



EFFECTIVENESS OF LUMBAR OBLIQUE – PULLING MANIPULATION WITH COMBINATION OF SLING EXERCISE THERAPY v/s STANDARD PHYSIOTHERAPY PROTOCOL IN CHRONIC NON – SPECIFIC LOW BACK PAIN – A COMPARATIVE STUDY

By - Dr. Chahat Bhandari

Under guidance of – Dr. Sanket Nagrale

ABSTRACT

BACKGROUND: Low Back Pain refers to a syndrome of pain and discomfort in the lower back, lumbosacral portion and hip. Chronic Non- Specific Low Back Pain (CNSLBP) refers to pain or discomfort that continuously persists for more than 12 weeks, which is accompanied or not by relevant low back pain symptoms in middle aged and elderly people over 40 years old. The incidence rate of CNSLBP accounts for over 85% LBP, which severely affects the quality of life and working and labor abilities of these patients. Sling Exercise Therapy (SET) is a rehabilitation method that enhances core muscles and improves balance and control ability of body under an unstable state. Lumbar Oblique Pulling Manipulation (LOPM) includes relaxation and pulling technique. Standard Physiotherapy Protocol (SPP) includes heat, massage and active isotonic and isometric strengthening exercises of abdominals and back muscles.

AIM: To study the effectiveness of LOPM with SET v /s SPP in CNSLBP.

METHODOLOGY: Population aged between 20-40 years both male and female having LBP and discomfort sine 10-12 weeks were included in this study. The duration for study was 4 weeks. PRE and POST data for Oswestry Disability Index and Visual Analogue Scale was calculated and analyzed.

OUTCOME MEASURE: ODI and VAS

RESULTS : Paired t test was used to analyze pre and post differences within the group and p value mean and mean of differences were calculated. The pre treatment mean for group A is 39.33 and post mean for group B is 20.80 of ODI. The pre treatment mean for group B is 29.20 and post treatment mean for group B is 18.93 of ODI. The pre treatment mean for group A is 5.693 and post Rx mean for group A is 3.40 of VAS. The pre treatment mean for group B is 6.073 and post treatment mean for group B is 4.767 of VAS. The study was extremely significant as the p value was less than 0.00001.

CONCLUSION: The study concluded that both the groups are effective in treating CNSLBP patients. LOPM with SET is effective but not significant to Group B in treating patients of CNSLBP.

KEY WORDS: CNSLBP, SET, LOPM, SPP.

INTRODUCTION

Low back pain refers to a syndrome of pain and discomfort in the lower back, lumbosacral portion, and hip, these are the main symptoms.

Low back pain is classified into three categories:

Specific spinal marrow pathological lower back pain.

Example: infection, tumour, bone fracture, osteoporosis, etc.

Nerve root low back pain.

Non-specific low back pain.

Chronic non-specific low back pain refers to pain or discomfort that continuously persists for more than 12 weeks, which is accompanied or not by relevant low back pain symptoms. Its population mainly includes middle-aged and elderly people over 40 years old but also may include 18-65 years aged patients.

The incidence rate of chronic non-specific low back pain accounts for over 85% low back pain, which severely affects the quality of life and working and labor abilities of these patients.

There are various chronic low back rehabilitation therapies, as one of the exercise therapy is Sling Exercise Therapy, which is a modern rehabilitation method that enhances core muscles. It improves the balance and control ability of body under an unstable state by enhancing trunk muscles and exercise ability of the unilateral limb.

As one of the alternative therapy is lumbar manipulation (lumbar oblique-pulling manipulation). Also standard physiotherapy protocol can be given for low back pain which includes heat, massage and exercise.

AIMS:

To study the effectiveness of lumbar oblique-pulling manipulation in combination with sling exercise therapy v/s standard physiotherapy protocol using heat, massage, and exercise in Chronic non-specific Low back pain.

OBJECTIVE:

To investigate the clinical curative effect of lumbar oblique-pulling manipulation in combination with sling exercise therapy v/s standard physiotherapy protocol using heat, massage, and exercise.

NEED OF STUDY

Nowadays many people are having non-specific low back pain. Many studies have shown the standard physiotherapy protocol for low back pain. Also there are manipulative techniques used for lumbar spine for low back pain.

There are no studies which shows effectiveness of manipulation techniques with sling exercise therapy over standard physiotherapy protocol.

REVIEW OF LITERATURE

- **RESULTS:**
Before and after treatment, the ODI score was compared within the group. A remarkable statistical significance was observed from third day ($P < 0.05$). At the third month of follow-up, the difference in ODI scores between these two groups was statistically significant ($P < 0.05$). (2) Before and after treatment, it was observed that differences in VAS scores from the third day were statistically significant ($P < 0.05$). (3) The difference in muscle strength between these two groups had remarkable statistical significance in the third month of follow-up ($P < 0.05$).
- **CONCLUSION:**
The effective rehabilitation function of lumbar oblique pulling manipulation in combination with sling exercise therapy training in patients with CNLBP is superior to that of sling exercise therapy training alone.

METHODOLOGY

- Sample size: 30
- Study setting: Physiotherapy OPD
- Study design: Comparative study
- Sampling methods: Convenient
- Study Population: Between 20-40 years male and female
- Study duration: 4-weeks

INCLUSION CRITERIA

- Patient having low back pain and discomfort since 10-12 weeks.
- Patient aged 20-40 years old male and female..
- Oswestry Disability Index score between 20% - 60% (minimal to moderate disability).
- VAS score between 4 to 7(moderate pain).

EXCLUSION CRITERIA

- Imaging examination indicating significant abnormalities including compression fracture of lumbar vertebrae, lumbar disc herniation, lumbar spinal stenosis, lumbar spondylolisthesis, spinal tumour infection, tuberculosis, etc.
- Patients suspected of spinal cord injuries.
- Patient with severe cardiac, pulmonary, cerebral and blood system disease, as well as diabetes mellitus, ankylosing spondylosis, rheumatoid arthritis, and severe osteoporosis.
- Patient with severe skin injuries in the treatment area.
- Patients who received lumbar surgery and patient with lumbar deformation.

PROCEDURE

- Study was begun after the presentation of synopsis to an ethical committee in PES MCOP.
- Study was begun after obtaining ethical clearance from the committee.
- Many patient came with the complaints of chronic non-specific low back pain.
- Then we selected the subject on the basis of their inclusion and exclusion criteria.
- The subject was explained about the study before starting the treatment .
- Then consent was taken by the subject.
- VAS and oswestry score was measured before and after the treatment.
- The data was collected and analysed.

SLING EXERCISE THERAPY:

The sling exercise program was based on a lumbar stabilization exercise that works on part of the trunk, and a pelvic stability exercise series that consisted of six movements:

- 1) Trunk-pelvis stretching
 - 2) A hip-trunk bridging exercise
 - 3) Pelvic tilting exercise (anterior and posterior)
 - 4) A lower crossed exercise
 - 5) Trunk rotation exercise
 - 6) Oscillating trunk-pelvis exercise.
- These were carried out in supine position.

2. LUMBAR OBLIQUE PULLING MANIPULATION:

1. **Relaxation manipulation:** massage, roll or push pain points in the lumbar and surrounding regions for 5-15 minutes to fully relax the spastic muscles.
2. **Pulling technique:** In the lateral position, the patients bend the hip and knee of lower limb upwards, and naturally extends the lower limb downwards. The physician stands by the bedside to support the hip by the other elbow or hand. With a stable touch, a sudden and large-scale pulling motion is applied and “kata” sounds are heard.

3. STANDARD PHYSIOTHERAPY PROTOCOL:

Active isotonic and isometric strengthening exercises were prescribed to strengthen the frontal abdominal muscles (musculus obliquus externus abdominis, musculus obliquus internus abdominis, musculus rectus abdominis), deep abdominal muscles (musculus psoas major, musculus psoas minor, musculus iliacus, musculus quadratum lumborum), and back muscles (musculi dorsi, musculus erector spinae, musculi transverso-spinales, musculi inter-spinales, musculi intertransversarii). For the hamstrings, lumbar extensors, and hip flexors, a set of stretching exercises was prescribed.

PROTOCOL

Group 1:

- Patient receiving lumbar oblique-pulling manipulation in combination with sling exercise therapy 4 times in a week.
- Sling exercise therapy- three time a week, 15-20 minutes per session with 3 repetitions of 30 seconds hold.
- Lumbar oblique-pulling manipulation – once a week, 15-20 minutes per session.

Group 2:

- Patients receiving Standard Physiotherapy Protocol which includes heat, massage and exercises.
- Three times in a week.
- 30 minutes per session.

OUTCOME MEASURE

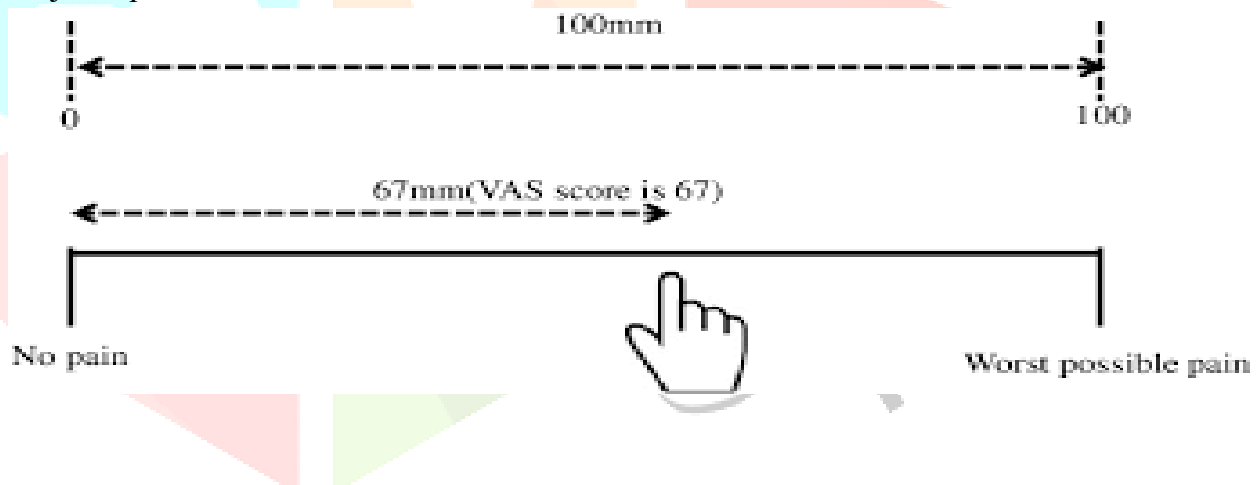
1) **OSWESTRY DISABILITY INDEX:**

- The Oswestry Disability Index (also known as the Oswestry Low Back Pain Disability Questionnaire) is an extremely important tool that researchers and disability evaluators use to measure a patient's permanent functional disability. The test is considered the ‘gold standard’ of low back functional outcome tools .

- **Interpretation of scores 0% to 20%: minimal disability:** The patient can cope with most living activities. Usually no treatment is indicated apart from advice on lifting sitting and exercise.
- **21%-40%: moderate disability:** The patient experiences more pain and difficulty with sitting, lifting and standing. Travel and social life are more difficult and they may be disabled from work. Personal care, sexual activity and sleeping are not grossly affected and the patient can usually be managed by conservative means.
- **41%-60%: severe disability:** Pain remains the main problem in this group but activities of daily living are affected. These patients require a detailed investigation.
- **61%-80%: crippled:** Back pain impinges on all aspects of the patient's life. Positive intervention is required.
- **81%-100%:** These patients are either bed-bound or exaggerating their symptoms.

1. VAS -Visual Analogue Scale (ICC =0.97)

- The Visual Analogue Scale (VAS) consists of a straight line with the endpoints defining extreme limits such as 'no pain at all' and 'pain as bad as it could be'. The patient is asked to mark his pain level on the line between the two endpoints. The distance between 'no pain at all' and the mark then defines the subject's pain.



DATA ANALYSIS AND INTERPRETATION

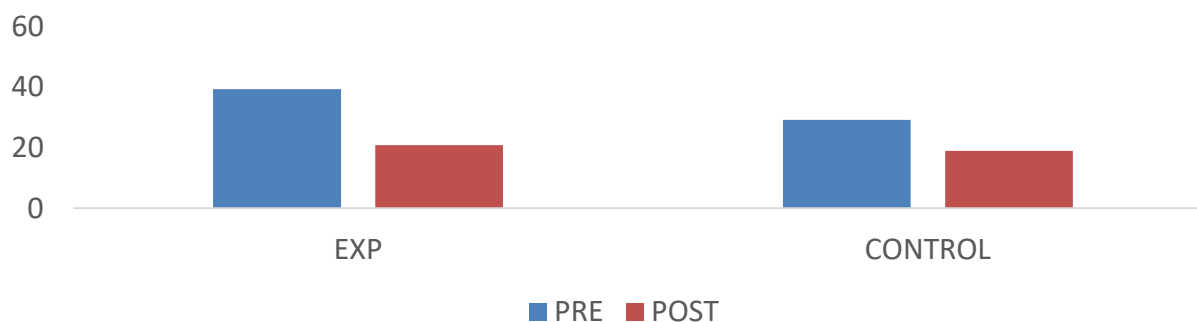
- The data was analyzed using Graph pad Prism software for windows version.
- Mean and standard deviation of all the variables were calculated.
- The intragroup data was then subjected to statistical analysis using paired t test.
- The inter group data was then subjected to statistical analysis using unpaired t test.

RESULTS AND TABLE

GROUP	TEST)	OSWESTRY DISABILITY SCALE (PAIRED t			
		Mean Comparison	SD	t value	P value
EXPERIMENTAL	PRE	39.33	6.53	15.114	0.0001
	POST	20.80	6.13		
CONTROL	PRE	29.20	7.63	23.840	0.0001
	POST	18.93	8.55		

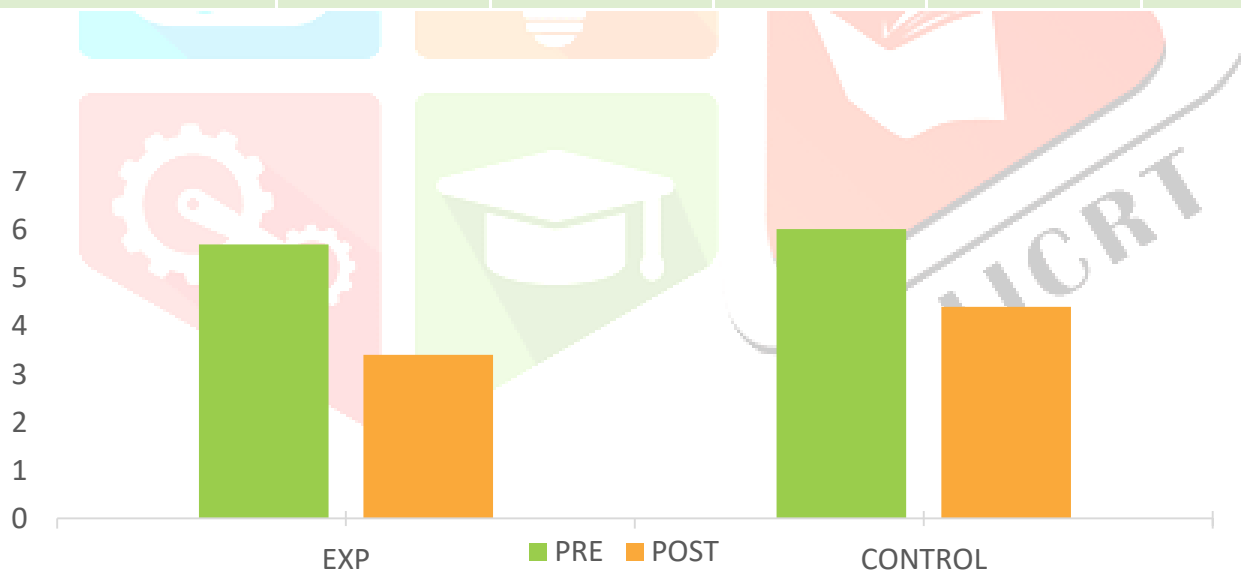
T-test is carried for comparison between two groups. From above graph and table we can observe that Comparison of pre and post treatment values of Oswestry disability index scores of Experimental and Control group shows a significant difference.

OSWESTRY DISABILITY INDEX



VISUAL ANALOGUE SCALE

GROUP		Mean Comparison	SD	T Value	P value
EXPERIMENTAL	PRE	5.693	0.754	19.688	0.0001
	POST	3.400	0.804		
CONTROL	PRE	6.013	0.913	12.979	0.0001
	POST	4.767	0.802		



From above graph and table we can observe that Comparison of pre and post treatment values of visual analogue scale scores of Experimental and Control group shows a significant difference.

UNPAIRED t TEST

		Mean Comparison	SD	T Value	P Value
OSWESTRY DISABILITY SCALE	POST	20.80	6.13	0.6872	0.4976
	POST	18.93	8.55		
VAS	POST	3.40	0.804	4.6612	0.0001
	POST	4.767	0.802		

The Unpaired T-test is carried for comparison with two groups, Lumbar oblique pilling manipulation and standard physiotherapy protocol. The p value of VAS is clinically significant. The p value of Oswestry Disability index for Lumbar Oblique Pulling Manipulation is clinically not significant.

RESULTS

- The comparison of Oswestry Disability Index PRE and POST scores of Lumbar Oblique Pulling Manipulation treatment , the p value is <0.0001 which is considered extremely significant.
- The pre treatment mean is 39.33 of Experimental group with SD value of 6.53 while post treatment mean is 20.80 with SD value of 6.13. The t-value is 15.114.
- The pre treatment mean of Control group is 29.20 with SD value of 7.63 while post treatment mean is 18.93 with SD value of 8.55. the t-value is 23.840.
- The comparison of VAS PRE and POST scores of Lumbar Oblique Pulling Manipulation with Sling exercise treatment , the p value is <0.0001 which is considered extremely significant.
- The pre treatment mean is 5.693 of Experimental group with SD value of 0.754 while post treatment mean is 3.400 with SD value of 0.804. The t-value is 19.688.
- The pre treatment mean of Control group is 6.013 with SD value of 0.913 while post treatment mean is 4.767 with SD value of 0.802. The t-value is 12.979.

- Unpaired t-test is carried out. The comparison of ODI POST and POST of Lumbar Oblique Pulling Manipulation with Sling exercise treatment , the p value is 0.49 which is not statistically significant.
- The comparison of VAS POST and POST of Standard physiotherapy protocol is done, the p value is 0.0001 which is considered extremely significant.

DISCUSSION

- The present study was undertaken to compare the clinical curative effect of Lumbar-oblique pulling manipulation in combination with Sling exercise therapy v/s Standard physiotherapy protocol using heat, massage and exercise for chronic non-specific Low back pain patients (age 20 to 40 years).
- In this study total 30 patients were included with 15 participants in each group. One group was given Lumbar oblique pulling manipulation with Sling exercise therapy and other group received Standard physiotherapy protocol for 4 weeks.
- The Outcome measure for pain was VAS and for functional disability was Oswestry disability index. The Oswestry disability index values and VAS score in Group A (Lumbar oblique pulling manipulation with Sling exercise therapy) and Group B (Standard physiotherapy protocol) were found to be extremely statistically significant as the p values was <0.0001 for both the groups for both the outcome measures.
- When the post VAS scores of both the group were compared, both the interventions proved to be effective in treating Chronic non-specific Low back pain patients as the p value was <0.0001 . When the post Oswestry disability index values of both the groups were compared, the results were not statistically significant as the p value was <0.4976 .
- Barker KL, Shamley DR, Jackson D stated that The trunk muscles of patients with low back pain show atrophy. Pain changes the contraction pattern of trunk muscles and inhibits their activation (11), eliciting atrophy of the trunk muscles.
- Previous investigations have found that trunk muscle strengthening and normal recruitment of the trunk muscles through neural adaption are effective at reducing pain and disability and improving trunk stability(12). Therefore, trunk muscle strengthening and neural adaption via sling exercise can be expected to reduce the pain and disability of patients with low back pain.
- Sun Shuchun, a successor of the Qingkong Zhenggu School thought that Lumbar oblique-pulling manipulation can effectively improve the disorders of the anatomical structure of posterior lumbar joints, in combination with the activation of lumbar core muscles by SET, which summarized the idea behind the treatment: “attach equal importance to the tendon and bone”
- Lumbar oblique-pulling manipulation in combination with SET not only treats symptoms of the disease but also re-adjusts the muscle strength balance of the back, preventing recurrence and further improving the quality of life and working ability of patients.
- The manipulation method can promote blood circulation to remove blood stasis, soothe the vessels, resolve tetany and relieve pain, and lubricate the joints. From the perspective of modern medicine, manipulation can improve blood circulation, relax spastic muscles, remove abnormal stress points of the spine, and reconstruct the mechanical balance of soft tissues.

- Van Tulder et al.[13] reported that exercise for the treatment of low back pain was effective in accelerating improvements in daily life activities and return to work. In a meta-analysis, the patients with CLBP treated with exercise therapy showed a significant improvement in terms of pain and functional status.
- Hence, Lumbar Oblique pulling manipulation with Sling exercise therapy is more effective than Standard physiotherapy protocol in treating Chronic non-specific Low back pain patients.

CONCLUSION

- The present study concluded that, both the groups are effective in treating Chronic non-specific Low back pain patients.
- Lumbar Oblique Pulling Manipulation with Sling Exercise Therapy is effective but not significant when compared to the other group in the treatment of chronic non-specific low back pain patients.

CLINICAL IMPLICATION

- The result of this study can be used to make good clinical decision in cases of chronic non-specific low back pain patients.

LIMITATION

- Small sample size.
- Only short-term effects of intervention were examined as the study was limited to 4-weeks of protocol.

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