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## Effect of neurodynamic sciatic sliding technique on hamstring flexibility in healthy individuals

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### Abstract

**Background:** Flexibility of muscle is “the ability of a muscle to lengthen allowing one joint or more than one joint in a series to move through a range of motion”. Good muscle flexibility will allow muscle tissue to accommodate to imposed stress more easily and allow efficient and effective movement. More efficiency and effectiveness in movement as a result of enhanced muscle flexibility will assist in preventing or minimizing injuries and may enhance performance.

**Method:** The study sample comprised 30 patients, of which 15 were divided in Group A and other 15 were divided in Group B. The median time interval applied before and after therapy was 2 weeks. Patients with age group of 20-40 years healthy individuals of both sexes were taken as population. Group A treated with Neurodynamic sliding technique and Group B treated with Static Stretching.

**Result:** The paired t test values have shown that Neurodynamic sciatic sliding technique was more effective than Static stretching for patients with Hamstring tightness. The unpaired t test values have shown that there was significant difference between two groups in showing improvement in their quality of life in patients with Hamstring tightness.

**Conclusion:** Neurodynamic sciatic sliding technique resulted in a positive impact on the lower limb flexibility in the Physical, Functional and Emotional levels. The GONIOMETER score in hamstring tightness subject before and after treatment were statistically significant.

Through the results, alternate hypothesis is accepted and also the study could be concluded that there is a significant difference between “effect of neurodynamic sciatic sliding technique versus static stretching on hamstrings flexibility in healthy individuals” in improving the lower limb flexibility in healthy individual.

**Keywords:** Flexibility, neuro dynamic sliding technique, static stretching, goniometer

### Introduction

Flexibility of muscle is “the ability of a muscle to lengthen allowing one joint or more than one joint in a series to move through a range of motion”. Good muscle flexibility will allow muscle tissue to accommodate to imposed stress more easily and allow efficient and effective movement. More efficiency and effectiveness in movement as a result of enhanced muscle flexibility will assist in preventing or minimizing injuries and may enhance performance.

The concept of neurodynamics in physiotherapy with the aim of stimulating clinical integration of mechanics and physiology of the nervous system. Since then, the approach has developed into a much more comprehensive system of musculoskeletal treatment and has recently emerged as an adjunct to assessment and treatment of pain syndromes.

An important aspect of this approach is that healthy mechanics of the nervous system enable pain posture and movement to be achieved. However, in the presence of any muscular imbalance such as tightness it helps in improving the flexibility to a greater extent.

Stretching is a form of physical exercise in which a specific muscle or tendon [or muscle group] is deliberately flexed or stretched in order to improve the muscle’s felt elasticity and achieve comfortable muscle tone. The result is a feeling of increased muscle control, flexibility and range of motion.

Static stretching has been defined as elongating the muscle to tolerance and sustained the position for a length of time. Slower stretching technique include that the stretch prevents the tissue from having to absorb great amounts of energy per unit time, the slow stretch not elicit a forceful reflex contraction, and this technique alleviates muscle soreness.

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### Static Stretching

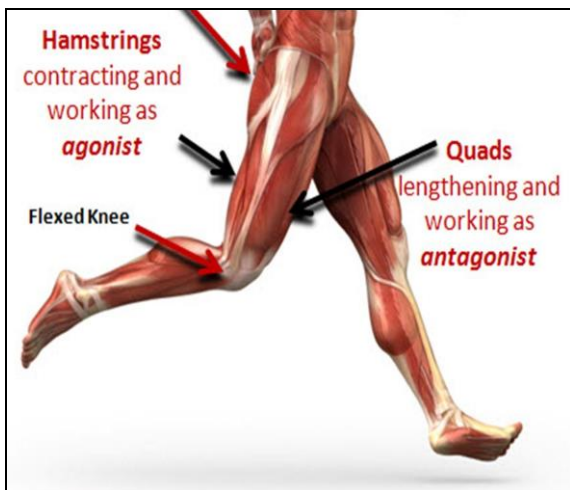
Static stretching is used to stretch muscles while the body is at rest. It is composed of various techniques that gradually lengthen a muscle to an elongated position (to the point of discomfort) and hold that position for 30 seconds. 30 seconds is the minimum duration to get the benefits of stretching, whereas two minutes is the maximum. A warm sensation in the muscles is produced. Static stretching exercises involve specialized tension receptors in our muscles. Static stretching slightly lessens the sensitivity of tension receptors, which allows the muscle to relax and to be stretched to greater length.

Stretching also helps keeping flexible, lengthen tight muscles, improve balance, overall fitness and helps relieve stress and tension.

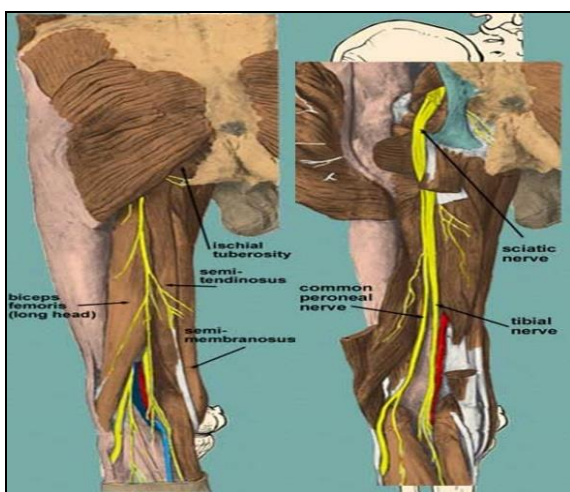
### Anatomy and Function of Hamstring Muscle

In human anatomy, the hamstring is a group of tendons contracted by three posterior thigh muscles.

- Semitendinosus-Knee flexors and medial rotator of leg when knee is semi flexed
- Semimembranosus-Flexor of knee and medial rotator of leg
- Biceps femoris-Flexor of knee and lateral rotator of leg
- Adductor Magnus-Hamstring part extension of hip and flexion of knee



Function of Hamstring muscles



Muscles of hamstrings

### Aim of the Study

To find out the effectiveness of “Neurodynamic Sciatic Sliding versus static stretching On Hamstring Flexibility in

Healthy Individuals”.

### Materials

#### Materials and methodology

- Treatment couch
- Goniometer
- Pillows
- Blankets

### Methodology

Goniometer is used to measuring range of motion.

### Population

Patients with age group of 20-40 years healthy individuals of both sexes.

### Criteria for Sample Selection

#### (A) Inclusion Criteria

- Both genders.
- Subject with hamstring tightness.

#### (B) Exclusion Criteria

- Subject having low back pain and neurological pain.
- Any congenital deformities in lower limb.
- Previous history of any low back and lower limb surgery
- Any history of trauma like fracture, dislocation, or subluxation of any lower limb joint.
- Any uncooperative subject.

### Source of Data

- Nandha college Of Physiotherapy. Erode
- Nandha college of Arts and Science. Erode
- Nandha Hostel.

### Sample Sizes

- Sample size is 30 subjects.
- Group A-15 patients.
- Group B-15 patients.

### Study Design

- Quasi Experimental Design
- Pre and Post Experimental Study Design

### Sampling Method

Convenient Sampling Method

### Duration of the Study

8 Months.

### Treatment Duration

- Study was carried out for 2 weeks for each patient.
- Neurodynamic sciatic sliding technique was performed for in 5 repetitions of one set (20 minutes).
- Static stretching for 15 minutes.

### Parameter

#### Goniometer

Universal goniometer an instrument used to measure the ROM

### Procedure

- Subjects were selected by convenient sampling method. 30 subjects who fulfilled inclusion and exclusion criteria were selected by random sampling method, out of them

15 were allotted in Group A and 15 in Group B.

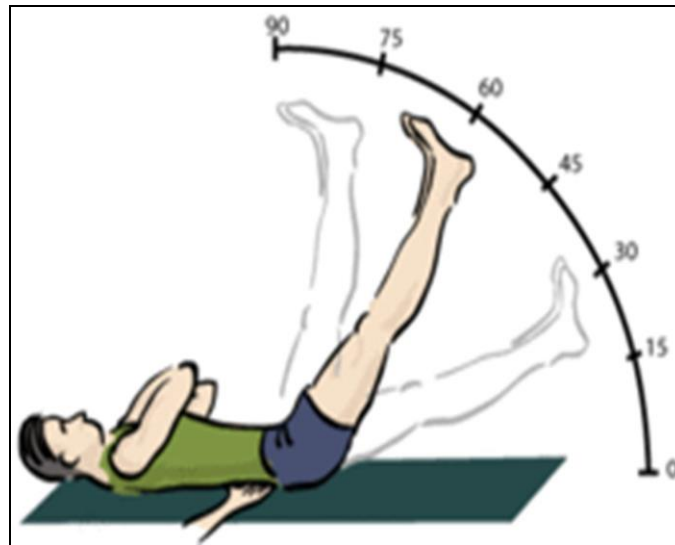
- Subjects were clearly explained about the study and written informed consent was obtained from the subjects who fulfilled the criteria.
- After completing the informed content and they were explained about the scale and the scale was administered.
- Proper instructions such as purpose, safety measures, comfort, precautions and psychological support were given to the subjects.
- All vital signs were checked.
- While doing the assessment, the subject's willingness to continue the procedure with or without rest was given preference.
- Both Group A and Group B subjects were involved for pretest assessment.

- Group A underwent Neurodynamic sciatic sliding technique.
- Group B underwent Static stretching 15 minutes once in a day.
- The total duration is 30 minutes.

**SLR test**

Before beginning with the technique, pre hip range of motion will be noted. Subjects will be first checked for hamstrings tightness.

Tightness of hamstrings will be checked by doing passive SLR with subject in supine position. The range of SLR will be noted by using a goniometer.



**Straight leg raise**

**GROUP-A [NE urodynamic sciatic sliding technique]**

**Patient position:** Subject is lying supine on the plinth

- NE urodynamic sciatic slider technique will be done passively by alternating hip flexion, knee flexion and ankle dorsiflexion with hip extension.
- Knee extension and ankle plantar flexion while the subject's cervical and thoracic spine will be maintained in flexion. Movements will be performed for 5 repetitions of one set.

for a period of 30 seconds, 3 times for total stretching time of 180 seconds.

**Outcome measures**

After two weeks post hip range of motion will be noted. Hip range of motion is measured with the goniometer placed at the head of femur with its movable arm in parallel with the long axis of femur which is to be tested.

**Data Presentation and Statistical Analysis**

The paired t-test was used to find out the statistical significance between Pre and Post t-test values of Goniometer Before and after treatment for Group A and Group B.

**3.12 (b) Group-B [Static stretching]**

**Patient position:** Subject is lying supine on the plinth.

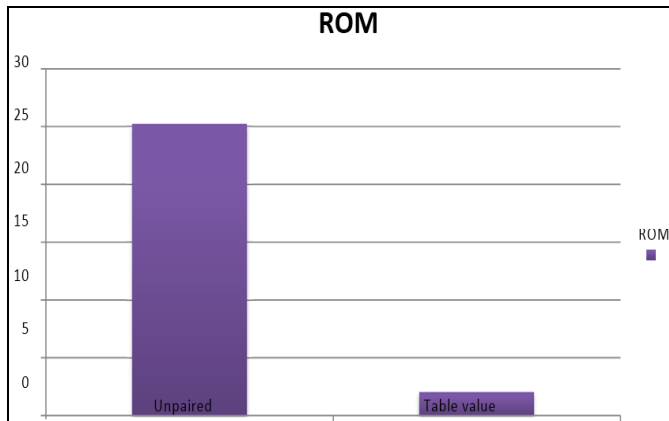
- Subject affected leg is kept at the level where tightness is felt and static stretching of the hamstring muscles is done

Groups	Mean Difference	Standard Deviation	Calculated 't' value	Table Value	Significance
Group-A	19	1.16	62.2	2.15	Significant
Group-B	9	1.06	32.2	2.15	Significant

**Mean Difference, Standard Deviation and Paired 't' Test Value between Group a and Group B of Goniometer comparison of unpaired 't' test and table value of rom**

Parameters	Unpaired 't' test	Table Value	Significance
Rom	25.25	2.05	Significant

## Comparison of Unpaired 'T' test and Table Value Of Rom



### Results and discussion

#### Results

The study sample comprised 30 patients of both sex. The diagnostic test for Hamstring tightness was positive in 30 patients. The median time interval of goniometer ROM assessment applied before and after therapy was after 2 weeks. Among 30 patients, 15 were treated with NE urodynamic sciatic sliding technique, and 15 were treated with Static stretching.

The pre and posttest values were assessed by Goniometer in Group-A & Group-B. The mean difference value is 19 & 9 respectively. The standard deviation value is 1.16 and 1.06 respectively. The paired t test value for Goniometer is 62.2 and 32.2. The paired t test value is more than table value 2.15 for 5% level of significance.

The calculated t values by unpaired t test were 25.25. The calculated t values were more than the table value 2.05 for 5% level of significance

The paired t test values have shows that Neurodynamic sciatic sliding technique was more effective than Static stretching for patients with Hamstring tightness. The unpaired t test values have shown that there was significant difference between two groups in showing improvement in their quality of life in patients with Hamstring tightness.

#### Discussion

While consideration of improving the flexibility of lower limb in subject with Hamstring tightness. I found there was a effective and good improvement.

There was a statistically significant difference in the impact of Hamstring tightness on the flexibility of lower limb of subject before and after Ne urodynamic sciatic sliding technique in all aspects (physical, functional and emotional). This demonstrates a positive effect of this Ne urodynamic sciatic sliding technique on the flexibility of lower limb of subject. The effectiveness of repositioning Ne urodynamic sciatic sliding technique for the treatment of Hamstring tightness was good. Repositioning Ne urodynamic sciatic sliding technique are faster and more practical than other therapies.

Studies on the factors affecting the flexibility in subject with Hamstring tightness are relevant for clinical reasons, when placed alongside with the results of Hamstring flexibility testing, professionals are able to better define the best approach by taking into account the changes in each subject with Hamstring tightness. The Goniometer may also be an interesting tool for checking the benefits and efficacy of conventional methods. It may be applied before and after therapy, which increases subject compliance each subject may

check his or her own difficulties in the questionnaire. This is a new approach that has been used more often in medical practice for flexibility of hamstring muscles.

#### Limitations

- The study has been conducted on small sized sample only.
- This study took shorter duration to complete.
- This study is not extended more than 2 weeks for a subject due to time constraint.

#### Recommendations

- A similar study may be extended with larger sample.
- The future study can be compared with various therapy also.
- The Ne urodynamic sciatic sliding technique may be applied to the other conditions like irritable LBA & Lumbosacral radiculopathy etc.
- This Ne urodynamic sciatic sliding technique may be compared with other neural mobilization also.

#### Summary and Conclusion

Subject with Hamstring tightness present with a history of tightness and discomfort. Whereas many treatment have been described, is a simple effective treatment for most subject with Hamstring tightness.

In our samples, Ne urodynamic sciatic sliding technique resulted in a positive impact on the lower limb flexibility in the Physical, Functional and Emotional levels. The Goniometer score in hamstring tightness subject before and after treatment were statistically significant.

Through the results, alternate hypothesis is accepted and also the study could be concluded that there is a significant difference between "Effect Of Ne urodynamic Sciatic Sliding Technique Versus Static Stretching On Hamstrings Flexibility In Healthy Individuals" in improving the lower limb flexibility in healthy individuals.

#### References

1. Agre JC. Hamstring injuries: Proposed etiological factors, prevention and treatment. *Sports Med.* 1985; 2:21-33.
2. Anderson B, Burke ER. Scientific, medical, and practical aspects of stretching. *Clin Sports Med.* 1991; 10:63-86.
3. Ciullo V, Zarins B. Biomechanics of the musculotendinous unit: Relation to athletic performance and injury. *Clin Sports Med.* 1983; 2:71-86.
4. Johnagen S, Nemeth Griksson F. Ham-string injuries in sprinters: The role of concentric and eccentric hamstring muscle strength and flexibility. *Am} Sports Med.* 1994; 22:262-266.
5. Fahrni W. Observations on straight-leg-raising with special reference to nerve root adhesions', *Canadian Journal of Surgery.* 1966; 9:44-48.
6. Elvey R. Treatment of arm pain associated with abnormal brachial plexus tension', *Australian Journal of Physiotherapy.* 1986; 32:225-230.
7. Maitland G0. *Vertebral Manipulation*, Butterworth, London, 5th edn, 1986.
8. Butler D, Gifford L. The concept of adverse mechanical tension in the newous system', *Journal of American Science.* 1989; 7(4):566-573.
9. Bandy W, Irion J. The effect of time on static stretch on the flexibility of the hamstring muscles. *Phys Ther.* 1994; 74:845-850.

10. Smith C. The warm-up procedure: To stretch or not to stretch.} Orthop Sports Phys Ther. 79:72-76, 1994.
11. Gelberman R, Rydevik B, Pess G, Szabo R, Lundborg G. A scientific basis for clinical care', Orthopedic Clinics of North America. 1998; 19(11):15-124.
12. Bhavana S, Mhatrea Yuvraj L, Singhb Janhavi embhekar T. Which is the better method to improve "perceived hamstrings tightness-Exercises targeting neural tissue mobility or exercises targeting hamstrings muscle extensibility? Sports med. 2003; 7:32-37.
13. Ayala F, Sainz de, Baranda P, De Ste Croix M. Comparison of active stretching technique in males with normal and limited hamstring flexibility. Journal of Orthopaedic and Sports Physical therapy. 2005; 27:16-21.
14. Ludwig Goeken. Effect on passive extensibility and stiffness in short hamstrings of healthy subjects. New York: Harper & Row, 1994, 32122-245.
15. Lee Herrington. Effect of Different Neurodynamic Mobilization Techniques on hip Range of Motion. The Australian Journal of Physiotherapy. 1998; 7:31-67.
16. William D, Jean Irion Briggler M. The Effect of Static Stretch and Dynamic Range of Motion Training on the Flexibility of the Hamstring Muscles Chiropractic Sports Med. 2003; 8:224-316.
17. Yolanda C, Caballeroa Marie C, Valenzab Lydia. Martín-Martín Effects of a NE urodynamic sliding technique on hamstring flexibility in healthy male soccer players. A pilot study. Physical Therapy, Philadelphia, PA: Lippincot Company, 7989. 2000; 8:698-699.
18. Meroni R, Charles Blake G. Comparison of active stretching technique and static stretching technique on hamstring flexibility. Orthop Sports Phys Ther. 2010; 73:778-725.
19. Ds Lincon, Murphy B. effect of passive stretching in tight hamstrings of male subjects. Dynamic range of motion training: An alternative to static stretching. Chiropractic Sports Med. 1994; 8:59-66.
20. Davis D, Scott S, Robert Wainner. The Effectiveness of 3 Stretching Techniques on Hamstring Flexibility Using Consistent Stretching Parameters. Improving flexibility. In: Scully RM, Barnes MR (eds), Physical Therapy, pp. Philadelphia, PA. 8. Lippincott Company, 7989, 2007, 698-699.
21. Glen M, De Pino, William Webright G. Duration of Maintained Hamstring Flexibility after Cessation of an Acute Static Stretching Protocol, Gerontol A BiolSci Med Sci. 1972; 27:218-221.
22. Wickie J, Gainey K, Figueroa M. A comparison of self-administered proprioceptive neuromuscular facilitation to static stretching on range of motion and flexibility. Differential responses to proprioceptive neuromuscular facilitation (PNF) stretch technique. Med Sci Sports Exerc 22. 2013; 7990: 706-777.
23. Riley D, Van Dyke JM. The effects of active passive stretching on muscle length. Med Sci Sports Exerc. 2012, 2000; 32:271-277.
24. Puentedura EJ, Celeste S, Edwards D, Landers MR. Immediate effects of quantified hamstring stretching: hold-relax proprioceptive neuromuscular facilitation versus static stretching. Orthop Sports Phys Ther. 1996; 24:303-308.
25. Johnson CD, Morrison RH. Studied the role of ne urodynamics in hamstring flexibility. Arch Phys Med Rehabil. 1989; 70:382-386.
26. Keitaro Kubo, Hiroaki Kanehisa, Yasuo Kawakami. Influence of static stretching on viscoelastic properties of human tendon structures *in vivo*. J Anat. 1978; 127:459-46.