

# Comparison of Neural Tissue Mobilization and Muscle Energy Technique on Hamstring Tightness in Chronic Low Back Pain

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## Abstract

**Introduction:** Low back pain is one of the most common musculoskeletal problem in a general population and affecting both male and female population equally. Many therapeutic interventions are used to treat the symptoms of low back pain. Today the main aim lies at faster recovery rate so the present study was conducted with the aim to find out the effect of neural tissue mobilization and muscle energy technique on hamstring tightness in chronic low back pain.

**Material and Method:** In this comparative study 52 subjects were treated for hamstring tightness on chronic low back pain between the age group of 25-40 years. The pre and post test was measure by visual analog scale, Oswestry Disability Index Questionnaire, Straight leg raising test.

**Results:** The statistical analysis for neural tissue mobilization was Visual analog scale ( $p = 0.0001$ ), Oswestry Disability Index Questionnaire ( $p = <0.0001$ ), Straight leg raising test ( $p = <0.0001$ ) showed significant improvement. The statistical analysis for muscle energy technique was Visual analog scale ( $p = 0.0001$ ), Oswestry Disability Index Questionnaire ( $p = <0.0001$ ), Straight leg raising test ( $p = <0.0001$ ) showed significant improvement. The study had found that neural tissue mobilization and muscle energy technique shows equally improvement on hamstring tightness in chronic low back pain.

**Conclusion:** The study concluded that there was no significant difference between neural tissue mobilization and muscle energy technique on hamstring tightness in chronic low back pain. Both the technique showed the equally improvement on hamstring tightness in chronic low back pain.

**Keyword:** Chronic low back pain, hamstring tightness, neural tissue mobilization, muscle energy technique.

## Introduction

Low back pain is one of the most common musculoskeletal problem in a general population and

affecting both male and female population equally. Many studied had found out that maximum 80% of adult population was suffering with low back pain and mostly it causes with the age group 20-40 years.<sup>1</sup> Chronic low back pain is a pain which last for more than 3 weeks. Low back pain change the psychological, physiological and sleep behaviour. There are various risk factors for low back pain like increase lumbar lordosis, decrease in abdominal muscle strength, decrease in back muscle flexibility and increase tightness of hamstring muscle. The most common cause of low back pain is body alignment or any alteration of movement.<sup>2</sup> Due to which it affect in daily activities and most commonly it impairs in functional tasks. Therefore, low back pain is one of

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the common problems in orthopaedic which is involve in physical therapy treatment today.<sup>3</sup>

One of the etiologies was found out that low back pain is occur due to lack of hamstring flexibility.<sup>4,5</sup> Pervious study Hultman et al. had concluded that there correlation in hamstring length between chronic low back pain subjects and subjects with no or occasional low back pain.<sup>4</sup> The most common task in daily activity is forward bending in which when subject forward bend a coupled movement occur with combination of lumbar flexion and pelvic rotation and this movement is known as lumbar-pelvic rhythm. This movement results in back extensors muscle that is erector spine and hip extensors muscle that is gluteals and hamstring muscles and if this muscle has lack of flexibility then subjects suffer with low back pain.<sup>6</sup> Pervious study Stokes and Abery, had found out that tight hamstring muscle will decrease the lumber lordosis in sitting, therefore it increase pressure in the lumbar intervertebral discs. This increase stress on lumbar spine may affect to the low back problem.<sup>7</sup>

Various physical therapy intervention like exercise like stretching, strengthening is used for lengthening the muscle, manual therapy is used for relaxaing muscle and electrotherapy like TENS OR IFT is use for relieving pain and this treatment was used for chronic low back pain and hamstring tightness but a different intervention has not been used for hamstring tightness in chronic low back pain. So in this study the two treatment will be compare for the hamstring tightness in chronic low back pain that is neural tissue mobilization and other is muscle energy technique.

When nervous system made taut and made slack is called as neurodynamic or nerve glide staretch which also terms as neural tissue mobilization. This decreases neural mechanosensitivity by providing movement which leads to change in neurodynamics and modification of sensation and help to explain the observed increase flexibility.<sup>8</sup> Either neural tension or slindingleads to joint movement. Neural tension means displacement of the nerve endings in opposite directions. Slinding means displacement of nerve endings in the same direction.<sup>9</sup> This technique can be apply to other condition were nerve is involve. Prolong sitting, standing and other activity sciatic nerve is exposed to constant pressure. Sciatic nerve innervates the hamstrings. Hamstring flexibility is affected due to nerve adhesion in hamstring causing abnormal mechanosensitivity of sciatic nerve which limits the hamstring length in normal health individuals.

Neural tissue mobilization leads to decrease in neural mechanosensitivity by applying stretch to the nerve structure through posture and multijoint movement.<sup>10</sup>

Muscle energy technique is a manual technique developed by osteopaths that is now used in many different manual therapy professions. In this type of therapy, a patient contracts muscles by pushing against resistance provided by the therapist. The goal is to restore normal muscle and joint mobility.<sup>11</sup> Muscle energy technique is of two forms: post isometric relaxation and reciprocal inhibition. Post isometric relaxation exercise helps in lengthening of tight hamstring by its contraction and relaxation method. The term post isometric relaxation refers to the subsequent reduction in tone of the agonist muscle after isometric contraction. This occurs due to stretch receptors called golgi tendon organs that are located in the tendon of agonist muscle. Reciprocal inhibition refers to the inhibition of the antagonist muscle when isometric contraction occurs in the agonist. This happens due to stretch receptors within the agonist muscle fibers-muscle spindle. Muscle energy technique is used to lengthen a short or spastic muscle, to strengthen a physiologically weak muscle or group of muscles, to reduce localized oedema and relieve passive congestion and to mobilize an articulation with restricted mobility.<sup>12</sup>

## Material and Methodology

The comparative study was carried out with 52 subjects in Krishna hospital, karad. A total of 52 subjects was divided equally into two groups by simple radom sampling (Group A and Group B). Both male and females between the age group of 25-40 years included.

The inclusion criteria in this study was both male and female, age group between 25-40 years and low back pain more than 6 month and exclusion criteria was History of any fracture of any body part, Already involved in any exercise program for lower extremity for last few month, History of any hamstring injury and History of neurological or orthopaedic disorder.

The outcome measures was Visual analoge scale, Oswestry disability index questionnaire, Straight leg raising test.

The materials used in the study was Plint, Hot moist pack, Goniometer, Data collection sheet, Consent form

**Procedure:** An approval for the study was obtained

from the Protocol committee and institutional Ethical Committee of KIMS DTU. Subjects were selected according to the inclusion and exclusion criteria. Subjects were explained about the procedure of the study and written consent was taken. Pre and Post assessment of Visual analog scale, Oswestry disability index questionnaire, Straight leg raising test was taken

to assess the subject. A total 20 subjects was equally divided into two groups. Group A received neural tissue mobilization were Group B received muscle energy technique. The intervention was conducted for 5 Days per weeks for 2 weeks. After two weeks post assessment was taken.

## Findings:

### 1. Within the Group Comparison:

#### Group A:

**Table No. 2: VAS, ODIQ and SLR OF Group A**

Outcome	Pre	Post	t value	p value	Remark
VAS	6.462±0.9892	4.538±1.029	20.278	<0.0001	Significant
ODIQ	38.692±7.296	28.923±4.390	9.765	<0.0001	Significant
SLR	58±3.868	62.5±4.052	20.125	<0.0001	Significant

**Interpretation:** Above table pre and post comparison within the group. Post treatment there was significant improvement noted in group A.

#### Group B:

**Table No. 3: VAS, ODIQ and SLR OF Group B**

Outcome	Pre	Post	md	t value	p value	Remark
VAS	6.808±1.059	4.423±0.9021	2.385	21.291	<0.0001	Significant
ODIQ	39.769±7.426	27.923±4.019	11.846	11.866	<0.0001	Significant
SLR	58.5±5.062	63.115±5.023	-4.615	22.177	<0.0001	Significant

**Interpretation:** Above table shows pre and post comparison within the group. Post treatment there was significant improvement noted in group A.

### 2. Between the group Comparison:

**Table No. 4: VAS, ODIQ and SLR comparison between both the groups**

Outcome	Group A	Group B	t value	p value	Remark
VAS	4.538±1.029	4.423±0.9021	0.43	0.6691	Not Significant
ODIQ	28.923±4.390	27.923±4.019	0.8567	0.3957	Not Significant
SLR	62.5±4.052	63.115±5.023	0.4862	0.6289	Not Significant

**Interpretation:** Above table shows pre and post comparison between the groups. Post treatment there was not significant improvement noted in both the groups.

## Discussion

This study “comparison of neural tissue mobilization and muscle energy technique on hamstring tightness in chronic low back pain” was conducted to compare the

two treatments that is neural tissue mobilization and muscle energy technique and find out which one is better treatment and relief pain for hamstring tightness in chronic low back pain. Now a days chronic low back

pain is a common complaint due to a sedentary lifestyle. Improper posture, prolonged sitting, improper lifting and muscle tightness are the causes of chronic low back pain. Muscle tightness may be linked to postural disturbances. Reduced extensibility resulting from increased hamstring stiffness could be contributing factors to low back injuries. Considering that forward bending is one of the most common movements in daily activities. Shortened hamstrings may increase the risk of injury to the spine from mechanical stresses. Hence this made indeed to study the effect of neural tissue mobilization versus muscle energy technique on hamstring tightness in chronic low back pain.

In previous study by Dr. Ujwal L “effect of muscle energy technique versus effect of neural tissue mobilization on hamstring tightness in young adults” had concluded that muscle energy technique and neural tissue mobilization techniques showed significant improvement in hamstring flexibility but Muscle energy technique is more effective than neural tissue mobilization for improving hamstring flexibility in young adults. In the present study we found that neural tissue mobilization and muscle energy technique both technique equally reduce the hamstring tightness along with chronic low back pain.<sup>8</sup> In previous study by Shubham SK, “Comparison between the effects of reciprocal inhibition technique versus mulligan’s straight leg raise with distraction in hamstring tightness on subjects with chronic mechanical low back pain” had reported that reciprocal inhibition is more effective than mulligan’s straight leg raise with distraction technique in reducing hamstring tightness along with chronic low back pain.<sup>17</sup> In previous study by Adel RA, “short term effects of neurodynamic stretching and static stretching technique on hamstring muscle flexibility in healthy male subjects” had reported that neurodynamic stretching is more effective than static stretching technique in reducing the hamstring flexibility in healthy male individuals.<sup>10</sup> Another study by Rakhi S, “Effect of hydrotherapy based exercises for chronic nonspecific low back pain” had stated that conventional and hydrotherapy both are effective maneuvers in chronic nonspecific low back pain.<sup>18</sup> In previous study by Rajesh S “Effect of hot moist pack and muscle energy technique in subjects with sacro-iliac joint dysfunction.” had reported that hot moist pack and muscle energy technique in combination can be useful in alleviating sacroiliac joint dysfunction in terms of pain, increase in lumbar range of motion and reduce disability.<sup>20</sup> In previous study by Devayani MM, “Comparison of hamstring tightness in skintfit clothing users versus loose

clothing users. Indian journal of physiotherapy and occupational therapy.” Had concluded that participants wearing skintfit clothing shows greater hamstring tightness and compared to those wearing loose clothing and the hamstring tightness can lead to back pain problems in younger individuals.<sup>21</sup>

The outcome measure for this study were Visual analog scale, Oswestry Disability Index Questionnaire and Straight leg raising test. The majority of studies included active knee extension, finger to toe test to identify the hamstring tightness. Oswestry Disability index questionnaire is one of the more reliable and valid for assessing the chronic low back pain. Then mean pain values recorded using VAS showed a significant level of pain in both groups with pre values of 6.462 in Group A and 6.808 in Group B. There was a significant reduction in pain levels post treatment with 4.538 and 4.423 mean values respectively. The mean disability status using Oswestry Disability Index questionnaire showed a significant difference in both groups with pre values of 38.692 in Group A and 39.769 in Group B. There was significant difference in disability level of post treatment with 28.923 and 27.923 mean values respectively. The mean tightness level using straight leg raising showed a significant level in both groups with pre values of 58 in Group A and 58.5 in Group B. There was a significant increasing range in post treatment with 62.5 and 63.115 mean values respectively. Comparison between the groups were not significant difference in reducing pain and decreasing tightness on hamstring tightness in chronic low back pain.

During lumbar flexion there is an anterior tilt of pelvic but if there is hamstring tightness the anterior tilt will reduce and increase the stress in lumbar spine, which hence it decrease the lumbar flexion. Therefore the tightness of back muscles will cause pain and reduce the functional mobility of the spine.

This study had some limitation but were majorly due to the small sample size. Further studies can be done on a larger sample size including small age groups.

## **Conclusion**

The study concluded that there was no significant difference between neural tissue mobilization and muscle energy technique on hamstring tightness in chronic low back pain. Both the technique showed the equally improvement on hamstring tightness in chronic low back pain.

**Conflict of Interest:** The authors declare that there is no conflict of interest concerning the content of the present study.

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**Ethical Clearance:** The study was approved by the institutional ethics committee of KIMSUDU.

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