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SPINAL FASCIA EXERCISE DECREASES THE PAIN AND IMPROVES QUALITY OF LIFE IN PATIENTS HAVE LUMBER DISC PROTRUSION

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Abstract

Introduction: Low back pain is one of the most common causes of absenteeism in the workplace, school, or any other promising activity. Disc disease is one of the key contributors to low back pain and radiculopathy. One among many disc problems is disc protrusion, which has more prevalence in outpatient department physical therapy management Centre globally. One of the spinal fascia stretching exercise is Elongation Longitudinaux avec Decoaption Osteo-Articulaire (ELDOA).

Objective: To find out the effects of ELDOA exercises on pain and quality of life in patients with lumbar disc protrusion.

Material & Methods: The single-blind randomized control trial of 120 patients was conducted at Max Rehab & Physical Therapy Centre Islamabad, Pakistan. The inclusion criteria were lumbar radiculopathy due to lumbar disc protrusion. Patients were randomly allocated into groups through lottery method. Both groups received manual physical therapy treatment and ELDOA Group received additional ELODA exercises. The tools were Numeric Pain Rating Scale score of back pain, leg pain and patient functional level through modified Oswestry disability index. The data was collected before the 1st visit and after 8th visit.

Results: Both groups show significant difference, when we compared the group the Post NPRS (Back Pain), NPRS (leg pain) and MODI P value show there was a significant difference.

Conclusion: ELDOA exercises have improved the pain and quality of life in patients with disc protrusion.

Keywords: Disc Protrusion, Fascia Stretching Exercises, ELDOA

Introduction:

Lumbar pain has been one of the frequent patient complaints and it has been suggested that it is the most disability causing than any other conditions.(1) The prevalence of low back pain among the

populations globally is said to be about 9.4%(2) and it is also said that intervertebral disc diseases are one of the major contributors of the low back pain.(3) Common diseases of spinal discs include disc protrusion, free sequestration and sometimes disc extrusion. One of the most common is disc protrusion, which may be known as nuclear rupture into the vertebral column in such a way that the central disc material pushes through annulus and out of which patient start to give radicular symptoms.(4) The overt herniation and internal disc disruption both by stimulation of nerve endings cause low back pain situated in the outer third of disc.(4-8) after herniation, either extrusion of nucleus or focal disc bulging may inflame, irritate and compress the adjacent nerve roots causing radicular symptoms. There can be many reasons of disc protrusion, which may include but not limited to sneezing, awkward bending, and heavy lifting, smoking, and obesity, weight bearing sports, and sometimes ageing which causes weakness of disc and thus leads to disc protrusion.(9) In vitro studies, it is seen that during flexion compression of discs results in herniation. Whereas neutral posture also causes compression of the disc, and it may lead to vertebral endplate failure.(10-12)

Symptoms of disc protrusion are but not limited to back pain, weakness, tingling sensation, numbness, leg pain, sometimes or in extreme condition bowel and bladder loss. Symptoms may worry according to level involved, worst symptoms may be seen with L4-L5, and L5-S1 segments.(4, 10, 12) Most of the disc protrusion occurs at the age of 30-70 years, and in 80% population at the level of L4-L5 and L5-S1 posteriorly whereas posterolaterally counts for about 37% of population.(13)

There is a wide range of options for treatment in disc protrusion, mainly medical treatment, surgical treatment, and physical therapy treatment to name a few. Medical treatment includes pain killers i.e. naproxen, ibuprofen, narcotics such codeine and oxycodone and acetaminophen, muscle relaxants and cortisone injection. Surgical treatment may include micro discectomy. A Bayesian network meta-analysis reported common treatments of low back pain with lumbar disc protrusion, it is reported that a variety of treatments are practicable to manage short-term and long-term goals. That meta-analysis reported highest ranking and effective treatment that has short-term effects includes medicine only whereas it also reports of the highest ranking and effective treatment that has long-term effects includes some cytokines treatment as well as Physical Therapy.(14) Physical therapy treatment includes Traction, Decompression Therapy, and TENS, Hot pack, Elongation Longitudinaux Avec Decoaption Osteo Articulaire (ELDOA), Mobilization, Manipulation and Core muscle strengthening.(15) ELDOA is a conditioning method but is relatively unknown which was developed by an osteopath Guy Voyer from France. It has series of exercises and stretches to perform to create decompression between vertebras, correct body posture, and maintain the spine alignment.(15, 16)

Current study will reveal the manual method of recovery of disc protrusion in the form of ELDOA. To understand the benefits of ELDOA in a group of patients of disc protrusion, this study will explore ELDOA along with the traditional physical therapy treatment. The objective of this study to find out the effects of ELDOA spinal stretching exercises on pain and quality of life in patients with disc protrusion.

Material & Methods:

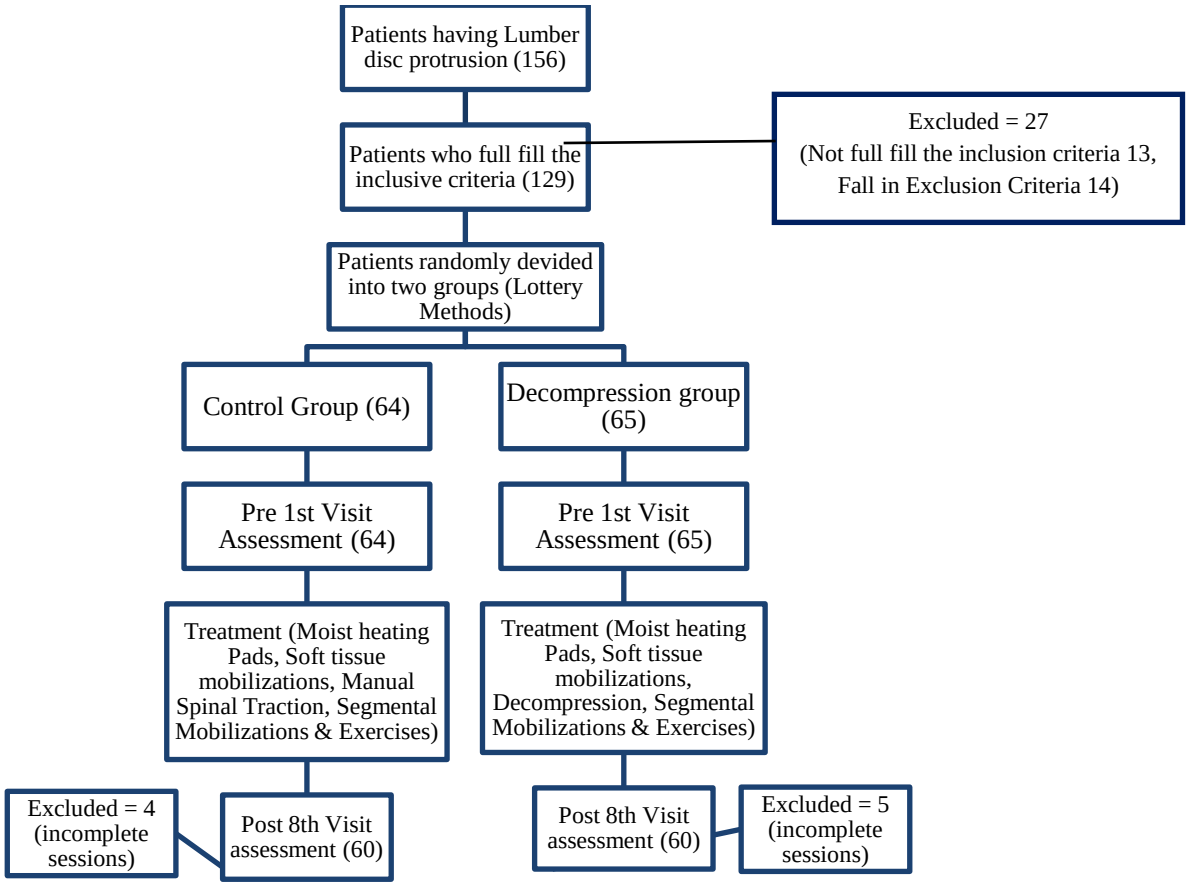
It was a registered randomized controlled trial having ethical letter number RIPHAH/RCRS/REC/Letter-00406 and was registered on US Clinical Trail registry. The RCT no was NCT04760210. Sample size for study was calculated through 'open-Epi' tool with 95% confidence level (CI) and 5% precision error.(17) The patients were randomly assigned in two different groups through random lottery method.

The data was collected between April 2018 to May 2022. Study was conducted at Max Decompression & Physical Therapy Center, Max Health Hospital, G-8 sector Islamabad, Pakistan. The Max health hospital is a private teaching hospital of Riphah International University Islamabad.

Initially 156 patients was recruited for the study, only 129 full fill the inclusion criteria which was; with minimum age limit of 30 years (18) and maximum age limit is 60 years (19)years, Both genders (Male and Female), Patients having complaint of localized and radiating pain of lumbar spine, Subjects having lumber disc bulging which was confirmed through Magnetic Resonance Imaging were counted in study.

The exclusion criteria were those with a history of lumber disc surgery, lumbar spondylolisthesis, Lumbar spine fractures, Spinal stenosis, Spinal tumors, Ankylosing spondylitis, and those using anticoagulants. Those participants who fall under the inclusion criteria were excluded from the study. All the participants were volunteers and have given written permission to be a part of this study. Patients were separated into two group's control and decompression group through Randomization. The method of randomization was the Lottery method. All the patients were treated for 8 sessions; the sessions were given on alternate days. Both group received standard physical therapy treatment including Moist Hot pack for 10 minutes on lumber spine, Kaltenborn lumber paraspinal soft tissue mobilization, Maitland manual lumber spine traction, Maitland Lumbar Mobilization techniques including posterior anterior central mobilization, posterior anterior unilateral mobilization and rotation mobilization(each technique have 3 sets of 10 repetitions in each set), Calf, Hamstring and back extensors stretching exercises (3 sets of 10 repetitions), Strengthening exercises included bridging, SLR, prone hip extension, prone back extension (3 sets of 10 repetitions). Stretching and strengthening exercises was also advised for home. The Decompression Group received the same treatment with additional decompression therapy. The data was collected on a structured questionnaire. The data was collected on the 1st visit before intervention and after the 8th visit of therapy. The data included demographics and Numeric Pain Rating Scale score in supine lying position for the painful leg and Straight Leg Raise Range for the painful side. A CONSORT diagram representing the whole procedure is given in Fig I.

CONSORT DIAGRAM



Results:

According to shapiro wilk test value the data was not normally distributed, So we apply Mann-Whitney U test for inter group analysis and Wilcoxon Sign Rank Test for within group analysis in SPSS version 21.

Table 1: *Demographic Data of the participants*

Table No 01		Demographic Result			
S. No	Variables	Sub Variable	Control (%) N=60	Decompression (%) N=60	Overall (%) N=120
1.	Age	Age (Years)	42.28 ± 14.69	47.27 ± 11.61	44.78 ± 13.42
2.	Gender	Male	23	30	53
		Female	37	30	67
3.	Occupation	Housewife	50.0	36.7	43.3
		Office Worker	43.4	30	36.7
		others	5.6	33.4	20
4.	Onset of Pain	Less than 6 months	30.0	13.3	21.7
		Less than 12 months	10.0	26.7	18.3
		More than a year	60.0	60.0	60
5.	Unilateral involve leg	Right Leg	88.3	56.7	72.5
		Left Leg	11.7	43.3	27.5
6.	Dermatome	L3-L4	3.3	6.7	5
		L4-L5	28.3	20.0	24.2
		L5-S1	68.3	63.3	65.8

The mean age of the participants was 44.78 ± 13.42 years. Among 120 participants the 53 were male and 67 were male. The 43.3% were housewife and 36.7% were office workers. Mostly participants had onset of pain more than one year (60%), 21.7% have pain less than 06 months and 18.3% have pain from less than 12 months. The percentage of radiculopathy due to PIVD in right leg was 72.5 and in left leg were 27.5. The highest dermatome level was L5-S1, which was 65.8%. (Table No 01)

The wilcoxon sign rank test was applied for inter group analysis. In the control group the NPRS score of back pain and NPRS score for leg pain was improved and show significant difference between pre 1st visit and post 8th visit treatment. The patient's functional status also showing significant difference between pre 1st visit and post 8th visit treatment. The pre median (IQR) score of NPRS (Back Pain) was 8(0) and Post Median (IQR) was 3(1), having the p-value < .001. The pre median (IQR) score of NPRS (leg pain) was 6(2) and Post Median (IQR) was 3(1), having the p-value < .001. The pre median (IQR) score of MODI was 75(16) and Post Median (IQR) was 43.5(7), having the p-value < .001.

In ELDOA group the NPRS score of back pain and NPRS score for leg pain was improved and show significant difference between pre 1st visit and post 8th visit treatment. The patient's functional status also show significant difference between pre 1st visit and post 8th visit treatment. In ELDOA group the pre median (IQR) score of NPRS (Back Pain) was 8(2) and Post Median (IQR) was 1(1), having the p-value < .001. The pre median (IQR) score of NPRS (leg pain) was 6(2) and Post Median (IQR) was 0(1), having the p-value < .001. The pre median (IQR) score of MODI was 76(16) and Post Median (IQR) was 18(3), having the p-value < .001. (Table No 02)

Table 2: *Wilcoxon Sign Rank Test Inter Group Analysis*

(Table No 02)		Wilcoxon Sign Rank Test Inter Group Analysis				
S. No	Variable	Groups	Pre-Median (IQR)	Post Median (IQR)	Mean Rank	P-Value
1.	NPRS (Back Pain)	Control	8(0)	3(1)	30.50	.000
		ELDOA	8(2)	1(1)	30.50	.000
2.	NPRS (Leg Pain)	Control	6(2)	3(1)	30.50	.000
		ELDOA	6(2)	0(1)	30.50	.000
3.	MODI	Control	75(16)	43.5(7)	30.50	.000
		ELDOA	76(16)	18(3)	30.50	.000

The Mann Whitney u test was applied between group analyses. At the base line before the treatment of 1st visit the p-value shows that there was no significant difference between NPRS back pain & NPRS leg pain. The Pre NPRS (Back Pain) Median (IQR) value of control group was 8(0) and ELDOA group was 8(2) having p-value .366.
The Pre NPRS (leg pain) Median (IQR) value of control group was 6(2) and ELDOA group was 6(2) having p-value .426.
At the base line the MODI P value shows there is a difference the Pre MODI-Median (IQR) value of control group was 75(16) and ELDOA group was 76(16) having p-value .043.

After the 8th visit p-value shows that there was a significant difference. The Post NPRS (Back Pain) Median (IQR) value of control group was 3(1) and ELDOA group was 1(1) having p-value .000 show significant differences. The Post NPRS (leg pain) Median (IQR) value of control group was 3(1) and ELDOA group was 0(1) having p-value .000 show significant differences. At the end of the last (8th) session MODI P value shows there was also a significant difference the Pre MODI-Median (IQR) value of control group was 43.5(7) and ELDOA group was 18(3) having p-value .000 show significant differences. (Table No 03)

Table 3: *Mann-Whitney U Test Between Group Analysis*

(Table No 03)		Mann-Whitney U Test Between Group Analysis			
S. No	Variable	Groups	Mean Rank	Median (IQR)	P-Value
1.	Pre NPRS (Back Pain)	Control	57.86	8(0)	.366
		ELDOA	63.14	8(2)	
2.	Post NPRS (Back Pain)	Control	86.70	3(1)	.000
		ELDOA	34.30	1(1)	
3.	Pre NPRS (Leg Pain)	Control	62.88	6(2)	.426
		ELDOA	58.12	6(2)	
4.	Post NPRS (Leg Pain)	Control	90.50	3(1)	.000
		ELDOA	30.50	0(1)	
5.	Pre MODI-Score	Control	54.14	75(16)	.043
		ELDOA	66.86	76(16)	
6.	Post MODI Score	Control	90.50	43.5(7)	.000
		ELDOA	30.50	18(3)	

Discussion:

The study found out ELDOA exercises are helpful in improving low back pain and disc protrusion in patients with disc protrusion. In this study NPRS as pain measurement and ODI measure were used to assess the patients.
Conventional physical therapy when given with ELDOA improved the results more significantly on NPRS as shown by 1st session it was 7.98 ± 0.813 and on 8th session it was 1.13 ± 0.724, p-value <0.001. Quality of life as measured on ODI also significantly improved as shown by 1st session it was 74.52 ± 8.484 and on 8th session it was 17.53 ± 4.268 i.e. p-value<0.001. one of my previous studies done at railway general hospital Rawalpindi and concluded that ELDOA stretching improve pain and functional movement in patients with disc protrusion, results of this were favorable with this study. Functional rating scale (FRI) was measurement tool in the study, FRI intensity of pain was noted around 2.58 ± 1.165 on pretreatment of ELDOA, and post treatment it was decreased to 0.92 ± 0.793, it was noted as significant difference i.e. p-value <0.001. FRI function of level was measured on 1st evaluation and it was about 21.42 ± 9.307 and after ELDOA exercises it was improved to 7.92 ± 5.583. (20) So, it is incorporated here that ELDOA exercises are beneficial when combined with conventional physical therapy.
Back pain may be effectively treated using the ELDOA treatment, Research by Shamshad et al. conducted a randomized clinical trial comparing the effects of ELDOA technique with McKenzie extension exercises on non-specific low back pain patients. According to the study, the ELDOA approach has a positive impact in lowering lower back discomfort and impairment. This implies that ELDOA might be a helpful treatment for people with non-specific low back pain.(21) Additionally,

Arif et al. looked into how a modified ELDOA approach affected individuals who had cervical radiculopathy. According to the study, the main goal of ELDOA is to apply targeted internal tension and load in order to improve blood circulation, relieve cervical spine discomfort, and relieve pressure on the spinal discs.(22) the result of above two studies support the result of this study in which pain was also reduce in conventional group and ELDOA group.

Clement A. in a quasi-experimental study reported physical tension and anxiety on a model of pre and post surveys after review of extensive literature. The author suggested that pre survey was performed to check general demographics of the participants, practicing information, instrument set up because the participants were musicians, their general health, and discomfort or pain. Whereas author reported practicing information, overall health and experience, location of pain and discomfort, response to ELDOA, and ELDOA overall in second survey of the study. Clement A. reported in the results of the study that about 3 of the participants stopped playing violin due to discomfort before doing ELDOA exercises, and 2 of the participants reported stopping the play after the ELDOA. Author recognized in the study that only 1 participant selected no in the pre-survey and yes in the post survey. The author also recognized that the pains of the participants were not significantly decreased but discomfort was improved, and they did felt some change between pre and post surveys. In the current study, quality of life of participants were significantly improved and patients were clinically better if compared clinically between ELDOA and conventional only.

M Shahzad et al, done study at Riphah Rehabilitation and Research Centre in Railway General Hospital in 2017 on Piriformis Syndrome (PS), where they applied ELDOA specifically on piriformis muscle. Authors took 46 subjects from the localities who were suffering from PS. For the measurement purposes study took several tools including NPRS for pain, Lower extremity functional scale (LEFS), Piriformis Length Test, and straight leg raise ranges. M Shahzad concluded in this study that significant improvement were noted in both of the groups but group who were treated with post facilitation stretching showed more improvements in pain, SLR range, piriformis length and lower extremity function than ELDOA group.(23) This study result was contradictory to the current study, because current study emphasize that ELDOA exercises improve fascia mobility hence it improve function, and pain and symptoms of disc bulge. This contradiction to the result may be due to their small sample size, in the current study participants were 60 and the study of M Shahzad had only 23. The study may have taken a large sample size to truly reflect on the results of ELDOA group.

The potential of the ELDOA approach to enhance the quality of life for patients suffering from lumbar disc protrusion has drawn attention. A study by Dohnert et al. conducted a blind randomized clinical trial comparing lumbopelvic stabilization exercises and the McKenzie method in individuals with low back pain related to disc protrusion. The outcomes showed that both exercise regimens were successful in lowering pain and enhancing function in these patients, pointing to the possibility that non-invasive therapies such as ELDOA could enhance the quality of life for those with lumbar disc protrusion.(24) Furthermore, Shamshad et al. investigated the effects on patients with non-specific low back pain of the ELDOA approach against McKenzie extension exercises. According to the study, the ELDOA approach showed promise in lowering pain and impairment related to lower back disorders, suggesting that it may improve the quality of life for those who have lumbar disc problems.(21) the result of these two studies support the result of this study in which quality of life was also improve in conventional group and ELDOA group.

Conclusion:

This study concludes that ELDOA exercises are beneficial for improving back pain as well as quality of life of the patients with disc protrusion when combined with routine physical therapy treatment. This study is also suggestive of the fact that physical therapy lacks the referral from the medical community on this serious disease, which if not managed timely may cause serious consequences in the form of disability.

Conflict of Interest: Nill
Funding: Nill

Ethical Approval: The study was approved by the ethical review board of the university.

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