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# RESEARCH ARTICLE

# EFFECT OF HIP MUSCLES STRETCHING IN LOW BACK PAIN PATIENTS WITH LUMBAR FLEXION DYSFUNCTION

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## ABSTRACT

**Aim of the study:** The aim of the study was to determine whether improving overerall hip joint flexibility by stretching the tight muscles of hip in patients with Flexion dysfunction show any improvement in their lumbar flexion ROM and functional ability.
**Methodology:** 30 subjects with low back pain due to flexion dysfunction were randomly divided into 2 groups. GROUP 1 - received Hold Relax PNF stretching for hip flexors, hamstrings and piriformis muscles along with conventional therapy. GROUP 2 - Received only conventional treatment (Lumbar traction, McKenzie flexion Exercises). Measurements of all dependent variables, Oswestry Disability Index (ODI), Modified Schober's Test and hip joint range of motion was measured by using Goniometer prior to the beginning of therapy and after three weeks of therapy.
**Data Analysis:** Data were analyzed using 2 X 2 ANOVA, there was one between factor group with two levels-Manual therapy and conventional therapy) and one within factors (Time)-Pre vs Post). Pair wise post HOC Comparisons were done using Tukey's HSD using a significance level of 0.05.
**Results and Conclusion:** This study shows that conventional treatment has a role in the management of patients with lumbar flexion dysfunction in improving lumbar range of motion and functional ability. However hip muscles stretching along with conventional treatment has additional effects in the above mentioned variables.



## INTRODUCTION

LBP has a lifetime prevalence of 60–85%. At any one time, about 15% of adults have LBP. LBP poses an economic burden to society, indirectly in terms of the large number of work days lost and less so by direct treatment costs. About 1 - 2% of all patients with early back pain a specific diagnosis can be made, whereas in 85 – 90% of all individuals with LBP no specific diagnosis can be made and termed as "nonspecific low back pain". Low back pain (LBP) is a multifactorial dysfunction, with one of the potential contributing factors being the hip joint. There is a Potential link between hip impairments and LBP by using the concept of regional interdependence. The concept of a biomechanical link between the hip joint and the lumbar spine has been described as hip–spine syndrome (HSS). HSS specifically depicts the influence of a pathological hip joint on the alignment of the spine and subsequent muscle length and joint forces. [1] Hip range of motion was identified as a risk indicator for recurrent NSLBP was also supported by previous researches by Fairbank JC *et al*. [2] Mannion AF suggested restoration of mobility through exercise programmes may be possible in adults with low back pain [3], McGill SM gave a scientific rationale for a limited hip range of motion being a risk indicator for low back pain, as flexibility of this joint facilitates spine conserving postures. [4] Impairments in range of movements of various joints could influence the development of lumbopelvic control problems. Lack of range of the hip and thoracic spine (i.e., the adjacent joints to the neutral lumbo pelvic region) is often observed in patients with low back pain. It is considered that mobility in these joints are important, especially for rotation, so that damaging rotation stress to the lumbar spine is avoided and injury prevented. A decrease in hip range of motion (mainly rotation) has been reported by Chesworth *et al*. [5] Hip joint function is integral in restoring lumbopelvic function and it is often overlooked in traditional lumbar spine evaluation and treatment. [6] Passive stretching exercises are often prescribed by clinicians and coaches for individuals with the goal of improving flexibility. The beneficial effects of passive stretching on improving hip flexion range of motion (ROM) and the associated ability to perform a straight leg raise have been well documented. Stretching has maintained a time-honoured role in health and fitness. A proper stretching program is key to improving flexibility. Some research suggests that stretches be held for 30 seconds, with at least 3–4 sets. For maximum improvement in flexibility, it has been recommended that stretching be done 5 or more times per week. Some studies have shown that proprioceptive neuromuscular facilitation (PNF) and contract-relax (CR) stretches may be most effective. Substantial gains in hip extension ROM were found with six treatment sessions of

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stretching spread across a 21- day period. [7] A study by Raymond Y.W. Lee & Thomas K.T. Wong was done to examine the relationship between the movements of the lumbar spine and hips in the three anatomical planes using an electromagnetic tracking device. This study showed that during forward and backward bending of the trunk, the overall contributions of the lumbar spine and hip were similar, but the spine had a greater contribution to the early stage of the movement. In the coronal plane, trunk movement was primarily accomplished by lateral bending of the spine, whereas in the horizontal plane, the hips were the predominate sources of movement. This observation could be due to the fact that the spine is relatively compliant in the coronal plane when compared to the horizontal plane. In the horizontal plane, the facets of the lumbar spine effectively resist any axial rotation of the vertebrae. It was also shown that in the sagittal and horizontal planes, the movement patterns of the spine and hip were in phase, whereas in the coronal plane, the spine generally moved earlier than the hips. It is concluded that clinical examination of the back should include kinematic measures of both the lumbar spine and hips. [8]

A study by Guy Mellen was conducted to find out the relationship of hip mobility to low-back pain and to lumbar spinal mobility in men and women with chronic and recurrent low-back pain. Hip flexion, extension, internal rotation and hamstring flexibility in the men and hip flexion and extension in the women had statistically significant negative correlations with low-back pain. Among the correlation between hip and lumbar spinal mobility, the hip flexion and extension with lumbar rotation were strongest. [9] Jennifer Barbee Ellison, Steven Jose, Shirley A Sahrmann did a study was to describe the amount of hip rotation ROM in healthy subjects and in patients with low back pain , to categorize individuals based on different hip rotation ROM and to compare the distribution of healthy subjects and patients with low back dysfunction in ROM pattern categories. These results suggest an association between hip rotation ROM imbalance and the presence of low back pain. [10] The hip flexor muscle group has received considerable attention regarding their influence on pelvic inclination. [11-15] For decades, tight or shortened hip flexors have been associated with an increased anterior pelvic tilt due to the iliopsoas' attachment to the pelvis [11, 15-17] One study by Link *et al*., 1990, revealed a significant relationship between hip flexor muscle length and anterior pelvic tilt [15] The piriformis muscle acts as an external rotator, weak abductor, and weak flexor of the hip, providing postural stability during ambulation and standing. Postural deviations can create abnormal stresses on the lumbar spine, including increased shear or compressive forces, which have the potential to lead to excessive wear on the involved articular surfaces. [17-19]

Historically, the position of the pelvis and length of muscles attaching to the spine and pelvis have been speculated to be contributing factors to the pathogenesis of low back pain based on the anatomical relationship between the pelvis and lumbar spine. [11-12, 19-22] In an anterior pelvic posture excessive compression is placed posteriorly on the vertebrae and articulating facets. Additional tension is also placed on the anterior longitudinal ligament. [17] This undue stress on the structures of the low back may have the potential to predispose an individual with this type of posture to painful conditions of the low back. Several studies have been conducted to establish if a true relationship exists between an increased anterior pelvic tilt in standing and low back pain. Roncarati and McMullen (1988) found anterior pelvic tilt and lumbar lordosis to correlate with low back pain in a general population. [23] Significant correlations have also been reported between sacral angle (a measure of lordosis) and pathological conditions such as spondylolysis and spondylolisthesis, yet no definite relationship was revealed when investigating pelvic tilt. [18, 20] The aim of the study was to determine whether improving overall hip joint flexibility by stretching the tight muscles of hip in patients with Flexion dysfunction with the view of applying relative flexibility show any improvement in their lumbar flexion ROM and functional ability.

## MATERIALS AND METHODS

**Study Design:** Experimental randomized control study.

**Sample Size:** 30 patients were randomly selected based on the criteria for the study and were assessed and divided into 2 groups: Group 1 (experimental) & Group 2 (control).

**Sample Design:** Simple random sampling

### Inclusion Criteria

- Age group 20 – 50 years.
- Patients with low back pain characterized by:
- Pain in the lumbar region with or without leg pain
- Decreased lumbar ROM
- Pain at the end ROM of lumbar flexion
- Normal load on shortened tissues leads to pain symptoms
- Shortening of iliopsoas and or piriformis and or hamstring muscles.

### Exclusion Criteria

- Red flag
- Patients with previous spinal surgery.
- Signs & Symptoms of spinal instability and PID
- Spinal fracture
- Spondylolisthesis
- Neurological deficit.
- Hip pathology

### Procedure

After fulfilling the inclusion and exclusion criteria, all subjects were asked to fill the Consent form, and then subjects were randomly allocated to:

GROUP 1 - 15 subjects
GROUP 2 - 15 subjects

Before initiating treatment, subjects were assessed for baseline values of all the dependent variables. Therapy was started the day after the measurements were taken.

- **Oswestry Disability Index:** It is an effective method for measuring disability in patients with LBA, high degree of severity & different causes. It includes 10 6 -

point scales. Sum of 10 ODI scores is expressed as a % of maximum scores & if patient fails to complete a section % score is adjusted. 1st section rates the intensity of pain & remaining 9 cover the disabling effect of pain on ADL's.

- **Measuring Tape:** it consisted of reading from 1 to 150 centimeter with an accuracy of 1mm and was used for measuring the range of lumbar flexion, extension and side flexion. Study by Hsieh and Yeung, 1986 has shown intra-tester reliability ranging from 0.78-0.94. The authors concluded that the tape measure is a reliable means to measure lumbar range of motion in Modified Schober method.
- Goniometer is a protractor with an extended stationary arm and a fulcrum-mounted moveable arm. A stationary arm holding a protractor is placed parallel with a stationary body segment and a moveable arm moves along a moveable body segment. The pin (axis) is placed over the joint. When anatomical landmarks are well defined, the accuracy of measurement is greater. Goniometery was performed using a universal goniometer with a measuring scale marked out at one degree interval.

**GROUP 1** - Received Hold Relax PNF stretching for hip muscles (flexor, hamstring, piriformis)

**Stretching Variables**

Type of stretching - Hold Relax PNF Stretching

Frequency - 6 – 10 stretches per session, 5 days / week for 3 WEEKS. Duration - 6 seconds hold, 5 seconds relax

Following stretching patients in the experimental group received conventional therapy (Lumbar traction, McKenzie flexion Exercises).

**GROUP 2 -** Received only conventional treatment (Lumbar traction, McKenzie flexion Exercises).

McKenzie Lumbar Flexion exercises (in supine, sitting, standing) followed by one session of extension in lying (10 repetitions each exercise per session, 3 times a day) and
Lumbar Traction in semi fowler's position)
Total duration of treatment was 5 days per week for 3 weeks.

**Data Collection**

Measurements of all dependent variables were taken prior to the beginning of therapy (Pre test) intervention for each patient. After three weeks of therapy (post test) final measurement were taken.

**Data Analysis**

The dependent variables were analysed using 2 X 2 ANOVA, there was one between factor group with two levels-Manual therapy and conventional therapy) and one within factors (Time-Pre vs Post). Pair wise post HOC comparisons were done using Tukey's HSD using a significance level of 0.05.

## RESULT

**Modified Schober's Test (MST):** As depicted in Graph 1 there was a significant increase in MST in both groups from pre treatment measurement to post treatment measurement over a period of weeks. However, increase being significantly more in experimental group (hip muscles stretching + conventional treatment)

- There was a main effect for time F (1,28,0.05) = 341.451, p = 0.000
- There was also a main effect for group F (1,28,0.05) = 17.030, p = 0.000
- The main effect was qualified into time X group interaction F (1,28,0.05) = 29.217, p = 0.000

Post hoc analysis showed that the experimental group showed significantly greater increase in MST when compared to control group, from pre to post test.

**Oswestry Disability Index (ODI):** As depicted in Graph 2 there was a significant reduction in ODI score in both groups from pre treatment measurement to post treatment measurement over a period of 3 weeks, with reduction being significantly more in experimental group (hip muscles stretching and conventional treatment).

- There was a main effect for time F (1,28,0.05) = 783.309, p = 0.000
- There was also a main effect for group F (1,28,0.05) = 21.804, p = 0.000
- The main effect was qualified into time X group interaction F (1,28,0.05) = 74.330, p = 0.000

Post hoc analysis revealed that experimental group improved significantly when compared to control group, from pre to post test.

**Hip range of motion Mearurements**

**Modified Thomas Test - Right (MTT RT):** As depicted in Graph 3 there was a significant decrease in MTT in both groups from pre treatment measurement to post treatment measurement over a period of 3 weeks. However, increase being significantly more in experimental group (hip muscles stretching + conventional treatment.

- There was a main effect for time F (1,28,0.05) = 67.758, p = 0.000
- There was also a main effect for group F (1,28,0.05) = 14.160, p = 0.000
- The main effect was qualified into time X group interaction F (1,28,0.05) = 29.223, p = 0.000

Post hoc analysis showed that the experimental group showed significantly greater increase in MST when compared to control group, from pre to post test.

**Modified Thomas test - Left (MTT LT):** As depicted in Graph 4 there was a significant decrease in MST in both groups from pre treatment measurement to post treatment measurement over a period of 3 weeks. However, increase being significantly more in experimental group (hip muscles stretching + conventional treatment).

- There was a main effect for time F (1,28,0.05) = 136.722, p = 0.000

- There was also a main effect for group F (1,28,0.05) = 10.532, p = 0.000
- The main effect was qualified into time X group interaction F (1,28,0.05) = 53.905, p = 0.000

Post hoc analysis showed that the experimental group showed significantly greater increase in MST when compared to control group, from pre to post test.

**Internal Rotation - Right (IR RT):** As depicted in Graph 5 there was a significant increase in IR Rt in both groups from pre treatment measurement to post treatment measurement over a period of 3 weeks. However, increase being significantly more in experimental group (hip muscles stretching and conventional treatment)

- There was a main effect for time F (1,28,0.05) = 166.278, p = 0.000
- There was also a main effect for group F (1,28,0.05) = 9.021, p = 0.000
- The main effect was qualified into time X group interaction F (1,28,0.05) = 136.340, p = 0.000

Post hoc analysis showed that the experimental group showed significantly greater increase in IR RT when compared to control group, from pre to post test.

**Internal Rotation - Left (IR LT):** As depicted in Graph 6 there was a significant increase in IR LT in both groups from pre treatment measurement to post treatment measurement over a period of weeks. However, increase being significantly more in experimental group (hip muscles stretching and conventional treatment)

- There was a main effect for time F (1,28,0.05) = 34.549, p = 0.000
- There was also a main effect for group F (1,28,0.05) = 6.523, p = 0.000
- The main effect was qualified into time X group interaction F (1, 28, 0.05) =21.533, p = 0.000

Post hoc analysis showed that the experimental group showed significantly greater increase in IR Left when compared to control group, from pre to post test.

**Active Knee Extension - Right (AKE RT):** As depicted in Graph 4 there was a significant decrease in AKE RT in both groups from pre treatment measurement to post treatment measurement over a period of 3 weeks. However, increase being significantly more in experimental group (hip muscles stretching and conventional treatment)

- There was a main effect for time F (1,28,0.05) = 102.139, p = 0.000
- There was also a main effect for group F (1,28,0.05) = 4.044, p = 0.000
- The main effect was qualified into time X group interaction F (1,28,0.05) = 69.627, p = 0.000.

Post hoc analysis showed that the experimental group showed significantly greater increase in AKE RT when compared to control group, from pre to post test.

**Active Knee Extension - Left (AKE LT):** As depicted in Graph 3 there was a significant decrease in AKE Lt in both groups from pre treatment measurement to post treatment measurement over a period of 3 weeks. However, increase being significantly more in experimental group (hip muscles stretching and conventional treatment)

- There was a main effect for time F (1,28,0.05) = 127.417, p = 0.000
- There was also a main effect for group F (1,28,0.05) = 4.672, p = 0.000
- The main effect was qualified into time X group interaction F (1,28,0.05) = 63.863, p = 0.000

Post hoc analysis showed that the experimental group showed significantly greater increase in AKE Lt when compared to control group, from pre to post test.

## DISCUSSION

The overall result of this study demonstrates that the patients with lumbar flexion dysfunction can be benefitted from conventional physiotherapy treatment (Mc Kenzie flexion exercises & traction) and Hip muscles stretching along with conventional treatment. There was a significant increase in the lumbar flexion ROM measured by MST and significant decrease in the low back pain disability percentage measured by Oswestry Low Back Pain Disability report in both experimental group (who received hip muscles stretching along with the conventional treatment) and in the control group (who received conventional treatment which included traction and McKenzie lumbar flexion exercises) over a period of 3 weeks therapy. However, it was found that experimental group showed significantly greater increase in lumbar flexion ROM and reduction in disability percentage from pre test to post test period after 3 weeks of treatment.

**Lumbar flexion ROM:** measured by MST improved significantly in both the groups, however there was significantly greater improvement in the experimental group which received hip muscles stretching along with conventional treatment. Subjects in both groups received Mc Kenzie lumbar flexion exercises and traction. The increase in the lumbar flexion ROM in both experimental and control group may be attributed to directional specific McKenzie lumbar flexion exercises for the treatment of flexion dysfunction. The McKenzie method for management of lumbar dysfunction progressively reintroduces movements that were initially problematic. This approach improves strength and restores full range of motion. [6] The subjects in this study were instructed to perform ten repetitions of Flexion exercises to the point of symptom reproduction with gradual progression in force application. Flexion to the point of symptom reproduction ensures that remodelling stress would be applied to the adhered tissues. [6] Inclusion of flexion exercises minimized adaptive shortening and adhesions of neural tissue and surrounding structures. [9] Tension–relaxation is the decrease in load of a viscoelastic tissue under constant elongation. Creep is the time–dependant elongation of a tissue under constant load. [24] Repetitive load induces creep in passive tissues of the spine including ligaments, disc, and joint capsule. [25] The resulting creep in the ligaments or the laxity developed in the viscoelastic structure may have helped in improving the ROM of the lumbar spine.

Flexion exercise protocol was supported by a case review in which the subject demonstrated rapid improvement in pain-free range of motion after the appropriate sequence of flexion exercises were initiated. [26] Another study by Nordin *et al.* supports the flexion biased exercise over extension biased exercises in improving lumbar ROM. In this study he compared the effects of spinal flexion and spinal extension exercises on LBP severity and thoraco-lumbar spinal mobility in LBP patients. Results indicated there was no significant difference between spinal flexion extension exercises in reduction of LBP severity. However, results suggested significant difference between the groups in increasing the sagittal mobility (P<.10). Spinal flexion exercises had an advantage in increasing the sagittal mobility within a short period of time. [27] The increase of lumbar flexion ROM in both experimental and control group may also be attributed to the traction which was given to all subjects in semi fowler's position as it elongates the posterior soft tissue structures, relieving pain and spasm. Mechanism responsible for increase in the physiological range of motion is the alteration of the length and mobility of the connective tissues structures. [28]
Separation of the vertebral bodies may provide a stretch to the spinal soft tissues that is adequate to induce increase in length. In addition to stretch stimulus, distraction forces have been shown to increase the length of spinal tissues by creep and hysteresis. [29] . The rational for using the lumbar traction is based on mechanical and neuroreflectory mechanisms. Spinal elongation due to IV widening is likely to occur with traction force and relaxation of spinal muscles is assumed to play an important role in reduction of pain. [30]

Theories on the physiological effects of traction suggest that stimulation of proprioceptive receptors in vertebral ligaments and mono segmental muscles may alter or inhibit abnormal neutral input from those structures. [31] Mechanism to relieve pain seems to separate the vertebrae, remove pressure or contact forces from injured tissue, increase peripheral circulation by a massage effect, and reduce muscle spasm. [32] Hence, the conventional treatment program which includes traction relieves pain and elongates the posterior soft tissue structures improves lumbar flexion ROM and McKenzie lumbar flexion exercises which reproduces remodelling stress to the adaptively shortened tissues which helps gain in the lumbar flexion ROM as indicated in Modified Schober's Test.
However, in this study it was found that experimental group which received hip muscles stretching along with conventional treatment showed significantly greater increase in lumbar flexion ROM from pre test to post test period after 3 weeks of treatment. This may be attributed to the additional hip muscles stretching in the experimental group based on proposed regional relationship between hip ROM and LBP. The results revealed there was a significantly greater increase in the HIP muscle length in the experimental group [*measured as Active Knee Extention (AKE) for Hamstring length, modified Thomas test (MTT) for Hip flexor length , and hip Internal ROM for Piriformis length*] from pre to post test period after 3 weeks of treatment.

Effect of hip muscles stretching on Lumbar flexion ROM measured by MST Lumbar flexion dysfunction patients have exaggerated lumbar lordosis. **Based on the anatomic relationship between the pelvis and the lumbar spine, it has been speculated that changes in the pelvic inclination affect the size of the lumbar lordosis and cause LBP.

**Hip flexor stretching**

There was a significant increase of the hip flexors length in both the experimental and control group. However there was significantly greater improvement of hip flexor length in the experimental group receiving the hip flexor stretching in Thomas test position. In an anterior pelvic tilt posture excessive compression is placed posteriorly on the vertebrae and articulating facets. Additional tension is placed on the anterior longitudinal ligament. [17] This undue stress on the structures of the low back has the potential to predispose painful conditions of the low back. Roncarati and McMullen (1988) found anterior pelvic tilt and lumbar lordosis to correlate with low back pain in a general population. [23] Gerard A Malanga proposed stretching exercises should be focused on restoring proper pelvic tilt with special emphasis placed on stretching those muscles that cause excessive anterior pelvic tilt. [36] Stretching of the shortened hip flexors improved its muscle length. Attainment of the normal muscle length may have restored the normal lumbar lordosis thereby decreasing the undue excessive compression on the posterior structures of the vertebrae and articulating facets subsequently increasing the lumbar flexion ROM. The above theoretical rationale on the basis of regional interdependence supports the use of hip flexor stretching in treatment of lumbar flexion dysfunction and a positive effect is reflected in the study in the form of improved muscle length of hip flexors contributing to subsequent improvement in Lumbar flexion ROM measured by Modified Schobers Test.

**Hamstring stretching**

There was a significant increase of the hamstring muscle length measured by AKE in both the experimental and control group. However there was a significantly higher improvement of hamstring length in the experimental group receiving the hamstring stretching. Due to the orientation of the hamstrings on the ischial tuberosity of the pelvis, it is logical that tension in the hamstring muscles may have an influence on movement of the pelvis. However, contrary to the long held notion that shortened or tight hamstrings result in a posterior pelvic posture. [17] Toppenberg & Bullock reported that shorter hamstrings were associated with a greater degree of lumbar lordosis i.e. negatively related (shorter hamstring muscles were associated with a greater degree of lumbar lordosis). [36] This relationship between short hamstring length and the exaggerated lumbar curvature established by Toppenberg & Bullock implies a probable involvement of tight hamstrings in pathogenesis of back pain. [36] In this study there was an attempt to correct the postural faults of the hyperlordotic flexion dysfunction patients which may be due to hamstring muscle shortness. Stretching of the short hamstring muscles improved the hamstring muscle length. Attainment of the normal muscle length may have restored the normal lumbar lordosis thereby decreasing the undue excessive compression on the posterior structures of the vertebrae and articulating facets subsequently increased the lumbar flexion ROM. The above theoretical rationale supports the use of hamstring stretching in treatment of lumbar flexion dysfunction and positive effect is reflected in this study in the form of improved muscle length of hamstrings contributing to the improved lumbar flexion ROM measured by Modified Shobers Test MST.

**Piriformis stretching**

There was a significant increase of the IR ROM of hip in both the experimental and control group. However, there was a significantly greater increase of IR ROM in the experimental group receiving the piriformis stretching. In most cases of piriformis syndrome, the sacrum is anteriorly rotated toward the ipsilateral side on a contralateral oblique axis, resulting in compensatory rotation of the lower lumbar vertebrae in the opposite direction. For example, piriformis syndrome on the right side would cause a left-on-left forward sacral torsion with L5 rotated right. Spasm of the piriformis muscle cause stress on the sacrotuberous ligament. This stress may lead to increased mechanical stress on the innominate bones, potentially causing back pain. [37] Stretching of piriformis muscle along with the conventional treatment would have helped in attainment of normal anatomical orientation of sacrum and lumbar spine and relief of low back pain and thus gain in the lumbar ROM. This reorientation of altered anatomical position would have been an additional adjunct to our conventional treatment of traction and lumbar flexion exercises. Based on biological risk indicators for low back pain which states limited hip range of motion being a risk indicator for low back pain [38] and the potential link between hip & lumbar spine supported by regional interdependence [39] provides the rational for statistically and clinically significant improvement in the lumbar flexion ROM in the experimental group (hip muscles stretching) due to improved hip mobility.

**ODI**

The reduction in the Oswestry Low back pain disability percentage score in both the groups (experimental and control) from pre to post (3weeks) may be attributed to the increased lumbar flexion ROM as an effect of mckenzie lumbar flexion exercises and traction causing reduction of pain and spasm which in turn would have add to increased pain free ROM activities contributing to decreased % of disability in the ODI score. However, the experimental group (hip muscle stretching group along with conventional treatment) showed significantly greater decrease in the ODI score as there was a significantly greater increase in lumbar flexion ROM .This may be attributed to the possible relationship between the hip ROM and the Lumbar ROM. A study showed that during forward and backward bending of the trunk, the overall contributions of the lumbar spine and hip were similar, but the spine had a greater contribution to the early stage of the movement. [37] A study shows that the lumbar spine is commonly subjected to substantial bending stresses during normal everyday activities. Bending stresses are higher in people with poor mobility in the lumbar spine and hips, suggesting that ‘stiff’ people are at greater risk of injuring their backs during bending and lifting activities. [40] Forward bending is a complex movement of combined lumbar and hip motion. Short hamstring muscles, because of their attachments to the posterior leg and to the ischial tuberosity, may limit hip flexion ROM. Stretching short hamstring muscles to increase hip flexion, therefore, may affect lumbar motion during forward bending. Postural correction of the hyperlordosis attained by the stretching of tight hip flexors , hamstrings and piriformis may have reduced the undue stress on the posterior structures thereby decreasing pain and mobility with subsequent increase in the functional ability. Evidence to support treating the hip for LBP is limited to a case study, 25 a case series,27 and 1 randomized controlled trial. Cibulka described the case of a 35-year-old male with unilateral LBP diagnosed as sacroiliac dysfunction. The subject was found to have hip - ER asymmetry that was treated with impairment - based stretching and strengthening program aimed at the hip, as well as the low back. Results indicated a 38% reduction in disability as measured by the Oswestry Disability Index, which was maintained at 1-year follow-up. [39]

**Conclusion**

This study shows that conventional treatment has a role in the management of patients with lumbar flexion dysfunction in improving lumbar range of motion and functional ability. However hip muscles stretching along with conventional treatment has additional effects in both the above mentioned variables.

**Limitations**

Sample size was small, Short duration of the study, No follow up to see long term effects. ROM outcome measurement device was not electronic to be highly précised.

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