EFFICACY OF SLUMP STRETCHING IN COMBINATION WITH CONVENTIONAL THERAPY IN NON-RADICULAR LOW BACK PAIN

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ABSTRACT: Background: *Low back pain (LBP) is a common problem which experienced by all in anyone stage in their lifetime. Mostly it is due to the altered neural tension which can be tested by slump test and this slump stretching can be also used as intervention tool and moreover studies showed that slump stretching is beneficial in treating the patients. If the effectiveness of the slump stretching and its combined effectiveness along with the conventional therapy are determined it will add evidence for their effectiveness in treating the patients with low back pain.*

Objective:

1. *To study whether the application of slump stretching with conventional therapy can reduce the disability due to pain andincrease the range of motion in patients with non radicular low back pain*
2. *To evaluate the treatment efficacy of slump stretching in comparing with conventional therapy in patients with non radicular low back pain.*

Methods and measures: *45 patients with non radicular low back pain satisfying the inclusion and exclusion criteria were randomly assigned to three groups. Group A received the slump with conventional therapy, Group B received slump stretching and group C received conventional therapy.*

Outcome measures: *NPRS Scores, Disability Questionnaire, Active Lumbar Flexion Range*

Statistical analysis: *paired t test is used to compare baseline and post intervention within the group and ANOVA with post hoc analysis is used to compare between the groups.*

Results: *Group A showed significant difference when compared with Group B and Group C. significant difference was found between Group B and C by comparing the mean difference between the groups.*

Conclusion: *from the study we can draw a conclusion that slump stretching is beneficial than the conventional therapy and can be added to conventional therapy protocols in improving the disability status due to low back pain. Slump stretching can be added with other treatment protocols based upon the patient requirements.*

INTRODUCTION

Back pain is an extremely common phenomenon; a price mankind has to pay for their upright posture. Low back pain is a major public health problem all over the world and by definition it is defined as pain, aching, or discomfort localized in the area between the costal margin and the gluteal folds.It occurs in similar proportions in all cultures, interferes with quality of life and work performance, and is the most common reason for medical consultations(1).

The prevalence of low back pain varies from country to country but uniformly high in industrialised nations(2). Though the Peak prevalence is in the group between 45 and 60 years of age but most of the people suffer incapacitating low back pain at some stages in their lives. Especially, the prevalence of low back pain in children and adolescents are higher in rates and shown by age of 20 as life time prevalence(3)(4).

Most of the patients will have chronic non-specific low back pain which is due to physiological and structural fragility in the lumbar region, and it is often caused by improper posture, which can be called a living functioning impairment. Basically, the structural integrity of the body segment depends upon on joint axis, muscles and nervous structure. Any alteration from normal structural &functional alignment of muscle and it results in alteration of extensibility of nervous system(5). When mechanical stresses applied to nerves evoke physiological responses such as shift in intraneural blood flow, impulse traffic and axonal transport and the joint angulation alter the length of the nerve bed on the opened side of the axis of rotation. This causes the nerve on the expanded side to slide and elongate in counter to that joint movement(6).

The lumbar spine consists of both static and dynamic components that are responsible for stability of the spine. Vertebral bodies, intervertebral disc, ligaments, facet joints and joint capsule constitute the static component whereas muscles and tendons of the trunk comprise the dynamic component. Without the assistance of the dynamic component, the lumbar spine buckles under compressive loads less than approximately 90N, whereas the vivo spine can with stands loads of up to 18000N. The important specific muscles needed for the stability of the spine are Transverse abdominis, Erector spinae, multifidus, Quadratus lumborum and Oblique abdominals(7).

Slump Stretching:

Stretching is one of the techniques or strategies to improve the motor function which involves the application of manual and mechanical force to elongate (lengthen) structures that have adaptively shortened. The term static stretching refers to the method of stretching in which the muscle is slowly elongated to the tolerance and the end position (greatest tolerated length) is held at least 20 to 30 seconds or longer depending upon the patient's tolerance (8). In recent years, neurodynamic tests have been used as an intervention to potentially to resolve the abnormal physiology within the nervous system. Slump test is one of the neurodynamic tests to rule out whether a herniated disc, neural tension, or altered neurodynamics are contributing to the patient's symptoms but it can be used as the interventional tool. Several studies have examined the effectiveness of slump stretching for subjects with LBP.

Physiologically Slump stretching was effective in reducing the patient's pain by dispersing intraneural edema, thus pressure gradients, hypoxia and associated symptoms are improved(9). Slump stretching also reduces antidromic impulses generated in C– fibers at the dysfunctional site which results in the release of Neuro peptides and subsequent inflammation in the tissues supplied by the nerve (6).

Hence, if the normal neurodynamics are restored by alleviating any sites of neural compression, dissipated friction, anti dormically evoked impulses may perhaps be eliminated. Slump stretching may have outcome in scar tissue reduction, which had gripped to neural tissue and its associated connective tissue structures(10) .

Shortwave Diathermy:

Shortwave diathermy is the use of high frequency electromagnetic waves of frequency at 27.12MHz and 11m therapeutically (commonly). Physiologically, The thermal heating effects of SWD is vasodilatation, exaggerated rate of nerve conduction and rise in collagen extensibility, acceleration of enzymatic activity, alteration in skeletal muscle strength, and possibly towering of nociceptive threshold (11). When the tissue temperature raised up to 42°C ,it is found to cause a decline in firing rate of type II muscle spindles efferent and γ – efferent and elevates firing rate of type Ib fibers from the Golgi tendon organs. These alteration in nerve fibers lowers the firing rate of α – motor neurons and hence reduction in the muscle spasm is found and non-thermal effects includes superficial wound local oxygen perfusion, enhance nutrient availability, and assist phagocytosis(11).

INCLUSION CRITERIA:

- Age: 18– 50 Years.
- Chronic low back pain without radiculopathy
- Pain that had an average intensity greater than or equal to 4/10 on an 11 point numeric pain rating scale (NPRS).
- Decreased spinal mobility.

EXCLUSION CRITERIA:

- Infectious diseases like TB.
- Spinal conditions like fracture,stenosis,Osteoporosis.
- Pregnancy
- Post – operative hip arthroplasty.

MATERIALS AND METHODS:

The study was conducted in physiotherapy department of Saveetha medical college & hospital.

Participants were chosen based on the inclusion & exclusion criteria. Those who are willing to participate were briefed about the study, advantages and disadvantages of the intervention in the language

best understood by them and then informed consent form was gathered. They were encouraged to clarify question regarding the study if any. The detailed assessment of participants was taken.

Participants were then randomized into three groups (i.e.) Group A, B&C allocation of participants of three groups was done on alternative basis. The pain is rated with numeric pain rating scale, the functional disability is assessed with Oswestry disability questionnaire for LBA and measurement of active lumbar flexion range was recorded prior to any intervention.

GROUP A: The participants received SWD followed by slump stretching and then lumbar stabilization exercises.

GROUP B: The participants of this group have undergone slump stretching technique only.

GROUP C: The participants of this group received SWD and followed by lumbar stabilization exercises.

Slump Stretching:

For slump stretching, the subjects were positioned in long sitting, feet is maintained neutral dorsiflexion angle by against it to a wall, trunk is flexed to enhance elongation, while the therapist applies over pressure into cervical spine flexion to the point where the patient's symptoms were reproduced. The stretch is maintained for 30 seconds and total of five repetitions is completed by the subjects.

SWD:

Power-500 Watts, each session of 15 minutes with coplanar method of electrode placement in the lumbar region in prone position (SWD is given thrice in a week).

LUMBAR STABILISATION EXERCISE:

The lumbar stabilization exercise includes Abdominal In-drawing ,Bird dog exercise,Side plank, Bridging on physio ball ,Abdominal crutches on Swiss ball, Wall squats with Swiss ball. Each exercise are done 2 sets of two repetition on every treatment session

STATISTICAL ANALYSIS AND RESULTS:

The data are statisticallyanalyzed and tabulated in Table 1-5. The paired t test is used to compare within the groups and ANOVA is used to find the difference between the groups. Statistical significance was set at $p < 0.05$. P value >0.05 was considered as non significant difference, while p-value ≤ 0.05 was considered to have represented a significant difference. Statistical analysis was done using the SPSS software (version 17.0).

TABLE 1: Intra group comparison of all outcome measures of Group A between Pre and Post intervention

Outcome measures	Pre test		Post test		Mean difference	"t" value	"p" value
	Mean	SD	Mean	SD			
NPRS	7.40	0.910	3.33	0.900	4.067	16.358	0.0001
Oswestry disability questionnaire	43.24	5.62	19.25	5.42	23.99	20.458	0.0001
Active lumbar range	18.67	0.90	22.87	0.99	-4.200	29.016	0.0001

TABLE 2: Intra group comparison of all outcome measures of Group B between Pre and Post Intervention

Outcome measures	Pre test		Post test		Mean difference	"t" value	"p" value
	Mean	SD	Mean	SD			
NPRS	7.06	0.96	4.4	0.91	3.000	14.270	0.0001
Oswestry disability questionnaire	46.07	8.58	26.25	5.46	19.81	12.552	0.0001
Active lumbar range	18.93	0.88	22.40	1.18	-3.467	14.66	0.0001

TABLE 3: Intra group comparison of all outcome measures of Group C between Pre and Post Intervention

Outcome Measures	Pre Test		Post Test		Mean difference	"T" Value	"P" Value
	mean	SD	mean	SD			
NPRS	7.13	0.834	4.53	1.24	2.600	12.128	0.0001
Oswestry disability	45.16	9.90	29.02	8.16	16.13	8.881	0.0001

questionnaire							
Active lumbar flexion range	19.40	0.98	21.53	0.91	-2.133	9.909	0.0001

Table4: ANOVA for baseline data comparison between the groups:

OUTCOME	F VALUE	SIGNIFICANCE	RESULT
NPRS	.309	.736	Not Significant
Oswestry disability questionnaire	.460	.634	Not Significant
Active lumbar flexion range	2.420	.101	Not Significant

Table 5: ANOVA for post intervention comparison between the groups:

OUTCOME	F VALUE	SIGNIFICANCE	RESULT
NPRS	5.956	0.005	Significant
Oswestry disability questionnaire	9.074	0.001	Significant
Active lumbar flexion range	6.399	0.004	Significant

On analysis of data of the three groups, Group A showed the higher mean difference in pain (NPRS: A=4.064, B=3.000, C=2.600), functional disability (ODQ: A=23.99, B=19.81, C=16.13) and increase in active flexion range(A= -4.200, B= -3.467, C= -2.133) when compared to Group B and Group C.Group B showedthe higher mean differencein all parameters when compared to Group C.The post hoc analysis showed the significant difference in Group A only in NPRS when compared to the Group B(NPRS:p=0.037, ODQ:p=0.14, ALFR:p=0.440) and highly significant difference when compared to Group C(NPRS:p=0.006, ODQ:p=0.00001, ALFR:p=0.003). There were no significant difference between Group B and Group C(NPRS:p=0.747, odq:p=0.44, ALFR:p=0.68)

DISCUSSION

The present study evaluates the effectiveness of Slump Stretching along with conventional therapy and also compares with Slump Stretching and conventional therapy in separately; all the groups showed improvement in relief of pain, improving spinal mobility and minimizing functional disability but the Group A (slump stretching with conventional therapy) showed greater improvement than the other groups. Hence the result of the present study confirms the hypothesis that slump stretching in combination with conventional therapy may beneficial in the management of non- radicular LBP.

The results of our study are similar to studies done by **Joshua Clelandet al**(12)and **Nagrale et al** (13) which concludes that Slump Stretching is beneficial for improving short term disability, decreasing pain and associated symptoms with combination of intervention such as lumbar mobilization and lumbar stabilization exercise, whereas the present study evaluates effects of slump stretching in combination with SWD and lumbar stabilization exercise.

Some studies have compared the effects of Slump Stretching with conventional modalities such as IFT, TENS. **S.Sudhakar et al** (14)compared the effects of slump stretching and lumbar stabilization exercise with IFT and lumbar stabilization exercise comparing with this our study investigated the lone effects of slump stretching with the conventional therapy and also with effectiveness of slump stretching in addition to conventional therapy protocol.

Core muscle strengthening plays important role in the management of low back pain. **Hye Jin moon et al** showed that lumbar stabilization is better for core muscle strengthening and endurance training (15). It can done on either stable or unstable surface , both the methods are effective in core muscle strengthening but exercise on unstable surface enhance the activities of trunk muscle than the other(16) . In this present study, we have given lumbar stabilization exercises on stable and unstable surfaces for specific group of muscle for best outcomes.

The operational difficulty faced during the study was regular follow-up of the patients which need regular reinforcement. The core muscles endurance have to be assessed in further studies. The present study focused on evaluation of the effectiveness of slump stretching in combination with conventional therapy in reducing the pain and disability.

CONCLUSION

From this study we can interpret that Slump stretching is beneficial and can be utilized in treatment of chronic non radicular low back pain patients for the relief of pain, restoration of movement and to minimize the functional disability and can be combined with conventional therapy to get maximum advantage.

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