}$$

Where \bar{x}_1 and \bar{x}_2 are the sample means, s^2 is the pooled sample variance, n_1 and n_2 are the sample sizes.

Student "t" test was used to compare the statically reference on VAS and ODI pre and post treatment in group A group B.

Result

The result of this study were analyzed in term of pain relief indicated by decrease in visual analogue score and reduction in score of modified oswestry disability questionnaire, Within and between group differences were compared so as to evaluate the effectiveness of two treatment technique under consideration in present study

Table 1 Statistics Showed the Effectiveness Pre and Post Score of Core Strengthening Exercises and McKenzie Extension Exercise on Low Back Pain of Lumbar Prolapsed Disc Condition Two groups were taken into consideration; Group A was given McKenzie extension exercise with SWD and, TENS. Group B was given Core strengthening with SWD and TENS for lumbar area.

Table 2 Student t test was used to compare the data of the two groups Core Strengthen Exercises and McKenzie Extension Exercise. The subject's conditions were similar between the groups, with regard to all variables selected. There was significant difference observed with respect to V.A.S. scale and O.D.I (Oswestry Disability Index) between McKenzie extension exercise and Core

Table 1: Descriptive Statistics Showing the Effectiveness Pre and Post Score of Core Strengthening Exercises and McKenzie Extension Exercise on Low Back Pain of Lumbar Prolapsed Disc Condition

			N	Minimum	Maximum	Sum	Mean	Std. Error	Std. Deviation
Group-A	VAS	PRE	15	50.00	80.00	965.00	64.3333	2.88125	11.15902
		POST	15	30.00	65.00	685.00	45.6667	2.48168	9.61150
	ODI	PRE	15	35.00	91.66	843.62	56.2413	4.38506	16.98327
		POST	15	31.66	60.00	660.29	44.0193	2.39214	9.26473
Group-B	VAS	PRE	15	50.00	90.00	940.00	62.6667	3.71184	14.37591
		POST	15	30.00	75.00	755.00	50.3333	3.88730	15.05545
	ODI	PRE	15	31.66	65.00	777.63	51.8420	2.50739	9.71109
		POST	15	26.66	58.33	682.95	45.5300	2.19923	8.51758

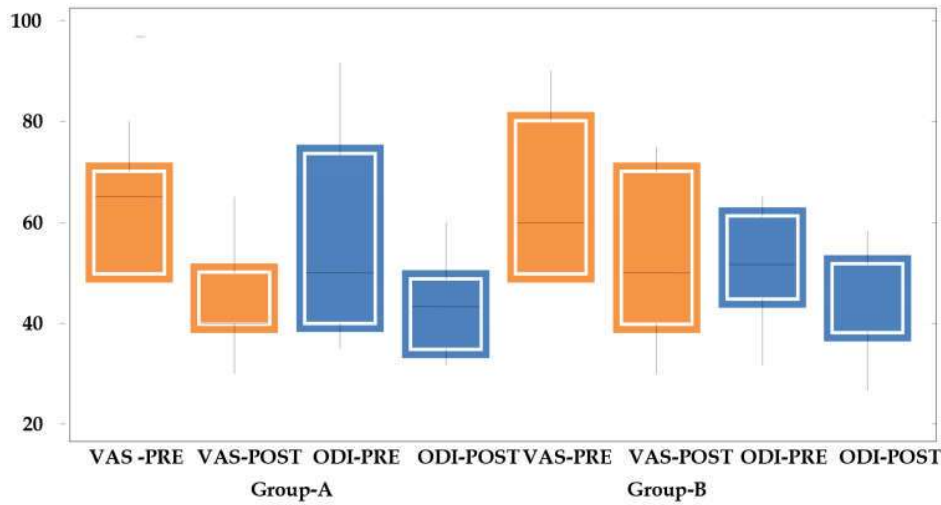
Table 2: 't' Test Comparison of the Effectiveness of Core Strengthen Exercises and McKenzie Extension Exercise on Low Back Pain of Lumbar Prolapsed Disc Condition

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	DF	Sig. (2-tailed)
				Lower	Upper			
Group-A VAS- Pre/ Group-B VAS-Pre	1.667	17.499	4.516	-8.019	11.353	.369	14	.718
Group-A VAS- Post/ Group-B VAS-Post	-4.667	16.417	4.238	-13.758	4.424	-1.101	14	.290
Group-A ODI- Pre/ Group-B ODI-Pre	4.399	21.155	5.462	-7.316	16.114	.805	14	.434
Group-A ODI- Post/ Group-B ODI-Post	-1.511	14.609	3.772	-9.601	6.579	-.400	14	.695

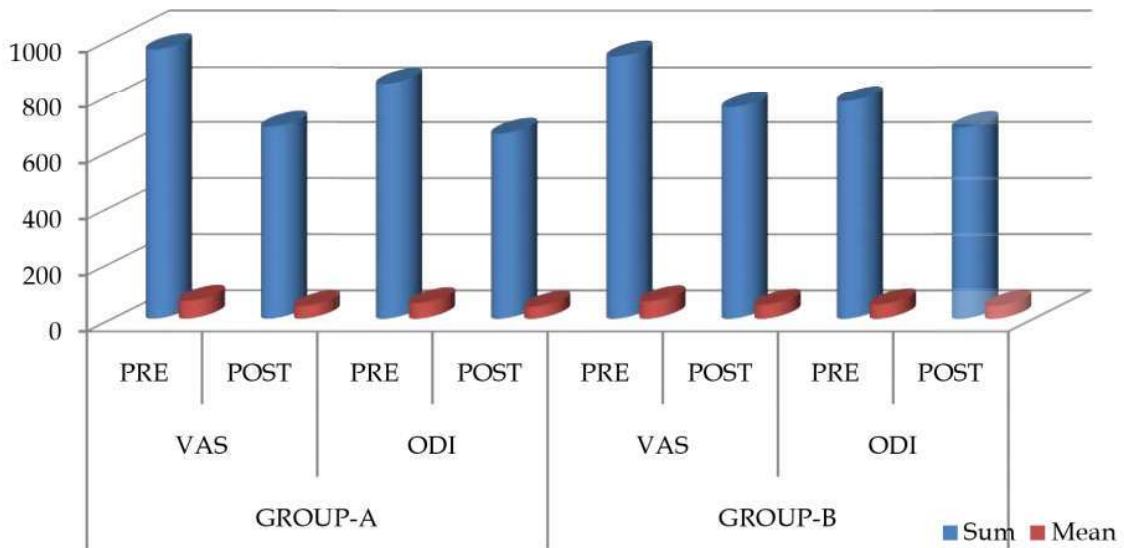
Table 3: Correlations Showing the Comparison of the Effectiveness of Core Strengthen Exercises and McKenzie Extension Exercise on Low Back Pain of Lumbar Prolapsed Disc Condition

	Group-A				Group-B			
	VAS-Pre	VAS-Post	ODI-Pre	ODI-Post	VAS-Pre	VAS-Post	ODI-Pre	ODI-Post
Group-A VAS-Pre	1.000	.658**	.861**	.853**	.042	.039	.109	.000
Group-A VAS-Post	.658**	1.000	.489	.486	.091	.111	.140	.118
Group-A ODI-Pre	.861**	.489	1.000	.923**	-.113	-.058	-.057	-.098
Group-A ODI-Post	.853**	.486	.923**	1.000	-.184	-.139	-.074	-.170
Group-B VAS-Pre	.042	.091	-.113	-.184	1.000	.967**	.745**	.779**
Group-B VAS-Post	.039	.111	-.058	-.139	.967**	1.000	.779**	.796**
Group-B ODI-Pre	.109	.140	-.057	-.074	.745**	.779**	1.000	.900**
Group-B ODI-Post	.000	.118	-.098	-.170	.779**	.796**	.900**	1.000

** Correlation is significant at the 0.01 level (2-tailed).



Graph 1: Showing the Comparison of the Effectiveness of Core Strengthening Exercises and McKenzie Extension Exercise on Low Back Pain of Lumbar Prolapsed Disc Condition



Graph 2: Showing The Comparison of Pre And Post Total And Mean Scores Of Group-A And Group-B Of Core Strengthening Exercises And McKenzie Extension Exercise On Low Back Pain Of Lumbar Prolapsed Disc Condition

strengthening exercise. Hence McKenzie extension exercise is found to be more effective in comparison to core strengthening.

Table 3 Correlations the Showed Comparison of the Effectiveness of Core Strengthen Exercises and McKenzie Extension Exercise. The result shown that GROUP A McKenzie extension exercise has shown significant improvement on pain and functional disability. Hence null hypothesis is rejected and alternative hypothesis accepted which clearly most effective in reducing pain, and improve functional disability.

Discussion

There were 30 Subjects in this study group A and group B both males and females were included protocol was carried for 2 week. V.A.S., O.D.I. were the deciding parameters to Compare the effectiveness among group A McKenzie extension exercise and group B core strengthening exercise .Outcomes were taken before and after treatment. Functional disability and low back pain was most common factor for all the subjects. As physiotherapy treatment of back pain there are

many approaches, but conventional treatment is normally tailored and includes exercises, Core strengthening and McKenzie extension exercise. Electrotherapy approach in form of superficial and deep heating modalities (SWD) short wave diathermy commonly used therapeutic approach in involves the application of deep heat and this treatment has been reported to have a measurable effect for patients with low back pain.

When the mean values of (Table 1) VAS & ODI were analyzed, it was found statically significant in groups A pre and post intervention. 64.3333 And 45.6667 and mean value of the ODI is 56.2413 and 44.0193. This might be due to McKenzie exercise directional preference that lead to centralization of protruded disc leading to release of impinged nerve. When the protrusion reduces in size, it release first nerve root and then the duramatter, The result from the statistical analysis of the present study indicates the McKenzie extension exercise significant effect of pain & functional disability in low back pain of lumber prolapsed disc condition. The result from the statistical analysis group B the mean values of VAS & ODI were analyzed, pre and post intervention of VAS 62.6667 And 50.3333 and mean value of the ODI is 51.8420 and 45.5300. Strengthening of core muscle may improve specific passive stability that would lead to reduce instability, reduce load on disc so less disc displacement. It leads to less nerve impingement and less radiating pain. Hence we can say core strengthening leads to reduce pain. Pain reduction gives chances to improve mobility thus reduction in overall disability. Core stability is more effective in decreasing pain and may improve physical function activity.

When we compared t test of the Effectiveness of Core Strengthening Exercises and McKenzie Extension Exercise on Low Back Pain of Lumber Prolapsed Disc Condition it was found statically significant in both group (Table 1, 2, 3) and shown improvement in pain, which represents an improvement in functional disability. Pre value of VAS group A & group B t is .369 (1.667) and Post value of VAS group A & group B (-4.667) t is (-1.101) ODI Pre value of group A & group B (4.399) t is (.805) Post value of ODI group A & group B (-1.511) t is (-.400) The McKenzie group a significantly ($P < 0.001$) greater increase in the pain-free movement with improve functional disability. Core strengthening is a protective mechanism that increases strength, which increase stability and reduces the risk of disc displacement, reduced core strength leads to recurrent disc displacement the studies included in the review

suggest that McKenzie therapy is more effective than most comparison treatments at short-term follow-up.

When compared both groups of post treatment signifies that all outcome measures showed Correlation significant at the 0.01 level (2-tailed) improvements from baseline values of McKenzie extension exercise. The both techniques shows effectiveness in post treatment outcome measure, McKenzie exercise helped shifting the disc in opposite side of derangement thus reducing the disc prolapsed and core stabilization exercise it strengthened the surrounding muscle thus improving stability. Which is clearly most effective in reducing pain, improve functional disability.

Back pain is strongly associated with degeneration of the intervertebral disc. It is associated with sciatica and disc herniation or prolapsed. Degeneration of the lumbar intervertebral disc is a major factor associated with low back pain. In fact, the risk of developing low back pain increases with the severity of degenerative disc changes [4].

McKenzie therapy improves return-to work status over other treatments. No other comparative treatment was more effective than McKenzie therapy at any identified point in time. Clinical evidence suggests that McKenzie therapy is an effective method for managing back pain in the short term 3 months [14].

Pre-defined selection criteria, most of the results from individual studies and the pooled results reveal that McKenzie therapy was statistically significantly more effective than other treatments in reducing pain and disability at short term follow-up. Our results suggest that McKenzie therapy provides on average 8.6 point greater short term pain reduction (pain measured on a 0 to 100 point scale) than other conservative treatments. The sensitivity analysis revealed a slightly greater effect of 11.4 points [24].

The results of this preliminary study demonstrated that the McKenzie protocol of treatment for low back pain was significantly better than that of Williams in decreasing pain, increasing the period of comfortable sitting time, and increasing the pain-free range [6].

The effect of McKenzie approach on pain and functional disability which showed that there was significant reduction in pain ($p < 0.0001$) and functional disability ($p < 0.0001$) post treatment [25].

Limitation of Study

Population of the patients was small due to certain time limitation.

Short duration of study.

Lesser follow-up periods due to lack of time.

Clinical Implication

The study can be applied to patients suffering from prolapsed intervertebral disc condition, there condition can be improved by using McKenzie extension exercise .because McKenzie extension gives result within 3 to 4 days and core strengthening gives result after 10 days, but strength of recovery is better in McKenzie than core. thus clearly it is helpful in alleviating pain in prolapsed disc condition.

Scope for Future Study

The research to be carried out by taking large sample size.

Further studies can be done by using different outcome measures.

Studies with longer duration are recommended with longer follow-up period to assess the benefits.

Further studies can also be done by using different variable.

Conclusion

The present study showed that McKenzie extension exercise protocol was very much effective in low back pain with Prolapsed Lumbar Intervertebral disc Condition. As a treatment intervention it is efficient in relieving pain and functional disability. McKenzie extension exercise helps shifting the disc in opposite side of derangement thus reducing the disc prolapsed whereas core stabilization exercise helps strengthening the surrounding muscle thus improving the stability, here my result significantly shows more effective result in McKenzie treatment to reduce pain & improve functional disability.

References

1. N.P. Singh, Suneeta Koul. Anxiety among the Patient with Lumbar Disc Prolapse: A Case Report. 2016 Jan-Mar;3(2):172-75.
2. Bao-Gan Peng. Pathophysiology, diagnosis, and treatment of discogenic low back pain. 2013 April 18;4(2):42-52.
3. P. Prithvi Raj. Intervertebral Disc: Anatomy Physiology-Pathophysiology-Treatment. 2014 Jul 3;8(1):18-44.
4. Dino Samartzis, DSc, Jaro Karppinen, Florence Mok, MSc, Daniel Y.T. Fong, Keith D.K. Luk, Frcse, Frcsg, Fracs, Fhkam, Kenneth M.C. Cheung, Frcs, Fhkc, Fhkam. A Population-Based Study of Juvenile Disc Degeneration and Its Association with Overweight and Obesity, Low Back Pain, and Diminished Functional Status. 2011 April 6;93(7):662-70.
5. Akuthota, Venu, Ferreiro, Andrea, Moore, Tamara, Fredericson, Michael. Core Stability Exercise Principles Current Sports Medicine. 2008 Jan-Feb.; 7(1):394-402.
6. David Joseph Ponte, Gail J. Jensen, Barbara E. Kent. A Preliminary Report on the Use of the McKenzie Protocol versus Williams Protocol in the Treatment of Low Back Pain. 2017 June 16;6(2):130-39.
7. Mircea moldovan, Therapeutic Considerations and Recovery in Low Back Pain: Williams vs McKenzie. 2008;5(9):58-64.
8. M.G.C. Gillan J.C. Ross I.P. McLean R.W. Porter, The natural history of trunk list, Its associated disability and the influence of McKenzie management. 1998 May 28;7:480-83.
9. Sapna Gupta. A Comparison Between mckenzie Extensions Exercises Versus William's Flexion Exercises for Low Back Pain in B.Pt. Students. 2015 Jul-Dec;3(2):51-55.
10. Roy M. H, Anap D. Is McKenzie method with core exercise effective for Patients with disc derangement? A Case Series. 2015;2:26-30.
11. Szulc P, Wendt M, Waszak M, Tomczak M, Cieculik K, Trzaska T. Impact of McKenzie Method Therapy Enriched by Muscular Energy Techniques on Subjective and Objective Parameters Related to Spine Function in Patients with Chronic Low Back Pain. 2015;21:2918-32.
12. Ferreira P.H, Ferreira M.L, Christopher G Maher C. G, Robert D Herbert R.D, and Kathryn Refshauge. Specific stabilization exercise for spinal and pelvic pain: Systematic review. 2006;52:79-88.
13. Warude T, S. Shanmugam S. The Effect of McKenzie Approach and Mulligan's Mobilization (SNAGS) in Lumbar Disc Prolapsed with Unilateral Radiculopathy. 2012;3:59-63.
14. Brian M. Busanich; Susan D. Verscheure. Does McKenzie Therapy Improve Outcomes for Back Pain? 2006;41:117-19.
15. Hauggaard A, Persson A.L, Specific Spinal stabilisation Exercises In Patients With Low Back Pain. 2007;12:233-2.
16. Ponte D.J, Jensen G.J, Kent B.E. A Preliminary Report on the Use of the McKenzie Protocol versus Williams Protocol in the Treatment of Low Back Pain. 1984;6:130-139.
17. Audrey L. The centralization phenomenon. Its usefulness as a predictor or outcome in conservative treatment of chronic Low back pain. 1995;20:513-520.

18. Choi G, Raiturker P. P, Kim M. J, Jin C. D, Chae Y. S, Lee S.H, The Effect Of Early Isolated Lumbar Extension Exercise Program For Patients With Herniated Disc Undergoing Lumbar Discectomy. 2005;57:764-772.
 19. Rackwitz B, Bie R.D, Ewert T, Stucki G. Segmental stabilizing exercises and low back pain. What is the evidence? A systematic review of randomized controlled trials. 2006;20:553-67.
 20. Hoy D., Brooks P., Blyth F and Buchbinder R et al. The Epidemiology of low back pain. Best Pract Res Clin Rheumatol. 2010 Dec;24(6):769-81. doi: 10.1016/j.berh.2010.10.002.
 21. Ehrlich G. Low back pain. Bulletin of the World Health Organization 2003;81(9):971-76.
 22. Jayaram M., Kumar M, R. Raja, Prashantha S, Rajeeva A, Veena J, Rajini S. Rao. A Comparative Study Of Abdominal Strengthening Versus Spinal Extensors Strengthening Accompanied With Swd In Reducing Pain In Chronic Low Back Ache 2015;2:2035-40.
 23. Brumitt J., Matheson J.W., Erik P. Meira. Core Stabilization Exercise Prescription, Part I: Current Concepts in Assessment and Intervention. 2013;5:504-09.
 24. Helen A Clare, Roger Adams and Christopher G Maher. A systematic review of efficacy of McKenzie therapy for spinal pain. Aust J Physiother. 2004;50(4):209-16.
 25. Trupti Warude, S. Shanmugam. The Effect of Mckenzie Approach and Mulligan's Mobilisation (SNAGS) in Lumbar Disc Prolapse with Unilateral Radiculopathy. IJSR 2014 Oct;3(10):59-64.
-