



## Effect of Stretching Programme of Hamstring Muscles on Low Back Pain among Surgeons (Pilot Study)

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**Received:** February 4, 2019; **Published:** March 15, 2019

### Abstract

**Background:** Hamstring Muscles (HM) tightness one of the most common problem which facing Many people. The hamstrings run through the back of each thigh. motion in the pelvis is limited by Tightness in this muscle and also can increase stress across back and corrupt correct posture which may develop the onset of knee or back pain. Hamstring stretching exercises are a necessary part of training in any sport and are useful in the maintenance of good posture. I observe after treating of many surgeons in our hospital a relation between tightness of HM and back pain especially after OT work.

**Methods:** Ten participants from different surgical departments (plastic surgery department, orthopaedic Dept. etc.) were asked to do Hamstring Muscle Tightness test. They were chosen from AlQassimi hospital, Sharjah, UAE. They were assigned to one group and practiced a program of Stretching Program of Hamstring Muscles daily for 2 weeks. All participants had been evaluated to measure Hamstring Muscle Tightness test and all participants with positive Hamstring Muscle Tightness test were enrolled in this study. All participants were asked to do Visual analogue scale test. All data were registered in data collection sheets. All measurements were done before and after the study program.

**Results:** After completion of the study, a significant improvement was observed in in measurement of back pain on visual analogue scale ( $P < 0.05$ ), when compared to pre-program measurement.

**Conclusion:** Stretching exercises Program of Hamstring Muscles could improve Low Back Pain among Surgeon in Operation Theatre. Stretching Program of Hamstring Muscles is good methods that improve Low Back Pain among Surgeon.

**Keywords:** Stretching; Hamstring; Mechanical low back pain; Pain Flexibility; Functional Disability

### Introduction

Many people are suffering from hamstring (HM) tightness. Which are a muscle group that tightens up quickly and depending on your posture can be responded. The hamstrings extended on back of each thigh. Tightness in this muscle can affect motion in the pelvis and may be the cause of increasing stress on the low back. Hamstring stretching exercises may be an important part of any training in any sport and are playing an important role in maintaining of good posture. Stretching tight hamstrings sometimes are lead to uncomforted sensation in many athletes and also in many adults. A lot of studies concentrated on flexibility including hamstrings because they are most probably tight and limited, it is relatively easy to stretch them. Most of Studies show that a single stretch is beneficial for improving flexibility . I observe after treat-

ing of many surgeons in our hospital a relation between tightness of HM and back pain especially after OT work.

### Aim of the Study

To study the effect of stretching programme of Hamstring muscles and its effect on Low Back Pain among surgeon.

### Hypothesis

There is no effect of stretching programme of Hamstring muscles on Low Back Pain among surgeon in OT.

### Literature Review

#### Anatomy of hamstrings

Origin Insertion Innervation

Semimembranosus	Ischial tuberosity	Medial tibial Condyle	Tibial nerve
Semitendinosus	Ischial tuberosity	Pes anserine Insertion	Tibial nerve
Biceps femoris (long head)	Ischial tuberosity	Head of fibula	Tibial nerve
Biceps femoris (short head)	Lineaaspera near head of femur	Head of fibula	Common fibular nerve

Table 1

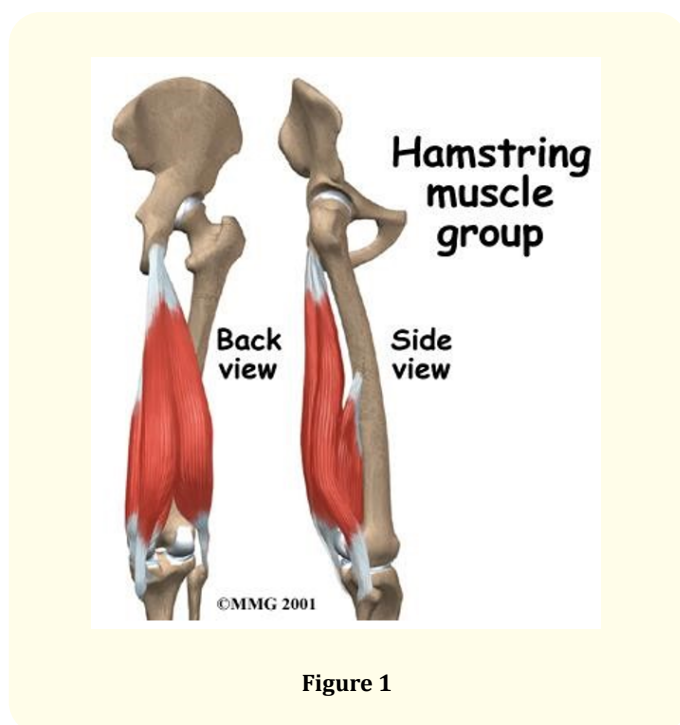


Figure 1

**Why is stretching hamstrings so difficult**

The hamstrings fall into the classification of a "postural muscle". Postural muscles are used to hold your upright posture. Slow twitch muscle fibres that They contain predominantly are designed to contract for long period without fatiguing. Hamstring muscles most probably tend to be short with time unless stretched or taken through their full range of motion on a regularly [1]. Because the hamstrings contain very strong connective tissue fibres (C T) they can work as strong knee flexors and hip extensors. Our bad postural habits play an important role in muscle tightness. In our sedentary culture we do a lot of nonproper way of sitting and standing [2]. We then must rely more on our hamstrings when standing. When standing for long periods we shift our hips forward also disengaging our gluteus and our hamstrings must work harder [3].

**Why are hamstring stretches so important**

Hamstring stretches are just part of a program of exercises you can do to prevent injuries. Subconsciously, any Muscle imbalances are often predisposing factor to an expected injuries. To prevent back injuries or discomfort it is important to concentrate on stretching hamstrings. Forward tilting of the pelvis is prevented by Tight hamstrings which may result and causing more bending of the lower back. In a forward bending position, The lower back was not designed to tolerate the forces exerted on it. One of the most important stretches to prevent low back pain should be applied on hamstring muscles. A lot of stress on your low back is placed, When your hamstrings muscles are tight, which may lead to more pain and can actually cause more difficulty and discomfort.

**Hamstrings Muscle's normal range**

Stretching Hamstrings is always a challenge. A group of muscles which used to hold yourself upright are the hamstrings muscles. Hence, tightness is common in these muscles. Main components of the muscles are the semitendinosus, semimembranosus, and biceps femoris. Because they run over both knees and the hip joints they can act both joints. The hamstrings support the pelvis on the femur and can flex the knee also in upright position that may result in some resisting forward flexion of the trunk [3].

**Stretching hamstrings techniques**

Much studies had been revealed the best technique of stretching Exercises, also the optimum frequency, and duration to achieve the best gains in muscles flexibility. There are alot of methods for stretching methods, like static stretching, PNF stretches and ballistic stretching. All of them demonstrated an effective role in increasing hamstring flexibility. because hamstrings are often tight, many studies on flexibility tend to focus on, it is easy to measure range of motion and relatively easy to stretch them. to achieve long term results Exercises must be done over the long term.

**Hamstrings stretching using static stretches technique**

Hamstring tightness can be a limiting factor for the optimal performance of particular sports and an intrinsic risk factor for sports injuries. In the literature, Static stretching has been always reported as an effective metod in preventing injuries related to lack of flexibility. This type of stretching are relatively safety which makes it a good method for a healthy general population flexibility.

- Standing Hamstring Stretch
- Doorway Stretch
- Table Stretch
- Floor Hamstring Stretch

- Hamstrings Stretching Using PNF Techniques
- Hamstrings Stretching Using Dynamic Stretching Techniques



Figure 2



Figure 3



Figure 4

**Dynamic Stretching [1]**



Figure 5

**PNF (proprioceptive neuromuscular facilitation) [3]**



Figure 6

**Specific hamstring stretches for back pain relief**

The hamstrings muscles lay on the back of each thigh. Tightness in this muscle can affect motion in the pelvis which can increase stress across the low back and also can affect correct posture. Stretching the hamstrings with these following exercises (or as part of a routine of back exercises) can gradually lengthen them and reduce the stress felt in the lower back. Virtually all cases of chronic lower back pain are accompanied by tight hamstrings. The pull of these tight muscles force the lumbar spine into a forward bent posture, the effects of which are especially felt during physical activity. Additionally, the overall mobility of the hip joints is affected.

**A visual analogue scale (vas) [4]**

A Visual Analogue Scale (VAS) is a measurement instrument that tries to measure a characteristic or attitude that is believed to range across a continuum of values and cannot easily be directly measured. For example, the amount of pain that a patient feels ranges across a continuum from none to an extreme amount of pain. From the patient's perspective this spectrum appears continuous ± their pain does not take discrete jumps, as a categorization of none, mild, moderate and severe would suggest.

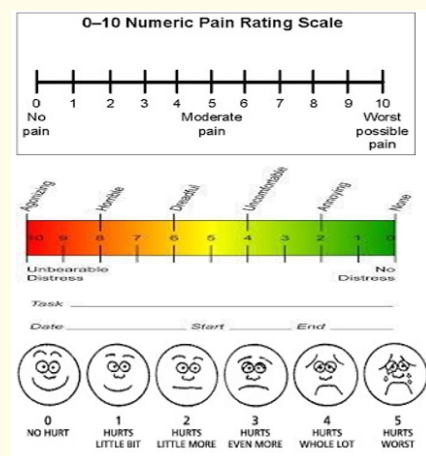


Figure 7

### Subjects and Methods

Ten participants from different surgical departments (plastic surgery department .surgery Dept, orthopaedic Dept .....), all participants will asked to do Hamstring Muscle Tightness test.

#### Inclusion criteria

- All participants well share in this study from Al Qassimi-hospital,
- Complaining from Back Pain in OT
- Positive Hamstring Muscle Tightness test

#### Exclusion criteria

- Participants with severe back pain
- Patients with negative Hamstring Muscle Tightness test

#### Evaluating procedure

All participants will asked to do Hamstring Muscle Tightness test and all participants with positive Hamstring Muscle Tightness test will share in this study .All participants will be asked to do Visual analogue scale test. All data will be registered in data collection sheets.

#### Therapeutic intervention

- Pain will measured by using Visual analogue scale before starting our programme,
- All participants will do a selected programme of hamstring stretching exercises
- For 5 minutes for each limb one time daily for two weeks.
- Then pain will be measursed again at end of programme

#### Statistical analysis

All data were expressed as mean ± standard deviation, standard error of the mean value of Low Back Pain pre and post exercise training with using the Paired t-test to describe the results. Data were analyzed with SPSS software version 23. The level of significance was set at  $P \leq 0.05$ . Paired t-test was applied to compare pre and post values within the same group.

#### Statistical analysis

##### Paired sample statistics

	Mean	N	Std Deviation	Std Error Mean
Pre exercises group	5.2000	10	1.03280	0.37330
Post exercises group	1.7000	10	.67495	0.21344

Table 2

##### Paired sample correlations

	N	Correlation	Sig
Pre and Post exercises group	10	0.733	0.16

Table 3

##### Paired sample test

	95% Confidence Interval of the Difference		t	df	Sig. (2 tailed)
Pre and Post exercises group	Lower 2.99417	Upper 4.00583	15.652	9	0.000

Table 4

##### Pain on vas pre and post ex's program

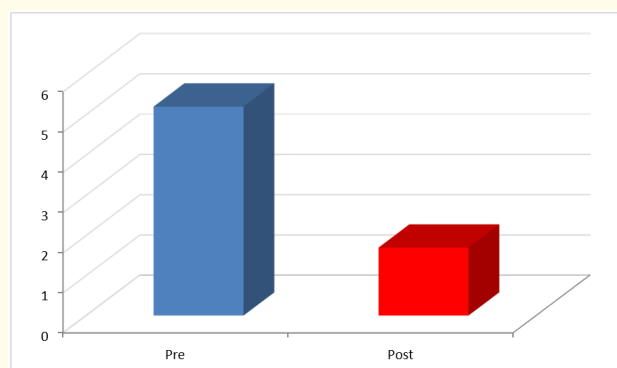


Figure 8

### Results

After completion of the study, a significant improvement was observed in in measurement of back pain on visual analogue scale ( $P < 0.05$ ), when compared to preprogram measurement.

### Discussion

From the analysis of most studies, It is found that significantly shown short term effect on reducing pain on the study group who received stretching, improving flexibility and functional ability. However, it was found that the greater percentage of improvements in study group than the control group. The improvement in study group in pre to post intervention is due to the static stretching of hamstring and lower back muscles. The stretching program that shows improvement in functional ability and the discomfort due to pain and tightness during forward bending and working might have reduced after giving stretching exercises. In the

study of Sahrman's movement balance system approach, active stretching is effective way to increases the flexibility of the tight muscles while concomitantly improving function of the antagonistic muscles. There was significant maintenance of improvements in study group obtained in outcome measurements at follow up, it is assumed to be due to the effect of the stretching on the muscle tendon transition while giving transitive pressure in vertical direction relaxing the muscle and increasing the expansibility of the muscle [5]. In community nurses, aberration of posture may play an important role in the development of mechanical low back pain [6]. In community nurses, improving flexibility and functional ability with chronic mechanical low back pain and the improvement was maintained significantly up to one week follow up. However, in study group, the greater percentage of improvements was found more than the control group. In pre and post intervention in study group, the improvement is speculated due to the static stretching of hamstring, tensor fascia latae and lower back muscles [7]. Bio-mechanical studies of the spine stated that mechanical loads are transferred through "Lumbo Pelvic Hip Complex" (LPHC) from the hips, pelvis, and low back across the thoracolumbar Fascia, to the upper back, shoulders, and arms in an "X" shaped fashion. Muscles imbalances resulting from the LPHC musculature leads to improper movement down the kinetic chain [5]. Study conducted by Keisuke Ohtsuki on 2012 stated that the reason for focusing on extension at the muscle tendon during stretching is because flexibility at that location is poor. The short term adapted extensibility in the muscle that maintains the length of the muscle reducing stress on lumbar spine [6]. In the study conducted by William D Brandy, et al in 1994 which aim to study the effect of frequency and time of static stretching on flexibility of the hamstring muscle on ninety three participants who had limited hamstring muscle flexibility, and their age ranging from 21 to 39 years . For five days per week for six weeks Stretching was given. In their study, they found that thirty second duration is an effective amount of time to sustain a hamstring muscle stretch in order to increase range of motion [8]. In this study significantly shown short term effect in reducing pain found as a result of stretching of lower back muscle, tensor fasciae latae and hamstring, and leading to improving flexibility and functional disability in chronic mechanical low back pain [9].

## Conclusion

Stretching exercises Program of Hamstring Muscles could improve Low Back Pain among Surgeon in Operation Theatre. Stretching Program of Hamstring Muscles is good methods that improve Low Back Pain among Surgeon.

## Acknowledgement

Author was expressing his sense of gratitude's to all physicians who helped and encouraged him for the guidance and completion of this study.

## Conflicts of Interest

None

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## Volume 2 Issue 4 April 2019

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