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THE EFFECTS OF NEURODYNAMICS SCIATIC NERVE SLIDING TECHNIQUE VERSUS SUB-OCCIPITAL MYOFASCIAL RELEASE TECHNIQUE ON HAMSTRING FLEXIBILITY IN ASYMPTOMATIC SUBJECTS

Dr. Jigyasa Consultant Physiotherapist

Dr. Mukesh Sharma* Assistant Professor in TDTD DAV IP & R, Yamunanagar. *Corresponding Author

ABSTRACT

Background: Neurodynamics sliding technique (NDST) and Sub-occipital myofascial release (SMFR) technique both have been individually advocated for increasing hamstring flexibility but comparison of these techniques have not been found in studies.

Objective: The purpose of the study was to find effect of NDST versus SMFR technique on hamstring flexibility in asymptomatic individuals.

Study Design: Experimental design

Source of Data Collection: DAV institute of physiotherapy, Yamunanagar.

Methodology: 50 asymptomatic Subjects with hamstring tightness (SLR < 80°) were included in the study on the basis of inclusion criteria and will be randomly allocated into 2 groups: Group A received NDST and Group B received SMFR technique. Treatment was given for 5 consecutive days. Outcome measure was evaluated on 1st and 5th day using active knee extension and finger floor test.

Result: When means of post intervention were compared there is statistically significant difference in means of active knee extension and finger floor test within the groups but there is no statistically significant difference in post intervention means between the groups.

Conclusion: Both NDST and SMFR technique are effective on improving hamstring flexibility for asymptomatic individuals with limited SLR ROM. However there is no significant difference in improvement in hamstring flexibility between the groups.

INTRODUCTION

Flexibility is defined as the range of motion around the joint or the group of joints and reflects the ability of muscle tendon unit to elongate. The hamstring muscles have more tendency to get shorten.[1] Hamstring tightness is usually attributed by inability to extend the knee completely when the hip is flexed accompanied by discomfort or pain along the posterior thigh in asymptomatic normal individuals.[2]

Female are more flexible than male of same age throughout the life, because of anatomical variation in joint structure and also performance of more rigorous physical work by men, resulting in greater micro trauma.[3] Hamstring muscles have an important role in the performance of daily activities such as controlled trunk movement, walking, and jumping.[4]

Poor hamstring flexibility appears to be one accepted factor causes of hamstring injuries[5], musculoskeletal disorders and reduction in physical performance.[6] Hamstring muscle injuries are one of the most common musculoskeletal tendinous injuries in lower extremity.[7]

Since many clinical observations have suggested that short hamstrings are associated with various problems, it is important to maintain the flexibility of hamstrings for the maintenance and improvement of physical performance and quality of life.

Various treatment techniques are available to treat hamstring tightness such as MET, position release, muscle inhibition and different stretching techniques such as ballistic stretching, PNF stretching, static stretching etc. However, there is limited evidence of the role of sub-occipital release technique and neurodynamic sliding technique on hamstring flexibility.

Although the importance of SMFR technique for cases of upper cervical spine treatment and cervicogenic headache is well accepted but its relationship with other structures has not yet been well identified. Erika et al, hypothesized that the hamstring muscle act as postural control of sub-occipital muscles due to the connection of sub-occipital muscles with duramater and presence of myofascial chains that links the connective tissue fascia and muscles along specific lines in the body.[8] So it is important to study the influence on SMFR on hamstring flexibility.

As altered posterior lower extremity Neurodynamics could arguably influence resting muscle length and lead to changes in the perception of stretch or pain. Providing movement or stretching could lead to changes in the Neurodynamics and modification of sensation and could help to increase in flexibility.[9]

The interest of this study is to compare the effects of NDST and SMFR on flexibility of hamstring in asymptomatic subjects as there is scarce research regarding these techniques.

OBJECTIVES

The purpose of this study is to compare the effects of the Neurodynamics sciatic nerve sliding technique and Sub-occipital myofascial release technique on hamstring flexibility in asymptomatic subjects.

MATERIAL & METHODS

Study Design: Experimental study

Sampling Method: Convenient sampling

Study Design: DAV Institute of Physiotherapy & Rehabilitation,

Sample Size: 50 Subjects

Sampling Criteria:

Inclusion Criteria:

- Both males and females
- Age Group 18-25 years old
- Normal asymptomatic subjects with no symptoms of hamstring tightness
- Subjects with limited SLR ROM less than 80 degrees.

Exclusion Criteria:

- History of hamstring injury
- Neck or low back pain
- History of neck trauma.
- Any spinal pathology e.g. herniated disc.
- History of spinal or lower limb fracture.
- History of neurological disease or peripheral neuropathy

PROCEDURE:
Subjects fulfilled the inclusion and exclusion criteria were included and were randomly divided into two groups.

Group A: NDST Group
NDST was performed by alternating hip flexion, knee flexion, and ankle dorsiflexion with hip extension, knee extension, and ankle plantarflexion while the subject's cervical and thoracic spine were maintained in flexion. Movements were performed for 3 minutes (approximately 25 repetitions) on their dominant lower limb.[10]

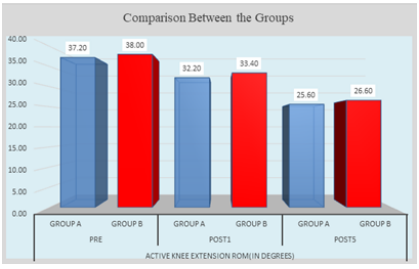
Group 2: SMFR Group
Before the main intervention, therapist flexes the MCP and extend IP joints of hands and placed them under the middle joints of cervical (C4-C5), and hold for 1-2 minutes; so that the cervical segment was moved passively with some rotation by the therapist.

For application of main technique, subjects were in supine position with knee flexion. Therapist sat on a stool at the head of the table with elbows and supinated forearms on the table. Subjects were asked to lift their head off the table. The tips of first three fingers were positioned into the soft tissue inferior to the arc of atlas. Fingers were stabilized in a flexed position about 45° at the MCP and PIP joints. Subjects were asked to rest their head back down so that their fingertips were over the sub-occipital soft tissues and their finger pads rest tightly against the inferior aspect of the atlas. This phase was repeated 3 times in each session.

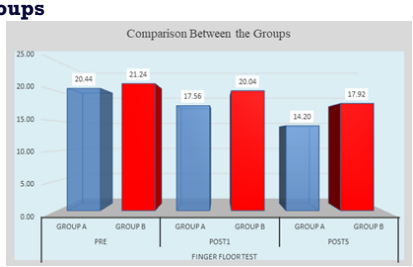
At the end, for more releasing, sub-occipital traction was commenced. Subjects lied supine with head supported and therapist placed the fingers just caudal to the nuchal line, lifted the finger tips upward while resting the hands on treatment table, and then applied a gentle cranial pull, causing long axis traction. The procedure was performed for 2 to 3 minutes[11] for 5 consecutive days.[12]

OUTCOME MEASURES
The outcome measures of hamstring flexibility was taken using Active knee extension (AKE) [12] and Finger floor Distance (FFD)test[10] on 1st day (pre and post-intervention) and 5th day (post intervention).[12]

DATA ANALYSIS AND RESULT
Data was analyzed using the software SPSS-15.0. Unpaired & Paired T- was applied to compare the outcomes between & within the groups.



Graph No. 1: Comparison Of AKE ROM Between NDST & SMFR Groups



Graph No. 2: Comparison Of FFD Between NDST & SMFR Groups

DISCUSSION
The present study found that there is no statistically and clinically significant difference between NDST and SMFR on increasing hamstring flexibility. However there is a significant difference in improvement within the group.

Improvement in hamstring flexibility by NDST:
NDST showed statistically significant improvement in hamstring flexibility. This could be due to the fact that when tension is applied to the nervous system while applying neurodynamics, it causes reduction in cross-sectional area and increase in pressure in the nerve that results in extension and movement of the sciatic nerve together with the hamstring and this compliance of the nerve, results in increased flexibility. Although the study does not provide any information about the mechanism of action or change, it does support that neurodynamics treatment can significantly increase hamstring flexibility in asymptomatic individuals.[13]

Improvement in hamstring flexibility by SMFR technique:
Significant improvement in hamstring flexibility by SMFR technique could be due to the fact that Suboccipital muscle stretch affects the posterior myofascial chain.[10] This technique relaxes the tension in the four muscles located between the occiput and axis, which regulates the upper cervical vertebra (rectus capitis posterior major, rectus capitis posterior minor, obliqus capitis inferior, and obliqus capitis superior); these muscles are known to be associated with regulating body posture. Decreased tone of suboccipital muscles reported to decrease the tone of knee flexors such as the hamstrings also due to relaxation of the myofascia because the hamstrings and suboccipital muscles are connected by one neural system, which passes through the dura mater.[14]

It appears reasonable to suggest that the observed increase in hamstring flexibility following the SMI might be due to decreased neural mechano sensitivity and changes in the perceptions of stretch or pain.[8]

These findings showed that the interventions localized at a distance from the musculature i.e. treating the sub-occipital muscles for improving hamstring flexibility is found to be effective. This supports the special importance treatment approach for hamstring tightness. Treating the hamstring in patients with acute lower back pain for increasing hamstring length such as local site stretching techniques may cause aggravation of the local inflammatory response and may cause further muscle spasm and guarding. The present study suggested new approach to the treatment of impaired hamstring extensibility and encouraged further investigation of remote effect of cervical treatment favoring the authors who concluded that manual therapy of neck may have a role to play in treatment of extra spinal lower limb musculoskeletal conditions.

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