

## Effect of spinal decompression with and without segmental mobilization in patients with posterolateral lumbar disc protrusion

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**Objective:** To evaluate the effect of spinal decompression with and without segmental mobilization in improving pain, ROM, walking time and disability in patients with posterolateral lumbar disc protrusion.

**Methodology:** This RCT include 44 patients of lumbar disc bulge and were randomly assigned through coin toss method into two groups. The Experimental Group ( $n=23$ ) received decompression therapy, Maitland mobilization of lumbar spine along with conventional treatment and the Control group ( $n=21$ ) received decompression therapy and conventional physiotherapy. Both groups received two treatment sessions per week. Non-parametric

tests was applied for the result.

**Results:** Comparison both groups showed significant improvement in MODI and NPRS with  $p<0.001$  after 2 weeks of treatment. The experimental group showed significant improvement in lumbar spine range of motion ( $p<0.001$ ). End values comparison of variables within groups showed significant improvement in lumbar ROM, NPRS and MODI ( $p<0.001$ ).

**Conclusion:** Neuro spinal decompression therapy along with CPA Maitland mobilization was effective in reducing NPRS score, MODI and increase lumbar ROM. (Rawal Med J 201;43:294-297).

**Keywords:** CPA, MODI, neuro decompression therapy, NPRS.

## INTRODUCTION

Disc herniation is very common in lumbar spine. It may occur due to jerk, lifting heavy loads or may happen by wear and tear of the lumbar spine. Usually, sciatica is the common symptom experienced due to disc herniation.<sup>1,2</sup> Surgery must be reserved for those patients who did not respond satisfactorily towards physical rehabilitation program. Stenosis is a condition that fails to respond to non-operative treatment.<sup>3</sup>

However, herniated lumbar nucleus pulposus may decrease and even disappear in patients treated successfully with conservative treatment.<sup>4</sup> A study in 2008 showed that ultrasound, traction and laser therapies were all effective in treatment of patients with acute lumbar disc herniation.<sup>6</sup> Another study concluded radicular symptoms are relieved by vertebral separation as it removes contact forces or direct pressure from sensitized neural tissue, mostly in patients with acute radicular pain (less than 6 months) and concomitant neurological deficits.<sup>7</sup> The aim of this study was to evaluate the effect of spinal decompression with and without segmental mobilization in improving pain, ROM, walking

time and disability in patients with posterolateral lumbar disc protrusion.

## METHODOLOGY

The study Randomized Control trial was conducted in KKT orthopedic spine center and Canada Orthopedic and Rehabilitation Center from February 16, 2016 to July 23, 2016. Patients of age 18 to 66 years having posterolateral lumbar disc bulge confirmed by MRI and patients who had localized as well radiating back pain and associated symptoms were included in the study. Patients who did not have MRI and patients with diagnosis of lumbar spondylolisthesis, spinal stenosis, lumbar spine fracture, spinal tumor, ankylosing spondylitis were excluded from study. The subjects were randomly divided into 2 groups (control group and experimental group) by coin toss method using purposive non-probability sampling technique. People who met the inclusion criteria and included in study were 52. Among them 26 were randomly assigned to each group. 5 patients in control group and 3 patients in experimental group dropped out, so total 44 patients i.e. 21 in control group and 23 in

experimental group were analyzed. The Riphah ethical review committee and KKT/CORC center approved to conduct the study in their setting. The informed consent from all patients was taken before enrollment in the study.

Intervention protocol for control group included application of TENS and Infrared heat at lower back region for 10 mins, treadmill for 10 mins in pre physiotherapy session, decompression therapy session of 25 minutes and infrared heat for 10 mins in post physiotherapy session. Same protocol was given to experimental group with addition of CPA Maitland mobilization at lumbar spine from L1 to L5 spinous process (3 sets of 10 reps) in pre physiotherapy session. Measurement tools were Modified Oswestry Disability Index (MODI) to measure functional disability, Numeric Pain Rating Scale (NPRS) to measure patient's pain intensity, walking time was calculated and range of motion of lumbar spine was measured by goniometer.

Structural questionnaire was used for first and final assessment. Base line measures were taken at 1<sup>st</sup> visit. ROM, walking time, NPRS score and MODI score were calculated. Two weeks treatment was given (no

of sessions=4). End values of variables were calculated after completion of treatment sessions.

Data was analyzed by using SPSS version 21. When tests of normality were applied to data, it was seen that data was dispersed and was not equally distributed. P-value was less than 0.05 so non-parametric tests were applied. Since the treatment effect was defined as the difference between before and after the therapeutic intervention, Wilcoxon test applied within the group to test whether there was a reduction in pain and MODI score and increase in ROM and walking time. Base line and end line values of variables between groups were determined by Mann-Whitney U-Test.

## RESULTS

Among 44 patients, 27 were males and 17 were females. Mean age was  $42.45 \pm 12.38$  years. Most common disc bulge level was L4-L5 (31.82%). Most of the patients were housewives (27.27%). Duty hours of majority of patients were less than 12 hours. Referral source of most of patients was other patients (34.09%). Most of the patients (79.55%) were experiencing pain form more than one year (Table 1).

**Table 1. Demographic Data.**

Variable	Overall	Control	Experimental
Age	Mean: $42.45 \pm 12.38$	Mean: $40.57 \pm 11.49$	Mean: $44.09 \pm 13.18$
Gender	M (27), F (17)	M (13), F (8)	M (14), F (9)
Disc bulge level	L4-L5: 31.82%	L4-L5: 45.5%	L2-L3: 30.4%
Occupation	House wives: 27.27% Businessman: 18.18%	Housewives: 27.3% Office workers: 22.7%	House wives: 26.1% Doctors: 21.7%
Duty hours	Less than 12 hours: 47.7%	Less than 12 hours: 59.1%	Less than 6 hours: 52.2%
Referral	Patients: 34.09%	Patients: 40.9%	Self: 30.4%
Onset of pain	Pain started more than one year before: 79.55%	Pain started more than one year before: 72.7%	Pain started more than one year before: 82.6%
Previous treatment	Neurophysician: 31.82%	General practitioner: 36.4%	Orthopedic consultant: 39.1%
Previous PT treatment	No: 54.5%	No: 54.5%	No: 52.2%
Pain	Yes: 93.2%	Yes: 95.5%	Yes: 87%
Muscle spasm	Yes: 72.7%	Yes: 59.1%	Yes: 82.6%
Pins and needles	No: 75.0%	No: 63.6%	No: 82.6%
Numbness	Yes: 52.3%	Yes: 54.5%	No: 52.2%
On Set	Suddenly: 43.2%	Suddenly: 45.5%	Suddenly: 39.1%
Worst during activities	Bending: 36.36%	Walking: 36.4%	Bending: 52.2%
Better during activities	Lying: 43.18%	Lying: 45.5%	Lying: 39.1%
Dermatome level	Multiple: 34.09%	Multiple: 40.9%	Multiple: 26.1%
Pain radiation	Yes: 68.2%	Yes: 72.7%	Yes: 60.9%
Pain radiation side	Left: 38.6%	Left: 31.8%	Left: 43.5%
Pain radiation level	Till ankle: 25.0%	Till ankle: 22.7% Below knee: 22.7%	Till ankle: 26.1%

**Table 2. Mann-Whitney U-Test comparison of baseline variables between groups.**

Test variable	Group allotted to patients	Median (IQ)	Mean rank	z-value	P value
Walking time 1st visit	Control	2(2)	23.71	-0.637	P > 0.05 (0.524)
	Experimental	2(2)	21.39		
Lumbar flexion 1st visit	Control	50(29.5)	25.00	-1.242	P > 0.05 (0.214)
	Experimental	42(20)	20.22		
Lumbar extension 1st visit	Control	20(12)	25.98	-1.719	P > 0.05 (0.086)
	Experimental	15(9)	19.33		
Lumbar right side bending 1st visit	Control	22(19)	25.24	-1.353	P > 0.05 (0.176)
	Experimental	21(5)	20.00		
Lumbar left side bending 1st visit	Control	26(19.5)	24.24	-0.859	P > 0.05 (0.390)
	Experimental	20(12)	20.91		
Lumbar right rotation 1st visit	Control	21(14)	25.52	-1.496	P > 0.05 (0.135)
	Experimental	20(8)	19.74		
Lumbar left rotation 1st visit	Control	20(12.5)	23.29	-0.389	P > 0.05 (0.697)
	Experimental	22(15)	21.78		
NPRS 1st visit	Control	7(3.5)	23.50	-0.502	P > 0.05 (0.616)
	Experimental	7(2)	21.59		
MODI 1 <sup>st</sup> visit	Control	62(22)	22.95	-0.224	P > 0.05 (0.823)
	Experimental	62(22)	22.09		

**Table 3. Mann-whitney U-Test comparison of end-values variables between groups.**

Test variable	Group allotted to patients	Median (IQ)	Mean Rank	Z-value	P value
Walking time last visit	Control	4(1)	19.55	-1.563	P > 0.05 (0.118)
	Experimental	4(1)	25.20		
Lumbar flexion last visit	Control	55(32)	17.69	-2.379	P < 0.05 (0.017)
	Experimental	72(12)	26.89		
Lumbar extension last visit	Control	19(11)	15.45	-3.489	P < 0.05 (0.000)
	Experimental	27(7)	28.93		
Lumbar right side bending last visit	Control	27(21.5)	17.17	-2.635	P < 0.05 (0.008)
	Experimental	37(10)	27.37		
Lumbar left side bending last visit	Control	23(14)	16.33	-3.045	P < 0.05 (0.002)
	Experimental	42(16)	28.13		
Lumbar right rotation last visit	Control	28(11)	18.10	-2.176	P < 0.05 (0.030)
	Experimental	38(11)	26.52		
Lumbar left rotation last visit	Control	25(12)	15.12	-3.645	P < 0.05 (0.000)
	Experimental	38(18)	29.24		
NPRS last visit	Control	5(3.5)	27.38	-2.448	P < 0.05 (0.014)
	Experimental	3(2)	18.04		
MODI last visit	Control	50(16)	27.95	-2.695	P < 0.05 (0.007)
	Experimental	40(16)	17.52		

The base line values comparison between control and experimental group Mann-Whitney test showed non-significant result. The p-value of walking time, lumbar flexion ROM, lumbar extension ROM, lumbar right side bending ROM, lumbar left side bending ROM, lumbar right rotation ROM, lumbar left rotation ROM, NPRS and MODI was non-significant (Table 2).

The end values comparison between control and experimental group Mann-Whitney test showed significant result. The p value of lumbar flexion ROM, lumbar extension ROM, lumbar right side bending ROM, lumbar left side bending ROM, lumbar right rotation ROM, lumbar left rotation ROM, NPRS and MODI was significant while the p-value of walking time was non-significant (Table 3).

## DISCUSSION

In this study, CPA Maitland mobilization was given at lumbar spinous process L1 to L5 in experimental group. There was a significant improvement in lumbar extension post treatment. A similar study showed significant increase in lumbar extension range post treatment.<sup>9</sup> NPRS score was significantly reduced in experimental group following treatment in present study. This is similar to a previous study, in which short term effects of lumbar posteroanterior mobilization were compared with a control intervention and score for pain on movement was reduced significantly after posteroanterior mobilization.<sup>11</sup>

The current study suggested that NPRS score was significantly reduced in both groups after 4 weeks treatment of non-invasive motorized spinal decompression. Previous study by Apfel et al supported the results of current study in which the effect of 6 weeks treatment protocol of motorized non-invasive spinal decompression DRX9000 on lumbar disc herniation was observed with pre and post CT scan. NPRS score was significantly reduced and disc height was significantly increased post treatment.<sup>15</sup>

In our study, MODI score was significantly reduced in control and experimental group after 2 weeks of treatment protocol. A similar study concluded that MODI score was significantly reduced and SLR range was significantly improved post treatment.<sup>16</sup>

Our results showed that there was significant reduction in NPRS and MODI score after 2 weeks treatment of non-invasive motorized spinal. A study by Choi et al favors the results of present study in which influence of spinal decompression therapy and general traction on pain, disability and SLR was identified in patients with disc herniation. Treatment

of 4 weeks was offered to patients. Both groups showed significant reduction in VAS and ODI scores and significant increase in SLR angle.<sup>17</sup>

## CONCLUSION

Neuro spinal decompression therapy along with CPA Maitland mobilization was effective in reducing NPRS score, MODI and increase lumbar ROM.

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