ORIGINAL ARTICLE

COMPARISON OF THE EFFECTS OF DECOMPRESSION AND ELDOA ON PAIN AND DISABILITY IN LUMBAR DISC PROTRUSION

Abdul Ghafoor Sajjad[1], Muhammad Shahid Javed[2], Akhtar Rasul[3], Syed Ali Hussain[1], Sidra Ali Naqvi[1]

ABSTRACT

Introduction: In today's sedentary lifestyle, low back pain especially radiculopathy is one of the most common complaints. Lumbar disc herniation is one of the key factors in radiculopathy. Various physical therapy interventions are being used to address this increasing complaint. This study was design to find out the effects of spinal decompression and ELDOA exercises on back, leg pain, and disability in patients with lumbar disc protrusion.

Material & Methods: This study was a randomized control trial. There were one hundred and twenty participants enrolled in this study. The inclusion criteria were age 30 to 60 years, lumbar disc protrusion confirms through MRI, and pain in the back and leg. Patients were randomly allocated into two groups Decompression and ELDOA, 60 in each, through the sealed envelope method. Participants were assessed at baseline and after the 8th visit. The primary outcome measuring tools were NPRS, and MODI. The data analysis was done through SPSS version 21.

Results: Among 120 participants, 56 were male and 64 were female with a mean age of 44.47±11.89. After 8th visit pain and disability show significant result. The back pain score for the decompression group was 1.75 ± 0.57 and ELDOA group was 1.13 ± 0.72 having P< 0.001, leg pain score for the decompression group was 1.90 ± 0.630 while the ELDOA group was 0.58 ± 0.99 having P< 0.001 and the MODI score of the decompression group was 72.12 ± 8.17 and the ELDOA group was 17.53 ± 4.27 having P< 0.001.

Conclusion: Decompression and ELDOA exercises are beneficial for improving back pain, leg pain as well as the quality of life of patients with disc protrusion. However, ELDOA exercise has shown significant results compared to the decompression and control group.

Key Words: exercise therapy, ELDOA exercises, spinal decompression, spinal disc protrusion

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Authors' Affiliation

[1]Department of Rehabilitation Sciences Shifa Tameer-e-Millat University, Islamabad

[2]Department of Physiology Sargodha Medical College University of Sargodha

[3]Department of Allied Health Sciences Sargodha Medical College University of Sargodha

Corresponding Author

Abdul Ghafoor Sajjad

Department of Rehabilitation Sciences Shifa Tameer-e-Millat University, Islamabad

email: abdulghafoorsajjad@yahoo.com

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INTRODUCTION

With the advancement of science and technology, life has become luxurious, however, the working schedules have become quite busy. Moreover, the tension on the whole body has also increased to a level that has impacted the body posture drastically leading to increased spinal pain in the majority population; such that 80% of people suffer from back pain at any stage in their life.[1] In this robotic era, the culture of sedentary work is becoming a fashion and thus the prevalence of musculoskeletal disorders is increasing with every passing day, which is negatively affecting not only the mental health but also the physical health and productivity of the patients.[2,3] The population that is most likely to be affected by these issues is those who spend most of the time sitting and working on computers, abnormal posture for a long-time which may cause back pain.[2] A Swedish study concluded that the sitting time is directly proportional to low back pain among the blue-collar workers in this context.[4] Moreover, having a dull routine without any physical activities being part of the daily schedule can make a person more susceptible to lumbar pain and discal issues.[5] Numerous methods are being used worldwide to treat low back pain ranging from non-invasive procedures to surgical interventions.[6] Physical therapy approaches that can be used to treat lumbar disc herniation include electrotherapy, manual therapy, traction, neuro-reflexotherapy, exercise, orthoses, acupuncture, taping, dry needling, pilates, yoga, and tai-chi exercises.[7]

Among the non-invasive treatment protocols used for the lumbar disc protrusion, one of the recommended is the process of motor traction.[8] Evidence has suggested that non-invasive spinal decompression therapy is an effective treatment for treating disc herniation and increasing the disc height in lumbar disc herniation patients.[7] It has been concluded in a trial that vertebral separation can help to reducing the radicular symptoms by removing the contact forces or direct pressure from the affected neural tissue, generally in patients presenting with acute radicular pain (less than 6 months) and associated neurological deficits.[9]

One of the known invasive treatment options create decompression at spinal segment level called Elongation Longitudinaux Avec Decoaption Osteo-Articulaire

(ELDOA), which can be described as a conditioning method involving a series of movements and body stretches to help correct body posture, rehabilitate people with injuries and prevent injuries.[10,11] The basic principles of this technique can be described as fascial stretch which concentrates tension at a specific spinal segment and thus, creates decompression. For every segment of the body, there are specially designed ELDOA exercises. So basically, there are separate exercises from the base of the skull to the sacroiliac joint. One thing that is common in all ELDOA exercises is that fascial tension has to be created above and below the specific joint or disc that the therapist is trying to "open up" or decompress. The positive results for this treatment included, rehydrated discs, vertebral decompression, improved blood circulation and improved muscle tone and awareness.[11] Also, many studies have proven that ELDOA exercises improved the pain and functional performance in spinal disc protrusion patients.[12] In addition, a recent study revealed that ELDOA exercises combined with core muscle strengthening exercises helped in improving prolapsed intervertebral disc symptoms.[13]

There has been no work carried out to compare the effects of decompression therapy with ELDOA exercises. Thereby, the current study is designed to compare spinal decompression therapy with ELDOA exercises as a method of recovery for lumbar disc protrusion.

MATERIAL AND METHODS

This study was a randomized control trial. After approval from the ethical review committee of the Riphah College of Rehabilitation Sciences Riphah International University Pakistan under number REC/00406, the trial was registered clinicaltrials.gov NCT04760210. Sample size of the study was 122 patients, 61 in each group. (Calculated with epitool referenced PJMS, volume 30, pages 157-160, 2014). The study was conducted at Max Spine Rehab Centre, Max Health Hospital Islamabad. Patients were assessed according to inclusion criteria of age 30 to 60 years, lumber disc pathology confirmed through MRI and pain in the back with radiation to one or both legs, after assessment and confirming eligibility, patients were randomized to the groups according to convenient sampling and randomization in groups was done using the sealed envelope method. The patients who had lumbar spondylolisthesis, spinal stenosis, fracture of the lumbar spine, spinal tumor, ankylosing spondylitis, and those who were taking blood thinner medication were excluded from the study.

Data collection was started from 1st January 2019 to 28th February 2021. Study information was given to the patients and after informed written consent, the patients were randomly allocated into either of the groups. Data collection tools included the Numeric Pain Rating Scale (NPRS) for pain and Modified Oswestry Disability Index (MODI) for quality of life. A total of eight sessions of treatment were planed over three weeks for each of the two groups. Detail of intervention is as follow;

In Group “A” pre-physiotherapy session included, moist heat for 10 minutes at low back region, paraspinal soft tissue mobilization, Lumbar Mobilization (Maitland) CPA, UPA, Rotation glides 3 sets of 10 reps. Decompression therapy session (Lumbar spinal decompression therapy for 30 minutes (Weight was adjusted according to patients’ body weight). Home plan include stretching exercises (Calf, Hams, Back Extensors) 3 sets of 8-10 reps, strengthening exercises (Back Extensors) 3 sets of 8-10 reps, postural education, precautions, contraindication.

In group “B” pre-physiotherapy session included, moist heat for 10 minutes at low back region, paraspinal soft tissue mobilization, Lumbar Mobilization (Maitland) CPA, UPA, Rotation glides 3 sets of 10 reps. ELDOA Exercise: segmental spinal decompression ELDOA exercises for 1 minute for each segment. Home plan included stretching exercises (Calf, Hams, Back Extensors) 3 sets of 8-10 reps, strengthening exercises (back extensors) 3 sets of 8-10 reps, postural education, precautions, contraindications.

Data was analysed on IBM SPSS-21 (Statistical Package for Social Sciences) software. The assessment was done on the 1st and 8th visits. Data was found with normal distribution through the Shapiro Wilk test ($P>0.05$) and an independent t-test was used for group comparison. Paired t-test was used for compression of means at baseline and post-test mean differences in both the groups was computed. Consort diagram shows the recruitment of the participants as shown in figure No. 1.

RESULTS

The overall mean age of the participants was 44.47 ± 11.89 years, the decompression group mean age was 47.27 ± 11.61 years and the ELDOA group mean age was 41.67 ± 11.60 years. Among 120 participants, 56 were male and 64 were female.

The pre-treatment mean back pain score for the decompression group was 8.05 ± 0.790 and ELDOA group was 7.98 ± 0.813 having a p-value of 0.650. The pre-treatment means leg pain score for the decompression group was 5.90 ± 0.70 while the ELDOA group was 5.95 ± 0.79 having a p-value of 0.71. The MODI pre-treatment score of the decompression group was 72.12 ± 8.17 and the ELDOA group was 74.52 ± 8.48 having p-value of 0.117. All variables showed that both the groups had no statistical difference at baseline. These values are given in Table 1.

Paired t-test was applied to both the variables and it was observed that both groups responded to the physical therapy treatment provided. Both groups' values for leg pain, back pain, and MODI changed from baseline to the end of the 8th session. The values for back pain on NPRS for the decompression group decreased from 8.05 ± 0.79 to 1.75 ± 0.57 and the value for leg pain decreased from 5.90 ± 0.81 to 1.90 ± 0.72. The value for disability also decreased from 72.12 ± 0.71 to 29.85 ± 0.63. The p-value was statistically significant ($p<.001$) between pre-treatment and post-treatment values indicating that the treatment was effective. The values for back pain for the ELDOA group decreased from 7.98 ± 0.79 to 1.13 ± 0.99 and the value for the leg pain decreased from 5.95 ± 8.17 to 0.58 ± 5.56 and for disability reduced from 74.52 ± 8.48 to 17.53 ± 4.26. The p-value for all the variables was <0.001 showing a statistically significant difference between pre- and post-values showing that decompression and ELDOA therapies were effective in managing the patient's leg and back pain. The details are given in table 2.

An independent sample t-test was used to compare the two groups at the end of eight treatment sessions. The post treatment back pain score for the decompression

group was 1.75 ± 0.57 and ELDOA group was 1.13 ± 0.72 having P< 0.001. The pre-treatment means score leg pain score for the decompression group was 1.90 ± 0.63 while the ELDOA group was 0.58 ± 0.99 having P< 0.001. The MODI pre-treatment score of the decompression group was 72.12 ± 8.17 and the ELDOA group was 17.53 ± 4.26 having P< 0.001. All variables showed that both the groups had statistical difference at the end of the 8th treatment session. The values are given in Table 3.

DISCUSSION

The aim of the current study was to determine how standard spinal decompression physical therapy treatment and ELDOA therapy have effects on leg pain, back pain and disability of patients with lumbar disc pathology. Findings of our study showed that values for leg pain, back pain, and disability changed from baseline to the end of the 8th session for both groups. The p-value for all the variables was p<0.000 showing a statistically significant difference between pre- and post-values of both groups. It has been reported that in intervertebral disc herniation patients, general traction therapy and spinal decompression therapy were helpful in reducing pain and disability and improving Straight Leg Raise.[10] A study conducted concluded on the combined manual mobilization and spinal decompression therapy showed favourable results in reducing pain, improving range of motion compared to standard physical therapy protocol with spinal decompression therapy. The values for back pain for decompression group decreased from 8.05 to 1.75 and the value for leg pain decreased from 5.90 to 1.90. The value for disability also decreased from 72.12 to 29.85. The p-value for all the variables were statistically significant for the assessment between pre and post-values.[20] Sang-Yeol et al. worked on the combination of Spinal decompression therapy and therapeutic modalities and concluded that there was significant reduction in disability after 10 and 20 treatment sessions. In addition, it was reported that therapeutic modalities in a combination of Spinal decompression therapy were more effective, safe, and non-invasive intervention in lumbar radiculopathy patients.[21]

Clement A. reported that the pain could be significantly decreased while applying ELDOA for the patients with disc pathologies in musicians when assess pre and post-treatment.[22] Likewise in the current study, the quality of life of participants was significantly improved after the administration of ELDOA therapy.

Another study conducted on ELDOA specifically on the piriformis muscle, suggested improvement on NPRS for pain, lower extremity functional scale (LEFS), Piriformis Length Test, and straight leg raise ranges.[23] These findings are in line with the findings of the current study. Some of the limitations of this study included lack of monitoring system for ELDOA and other exercise which are recommended in home. It is therefore recommended that future study covering the mentioned limitations may be conducted.

CONCLUSION

The study concludes that ELDOA and spinal decompression exercises are beneficial for improving back pain, leg pain as well as the quality of life of patients with disc pathology. ELDOA with Exercises yielded better/superior outcomes compared to spinal decompression alone.

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Table 1: Table showing Independent t-test for Base Line Association between the groups

Variables	Group	Mean ± SD	P-Value
NPRS(Back)	DECOMPRESSION	8.05±.790	0.650
	ELDOA	7.98±.813	
NPRS(leg)	DECOMPRESSION	5.90±.706	0.715
	ELDOA	5.95±.790	
MODI	DECOMPRESSION	72.12±8.170	0.117
	ELDOA	74.52±8.484	

Table 02: Table showing results of paired t-test for Decompression Group

Variable	Group	PRE- Mean ± SD	POST Mean ± SD	P-Value
NPRS(Back)	Decompression	8.05±.790	1.75±.571	P< .001
	ELDOA	7.98±.813	1.13±.724	P< .001
NPRS(Leg)	Decompression	5.90±.706	1.90±.630	P< .001
	ELDOA	5.95±.790	0.58±.996	P< .001
MODI	Decompression	72.12±8.170	29.85±5.563	P< .001
	ELDOA	74.52±8.484	17.53±4.268	P< .001

Table 3: Table showing Independent t-test for End Value Association between the groups

Variables	Group	Mean ± SD	P-Value
NPRS(Back)	DECOMPRESSION	1.75±.571	P< .001
	ELDOA	1.13±.724	
NPRS(Leg)	DECOMPRESSION	1.90±.630	P< .001
	ELDOA	0.58±.996	
MODI	DECOMPRESSION	29.85±5.563	P< .001
	ELDOA	17.53±4.268	

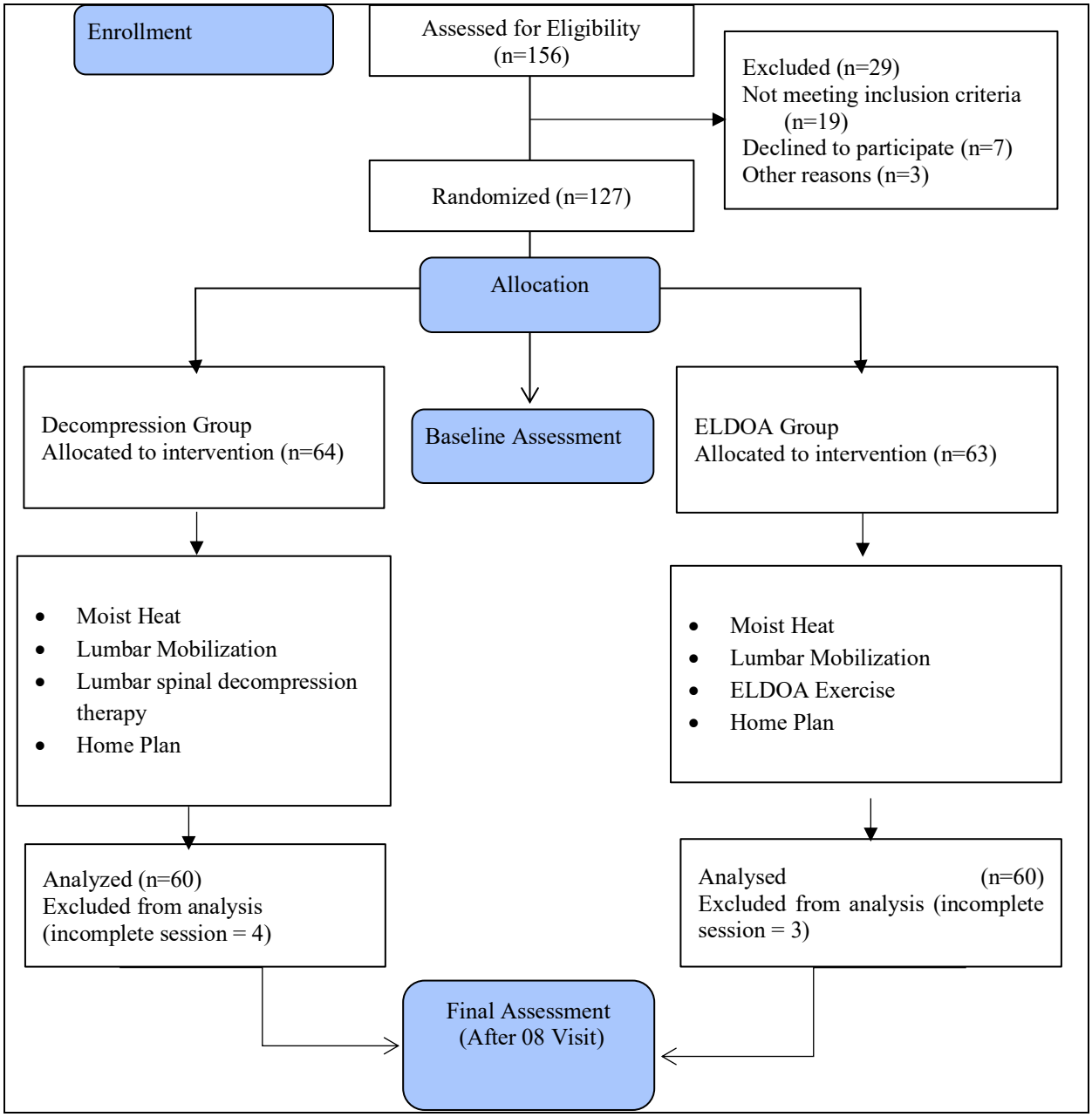

Figure 1; CONSORT diagram