

Effects of Hamstring Stretching on Mechanical Low Back Pain

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Abstract: *The present study deals with the relationship with hamstring tightness and low back pain in subjects age between 17-25 yrs. Visual analog scale was used to access the severity of low back in subjects. To access the hamstring tightness 90-90 SLR test was used. The findings of the present study show a significant co-relation between hamstring stretching and mechanical low back pain. Hence, adequate length of hamstring is desired for lower incidence of mechanical low back pain.*

Keywords: Stretching, Low back Pain, Hamstring stretching.

1. Introduction

- 1) **Design:** Experimental design
- 2) **Study setting-** Pravara institute of Medical Sciences, Loni.
- 3) **Aims:** To see the effect of hamstring stretching over mechanical low back pain.

Number of subjects

Thirty subjects between the age group of 17-25 years were taken.

Total number of subjects n=30 were divided based on simple random sampling and divided into two groups consisting of 15 subjects each and named as control group and study group.

For control group routine physiotherapy treatment for low back pain like transcutaneous electrical nerve stimulation, interferential therapy, short wave diathermy etc. and for study group the treatment given hot packs and hamstring stretching.

Selection criteria

A) Inclusion criteria

- Back pain with no radiation.
- Tight hamstrings (90-90 straight leg raising test positive).

B) Exclusion criteria

- Back pain with radiation.
- Spondylolisthesis.
- Back pain due to sacro- iliac joint dysfunction.
- Traumatic cases like fracture of vertebra.
- Spinal cord injury.

2) Purpose of study

The purpose of this study is to investigate the influence of a hamstring stretching program on the mechanical low back pain.

3) Duration of study

Two weeks

4) Instrumentation measures

- Goniometer
- Hot packs
- Belts for stabilization of other knee
- Couch

2. Methodology

The study was conducted between February 05 to May 05. The patients of low back pain are referred to physiotherapy department from orthopedics OPD.

30 patients of low back pain are assessed and were 90-90 straight leg raising test is positive. 30 patients were divided into two groups i.e. study group and control group. Patients are divided randomly.

Here a low-intensity stretch is used for hamstring stretching for 30 sec in several sessions. This is to ensure that the patients will stay as relaxed as possible (Bandy, WB, and Irion, JM, 1994). An external force is applied and it controls the direction, speed, intensity, and duration of the stretch. The muscles are elongate beyond their resting length (Colby and Kisner).

3. Results

After the study of two weeks it is clear that there is more visual analog scale in control group as compared to study group for low back pain.

4. Conclusion

From the study thus conducted it is found that adequate length of hamstring is desired for lower incidence of mechanical low back pain.

General introduction

The incidence of low back pain has reached epidemic proportion. Various population studies have reported the prevalence of low back pain as high as 2-5 percent and a price of mankind has to pay for their upright posture.

According to the study, as much as 80% of industrial population experience acute musculoskeletal low back pain at some time during their life and 70% of these patients the pain recurs (Essentials of orthopedics by Maheshwari).

5. Mechanical Low Back Pain

Definition:

Mechanical low back pain is defined as strain on the muscle or ligament around the spine and with no precise identifiable anatomic cause (Dr. Joseph F. Smith, medical library, 1999).

Predisposing Factors:

The predisposing factors for mechanical low back pain is excess weight, extreme lordosis, absence of regular exercises, flat back, posture, general muscular tension, tight hamstrings etc. (HSE1992,1994,Kraus,1972).

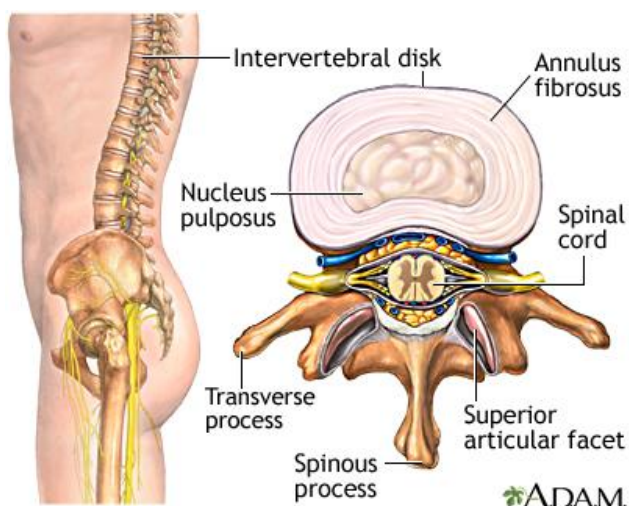
Bad posture such as sway back kyphotic posture, prolonged working in bending position etc.

Secondly the hamstring muscle plays a key role in mechanical low back pain. Tight hamstring can causes posterior tilting of the pelvis and causes low back pain, (Kendall).

6. Abnormalities

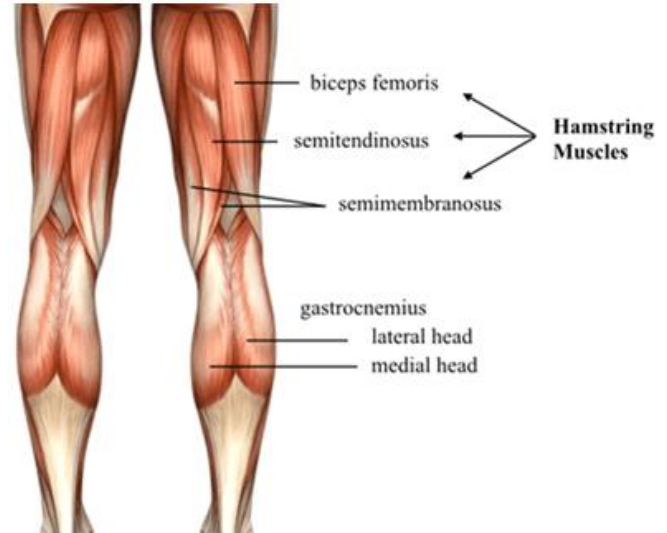
- Many people suffer with tight hamstrings and can prone to bad tears and limiting activity.
- Tight hamstrings can also be responsible for posture problems and other muscle abnormalities or imbalance as they will tend to pull the pelvis out of normal position.
- Hamstrings tightness is the result of some genetic reasons and when the person activity is more and do not stretch properly. (Farfan, 1978).
- Tight hamstrings interfere with the foot position which results in poor contact of the feet with the ground.(Grower's 1904).
- Poor contact of the feet with the ground which causes back problem as it increases the stress across the low back. This produces the abnormal slouching posture (Grower's).

7. Anatomy and Biomechanics



The basic motion segment of the spine is a three-joint complex, consisting of one intervertebral disk between adjacent vertebra and two zygapophyseal (facet) joints. The intervertebral disc composed of the central nucleus pulposus and the peripheral annulus fibrosus.

The individual lumbar nerve roots exits bilaterally below the pedicle of each vertebra.



Stability of three joint complexes depends on the integrity of the intervertebral disc.

Disc degeneration transfers weight bearing and rotational loads to the facet joints and may produce facet joint inflammation, arthropathy and a degenerative cascade in the lumbar spine.

Secondly the hamstring muscles play a key role in mechanical low back pain.

The group of three muscles i.e.semitendinosus, semimembranosus and biceps femoris are collectively known as Hamstrings. They are involved with the extension of the hip, flexion of the knee and rotation of the flexed knee. It has a stabilizing effect.

The hamstrings are working to their maximum, either to raise the trunk, or hold the trunk in such a position that the forward collapse of the body as a whole is imminent.

It plays a important role in balancing of pelvis in the standing position,particularly when the upper trunk is being moved off the vertical axis(Kandall).

It is proved that hamstrings tightness limits motion in the pelvis and can place it in a position that increases stress across low back.

Biomechanics

The cardinal movements of the lumbar spine include flexion, extension, side flexion and rotation.

Combined movements carry the highest injury potential (Norkin). Repetitive movements can fatigue the supporting structures of the lumbar spine and overwhelm the viscoelastic-protected mechanisms of the intervertebral disc and ligaments.

Back strains and sprains imply some degree of muscle stretching or microscopic tearing of the muscle fibres or ligaments. Muscle fatigue can cause reflex muscle spasm and pain.

Many people suffer with tight hamstrings and can prone to bad tears and limiting activity. Tight hamstrings can also be responsible for posture problems and other muscle abnormalities or imbalance, as they will tend to pull the pelvis out of normal position.

Stretching

Stretching is a general term used to describe any therapeutics maneuver designed to lengthen pathologically shortened soft tissue structures and thereby to increase range of motion.

Types of Stretching:

There are three types of stretching:-

- 1) Passive stretching
- 2) Active stretching
- 3) Self stretching

1) Passive stretching

Passive stretching procedures are classified by the type of stretch force applied, the intensity and duration of the stretch. Passive stretching can elongate both the contractile and non – contractile tissues.

There are three types-

- Manual passive stretching
- Prolonged mechanical passive stretching
- Cyclic mechanical stretching

2) Active inhibition

Active inhibition refers to techniques in which the patient reflexively relaxes the muscles to be elongated prior to or during the stretching maneuver. When a muscle is inhibited or relaxed, there is minimal resistance to elongation of the muscle.

- Hold and relax
- Hold and relax with agonist contraction
- Agonist contraction

3) Self stretching

Self-stretching is a type of flexibility exercises that patient carry out themselves. Patients passively stretch out their own contractures by using their body weight as the stretch force.

8. Data Analysis and Interpretation Procedure

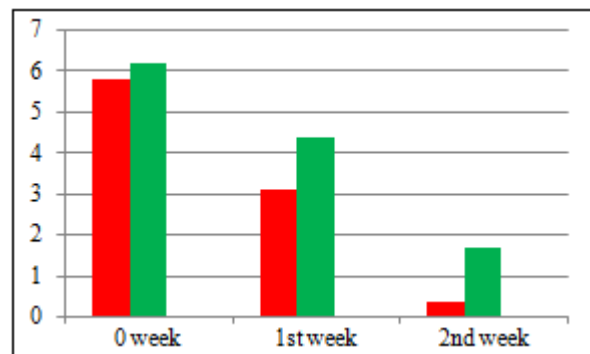
Group a – Control Group

Routine physiotherapy treatment for low back pain like TENS, IFT, SWD etc.

Group b- Study Group

Hot packs and hamstring stretching.

After the observation and values for visual analog scale we compare the mean analog score at 0, 1, 2 weeks in study & control group.



Series 1 represent study group

Series 2 represent control group

	0 week	1 st week	2 nd week
Study group	5.8	3.13	0.33
Control group	6.2	4.4	1.66

9. Results

The result was conducted between Feb 05 to May 05 in Physiotherapy department. Thirty subjects of low back pain with positive 90-90 straight leg – raising test for hamstring tightness were treated. These number of patients are divided into two groups ie study group and control group. These patients were divided randomly.

These patients were treated for two weeks. The treatment for study group was hot packs and hamstring stretching and that for the control group was TENS, IFT, SWD etc.

In present study the mean visual analog scale is 0.33 and in control group is 0.66.

So it is clear that there is more visual analog scale in control group as compared to study group.

After applying the unpaired ‘t’ test there is a highly significant difference between mean visual analog scale in study group and control group in first and second weeks (p is less than 0.01).

10. Discussion

The hamstring muscle seems to play a key role in the low back pain. Patients who have mechanical low back pain tend to have tight hamstrings.

Tight hamstring limits the motion in the pelvis and can place it in a position that increases stress across the low back.

Therefore, it follows that stretching the hamstring muscles typically helps in decreases the intensity of mechanical low back pain and frequency of reoccurrence.

11. Conclusion

From the study thus conducted it is found that –

Adequate length of hamstring is desired for lower incidence of mechanical low back pain.

12. Suggestion

Regular stretching of posterior pelvic tilt muscles should be undertaken to avoid low back pain.

Source of Funding

Nil

Conflict Of Interest

There is no conflict of interest.

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