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A COMPARITIVE STUDY TO FIND OUT THE IMMEDIATE EFFECT OF OCCIPITAL MUSCLE INHIBITION AND STATIC HAMSTRING STRETCHING ON HAMSTRING TIGHTNESS IN YOUNG ADULTS - AN EXPERIMENTAL STUDY.

Physiotherapy

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ABSTRACT

Context: There is hamstring tightness because of sedentary lifestyle and leads to increase incidence of low back pain. Superficial Back line connects occipital muscle to hamstring muscle so that releasing occipital muscle help to decrease tightness of Hamstring tightness.

Aim: To find out immediate effect of Occipital Muscle Inhibition and Static Hamstring Stretching on Hamstring Tightness.

Settings and Designs: The interventional study was carried out in Abu Road.

Method and Material: 50 subjects were included in the basis of inclusion criteria and exclusion criteria and divided into 2 groups with 25 participants in each group. One group received Occipital Muscle Inhibition Technique and other group received Static Hamstring Stretching Technique.

Statistical analysis: Data was analysed by using SPSS Version 20. Wilcoxon signed-rank test was used for the pre-treatment and post-treatment comparison within both the groups & Mann-Whilney U test was used for the inter group comparison.

Results: Statically is significant ($p<0.05$) the result showed high significant difference within & between the two groups. There was more effect of occipital muscle inhibition compared to static hamstring stretching.

Conclusion: The above study concluded that both the technique showed marked improvement in the outcome measure, but the occipital muscle inhibition is more effective for the hamstring tightness and it is easy to perform for the participants and it was observed that the effect was persistent for longer time.

KEYWORDS

Hamstring tightness, Occipital Muscle Inhibition, Static Hamstring Stretching, Active Knee Extension Test (AKET).

INTRODUCTION

Hamstring is one of the commonest muscles that often get tight. Hamstring tightness increases apparently from childhood up to age 40-49 years. Tight hamstrings can have profound effect on seated postural alignment of body and number of studies show positive correlation between decrease hamstring flexibility and low back pain of lumber intervertebral disc pathology.[1]

Shortness of hamstring muscle results in restriction of knee extension when the hip is flexed or hip flexion when the knee is extended also leads to postural changes in pelvic region causing posterior tilt and flat back. Hamstring tightness causes decrease in AKE range, dorsiflexion and lumbar lordosis decreases leading to postural deformities, bending forward deficit, hamstring strain or injuries, discomfort when sitting and a shambling gait.[2]

Tight hamstring muscles increase the patella-femoral compressive force because of the increased passive resistance during the swing phase of ambulation and running. In addition, hamstring cross over the two joints when tight muscle fails to passthrough full psychological amplitude under rapid and stress full situations. This result in varying degree of muscle damage and ultimately various hamstring injuries.[1] The increase in stiffness of the hamstring produce more burdens on the back and causes improper motion patterns in the lumbopelvic region.[3]

The suboccipital muscle inhibition technique relaxes the tension in the muscles located between the axis and occiput, which regulates the upper cervical vertebra. Sub occipital muscles are: Rectus capitis posterior major, Rectus capitis posterior minor, Obliques capitis inferior, Obliques capitis superior. The main functions of these muscles are to regulate body posture and rotation of the head. Hamstring flexibility increases due to relaxation of the myofascial as the tone of suboccipital muscles falls, they are connected by one neural system, which passes through the dura mater known as superficial back line (SBL).[1]

The upper cervical spine has been shown to be the most concentrated area of mechano-receptors (joint position receptor) in the body. The sub occipital muscle has been also shown to have a very dense number of muscles spindle cells and GTOs (Golgi Tendon Organs) monitoring joint position as it relates to the muscle.[3]

A crucial area of the myofascial meridian called the Superficial Back Line (SBL) is a ribbon of facial and muscular continuity that begins with the planter fascia and short toe flexors beneath the arches of foot, wrapping around the heel to the soleus and gastrocnemii of the lower leg. The gastrocs interlock with the hamstrings, which are in turn continuous with the sacrotuberous ligament, which feeds into the sacral fascia. The sacral fascia is the fascial anchor for the back muscle that transverse the spine, and it is the very top muscle of this group to which we will turn our attention in this column. The SBL, however, continues on beyond the occipital ridge, up along the top of the scull with the epicranial fascia, including both the occipitalis and frontalis muscle, until it attaches at its other end, the brow ridge just above the eye socket.[3]

In occipital muscle inhibition technique, patient lies comfortably in supine lying and can be easily administered by the therapist inducing relaxation of the fascia by applying pressure softly to the sub occipital area.[2]

Static stretching is commonly used method of stretching in which soft tissues are elongated just beyond the point of tissue resistance and then held in the lengthened position which a sustained stretch force over a period of time. The duration of static stretch can be predetermined prior to stretching or be based on the patient's tolerance and response during the stretching.[4]

AIM OF THE STUDY

The aim of the study was to compare the immediate effect occipital muscle inhibition and static hamstring stretching for hamstring tightness in young adults.

OBJECTIVES OF THE STUDY

1. To find out the immediate effect of Occipital Muscle inhibition technique on Hamstring Tightness.
2. To find out the immediate effect of static stretching on Hamstring Tightness.
3. To Compare the immediate effect of Occipital muscle inhibition and static stretching on Hamstring Tightness.

HYPOTHESIS

- **Null hypothesis:**
- There is no significant difference between the effect of muscle

inhibition and static hamstring stretching on active knee extension test in hamstring tightness subjects.

- **Alternative Hypothesis:**
- There is a significant difference between the effect of muscle inhibition and static hamstring stretching on active knee extension test in hamstring tightness objects.

MATERIAL AND METHODOLOGY

- **Study Setting**: Shri U.S.B. college of Physiotherapy, Abu Road
- **Source of data**: Abu road
- **Study population**: Subject with hamstring tightness and young adults.
- **Sample size**: 50 hamstring tightness.
- **Sampling method**: Convenient sampling.
- **Study Design**: A comparative experimental study

Materials to be used:

- Consent form
- Pencil and Pen
- Scale
- Stop Watch
- Measure tape
- Goniometer
- Chair
- Plinth
- Weighing machine

Inclusion Criteria:

- Age – 18 to 25.[2]
- Gender: both males and females.[2]
- Willingness of the subjects to participate in the study.[2]
- Unilateral or Bilateral short hamstring syndrome.[2]
- Active knee extension 150°or less.[6]

Exclusion Criteria:

- History of neck trauma or fracture.[2]
- Herniated disc or protrusion, spinal deformities, acute back pain.[2]
- Muscle tendon injury of hamstring.[2]

METHODOLOGY

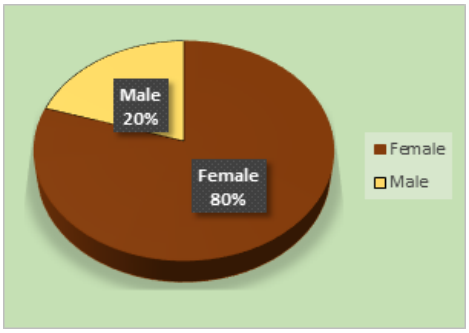
- After the approval of the study from the ethical committee, 50 subjects from Abu road were taken, who fulfilled the inclusion and exclusion criteria taken for the study purpose.
- After proper explanation about the purpose and procedure of this study, subjects who were willing to participate in this study were requested to sign a written consent form.
- The selection of subjects was done by convenient sampling.
- A pre-participation evaluation form consisting of basic assessment chart was filled. The data measured were recorded in the measurement for which included name, age, gender, height, weight, BMI, pre-intervention range of active knee extension test.
- Subjects were then explained about the test and procedure to be conducted.
- Group-A received Occipital Muscle Inhibition technique.
- Group-B received Static Hamstring Stretching technique.
- Assessment of tightness of hamstring was measured by active knee extension test before and after the intervention.

Treatment protocol:

- **Group A** - Occipital muscle inhibition technique was conducted with subject in a supine position with eye closed. The therapist placed hands below the subject's occiput and applied pressure to the area below the atlas, in the upward direction, toward the subject's nose, toward himself/herself, and in the direction of the head, to induce relaxation of the suboccipital muscles. The pressure was maintained for 2 minutes until tissue relaxation had been achieved.[2]
- **Group B** - Passive stretching technique. Subjects in the stretching group received passive stretching of the hamstring muscles in their dominant leg. While lying supine, a researcher who was blinded to AKET measures would passively position the subjects into the SLR position (hip in flexion, knee in extension, and ankle in neutral) without pain/discomfort to the point where resistance to movement was first noted. This position was then maintained for 30 seconds and repeated further 5 times. During the 30 second stretches, the therapist monitored the subjects to ensure they did not make any compensation that could modify the stretching position. Each subject had a total of 180 seconds of stretching on their lower extremity.[5]

RESULTS

All statistical analysis was done by SPSS statistics version 20.0 for windows software.



Graph 1- Pie chart showing gender distribution of the Hamstring Tightness Stretch

Table 1: Intragroup comparison of pre & post intervention of Group A & Group B

	Mean		SD		Z	Sig.
	Pre	Post	Pre	Post		
Group A	128.72	144.72	7.90	6.07	-4.382	0.000
Group B	134.32	139.32	5.53	5.34	-4.394	0.000

INTERPRETATION: The above table 1 shows the result of Wilcoxon sign rank test which shows there was significant different between the pre and post Occipital Muscle Inhibition in Group A & Group B. ($p<0.05$).

Table 2: Intergroup comparison of post treatment

Intergroup	Z	Sig.	Mann-Whitney U
(Group A-B)	-6.088	0.000	0.00

INTERPRETATION: The above table 2 shows the result of **Mann-Whitney U test** which shows there was significant different between both group ($p<0.05$).

DISCUSSION

The intent of the study was to compare the immediate effectiveness of Occipital Muscle Inhibition and Static Hamstring Stretching technique on Hamstring Tightness.

Hamstring flexibility increases due to relaxation of the myofascial as the tone of suboccipital muscles falls, they are connected by one neural system, which passes through the Dura mater known as superficial back line (SBL).

In present study, when the values of pre-treatment and post-treatment occipital muscle inhibition technique and static hamstring stretching technique were analysed, it was statically significant in occipital muscle inhibition technique and when comparison done between the groups, from both the techniques occipital muscle inhibition technique was proved statically more significant.

Tight hamstrings can have profound effect on seated postural alignment of body and number of studies show positive correlation between decrease hamstring flexibility and low back pain of lumber intervertebral disc pathology. Shortness of hamstring muscle results in restriction of knee extension when the hip is flexed or hip flexion when the knee is extended also leads to postural changes in pelvic region causing posterior tilt and flat back. Hamstring tightness causes decrease in dorsiflexion and lumbar lordosis decreases leading to postural deformities, bending forward deficit, hamstring strain or injuries, discomfort when sitting and a shambling gait. Tight hamstring muscles increase the patella-femoral compressive force because of the increased passive resistance during the swing phase of ambulation and running. The increase in stiffness of the hamstring produce more burdens on the back and causes improper motion patterns in the lumbopelvic region. By performing occipital muscle inhibition, it was found that after the treatment protocol there was marked increase in the AKET which stated significant outcome. Even the significant results were found after the static hamstring stretching technique when

measured with AKET. But the comparison between both that is occipital muscle inhibition technique and static hamstring stretching technique it was found that there is greater difference between both the techniques and occipital muscle inhibition is more beneficial.

We observed during study that effect of Occipital Muscle Inhibition Technique was even persisted for a longer period of time.

Pramod K. Jagtap et al, (2015) conducted a study to find out the effect of suboccipital muscle inhibition technique on hamstring tightness patients and conclude that sub-occipital muscle inhibition technique is effective in improving the flexibility of hamstring muscles.

Dr Rasika Panse et al, (2018) conducted a study to find out the effect of Suboccipital Muscle Inhibition and Neural Flossing Technique on Hamstring Flexibility in Young Adults. This study concludes that Hamstring tightness and stretch pain reduce significantly when combination of suboccipital muscle inhibition and neural flossing technique was given in young adults.

LIMITATIONS OF THE STUDY

- Long term follow up was not taken.
- Result could not be generalized to all age group because study age group was between 18-25 years.

FURTHER RECOMMENDATION

- Treatment can be given for longer duration with follow up.
- Further studies can be done with larger sample size.
- This study can be done by taking different outcome measures.
- Further studies can be done with different age group.

CONCLUSION

Between the Occipital muscle inhibition technique and Static Hamstring Stretching technique, there is significant increase in AKET results for Occipital muscle inhibition technique than Static Hamstring Stretching technique.

Hence it can be concluded that from both form of treatments option for the treatment of hamstring tightness, Occipital Muscle Inhibition technique proved to be more effective for the hamstring tightness and it is easy to perform for the participants and it was observed that the effect was persistent for longer time.

CLINICAL IMPLICATION

Results suggest that from both the techniques i.e. Occipital Muscle Inhibition & Static Stretching exercise it is proved that Occipital Muscle Inhibition is more effective than Static Hamstring Stretching exercise for the Hamstring Tightness. So, Occipital Muscle Inhibition technique can be more beneficial for this age group.

Conflicts of interest: Nil.
Source of fund: No fund was needed.
Ethical Clearance: from Shri USB College of Physiotherapy.

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