



Sub Occipital Muscle Inhibition Technique Verses Cranial Cervical Flexion Exercise for Increasing Hamstring Flexibility in Physiotherapy Students

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i49A33295

Editor(s):

(1) Syed A. A. Rizvi, Nova Southeastern University, USA.

Reviewers:

(1) Mohamed Atif A Said Ahmed, Zagazig University, Egypt.

(2) Ghada Ebrahim El Refaye, Cairo University & Pharos University, Egypt.

Complete Peer review History: <https://www.sdiarticle4.com/review-history/74798>

Study Pre-Protocol

Received 10 August 2021
Accepted 19 October 2021
Published 11 November 2021

ABSTRACT

Background: Variation in flexibility can put an unusual amount of annoyance on the framework of the musculoskeletal system. The hamstring muscles are restricted when they are short, which can interfere with everyday activities and is usually a cause for concern. The flexibility of the hamstrings increases as the suboccipital muscles' tone deteriorates,, which are is single neuronal pathway that goes through the dura mater and connects them and which is called as the superficial back line (SBL). Hence as an intervention suboccipital muscle inhibition technique and cranial cervical technique is less time and energy consuming with efficient amount of results.

Aim and Objective: The aim of this study is to investigate the effect of suboccipital muscle inhibition technique verses cranial cervical technique for increasing hamstring flexibility.

Methods: Here we will evaluate hamstring tightness and impact of suboccipital muscle inhibition technique verses cranial cervical technique as an intervention with duration of 2 weeks. As an

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outcome measure Sit and reach test is given to desired population .This study will be conducted in Ravi Nair Physiotherapy College, Sawangi, Meghe, Wardha. The duration of study will be two week. The study design is pre and post interventional study.

Results: The data will be analysed using Student paired t test.

Conclusion: The expected outcome includes detection of hamstring tightness and improvement in hamstring tightness using sit and reach test. Data analysis will be done using students paired t test and conclusion of the study will be published after the results are analysed.

Keywords: Hamstring; suboccipital muscle inhibition technique; cranial cervical technique; sit and reach test.

1. INTRODUCTION

The ability to move a single or several joints across their entire range of motion effortlessly and painlessly is referred to as flexibility. Variation in flexibility can put an unusual amount of annoyance on the framework of the musculoskeletal system, resulting in injury, decreased strength, and poor motor control, as well as a lot of physical discomfort [1]. The hamstring muscles are restricted when they are short, which can interfere with everyday activities and is usually a cause for concern [2]. There are three hamstring [3] muscles: biceps femoris, semitendinosus, semimembranosus. The hamstrings [4] are a group of muscles which are present on the back of the leg [5] which arises from posteromedial impression of ischial tuberosity and back of the femur and inserts in the medial condyle or below it in proximal tibia end and in the head of the fibula [6]. The prevalence of hamstring tightness is about 45% [7]. Young adults sometimes experience hamstring tightness [8]. The most common causes of hamstring tightness occur when you begin a new exercise routine or unexpectedly increase the intensity of your workout. After a long period of sitting or inactivity, some people develop tight hamstrings [9]. Long periods of sitting have negative biomechanical and physiological effects, as Static forces absorb more energy than dynamic movements, and to maintain the body immobile while resisting gravity, 50 percent of the body's muscles contract. Musculoskeletal problems, such as hamstring tightness, are caused by limited mobility and which leads to low back pain [10]. Physical therapy is normally recommended after hamstring tightness and low back pain to help patients heal by reducing pain, increasing range of motion, stamina, and restoring function. So sub occipital muscle inhibition technique (SMI), cranial cervical flexion exercise is found to be effective for increasing hamstring flexibility .The sub occipital muscle inhibition technique

relaxes muscles in between occiput and the axis, which control the cervical vertebrae in the upper region. Sub occipital muscles are: rectus capitis is a muscle that is located on the back of the head (posterior minor and major), obliquus capitis superior, and obliquus capitis inferior [1]. which originates from the C2 vertebrae's spinous process (axis) and inserts itself into the lateral section of the occipital bone's inferior nuchal line. The flexibility of the hamstrings [11] increases as the tone of the suboccipital muscles decreases, and they are linked by a single neural system that passes through the dura mater and is known as the superficial back line (SBL). And in Cranio-cervical flexion exercise (CCFE), neck deep muscles are activated ,the premise behind these techniques is that the myofascial chain's superficial back line connects which links the neck to the lower extremity and the dura and suboccipital muscle fascia are connected by soft tissue in the cervical spine. As a result, if the tone of the suboccipital muscles is decreased (passively, with fascial therapy, or actively, with vigorous exercises), the tone of the flexors of the knees (hamstring muscles) will be reduced and the amplitude of hip flexion will be increased, raising the sit and reach test score and thereby increasing hamstring flexibility. Stretching has traditionally been used to increase flexibility, but a study found little support for stretching as a sole tool for hamstring injury prevention. Soft tissue mobilisation, Myofascial release techniques [12] and other recent developments for enhancing flexibility have been researched, but there is a paucity of literary works on long-term and combined intervention technique effects [13]. So to check the effectiveness of sub occipital muscle inhibition technique and and Cranio-cervical flexion exercise for increasing hamstring flexibility following techniques are compared because it is less time and energy consuming with efficient amount of results.

Aim and Objectives: The aim of this study is to investigate the effect of suboccipital muscle inhibition technique verses cranial cervical technique for increasing hamstring flexibility.

2. MATERIALS AND METHODS

Study Setting: The study will be conducted in Ravi Nair Physiotherapy College, Datta Meghe Institute of Medical Sciences, Deemed to be University, Sawangi (Meghe).

Study type: Comparative study.

Targeted population: People with hamstring tightness, Physiotherapy students.

Sample size consideration: This study protocol will be an independent

two-group study investigating the impact of suboccipital muscle inhibition technique verses cranial cervical technique for increasing hamstring flexibility. The number of patients participating in the study is determined by SPSS 27.0 V, Graph Pad Prism 7.0 V software

Sample size formula: Cochran formula.

2.1 Eligibility Criteria

Inclusion criteria: It involves Low back pain, 18-25 age (male and female both), and Physiotherapy student.

Exclusion criteria: It involves Any lumbar surgery, Any vertebral disc slip (Bulging Disk, Ruptured or herniated disk, Spondylosis, Spondylolisthesis, Any lower limb surgery.

2.2 Study Procedure

Students will be selected as per the inclusion criterion that have been mentioned above. The participants will be well informed about the aim of the research and will get informed consent. Initially 50 participants will be given with modified Oswestry scale and numerical pain rating scale and the participants with the moderate score of will be selected for the intervention. And then participants with hamstring tightness are chosen according to sit and reach test. The subjects will be divided into 2 different groups; each group will have 25 participants. Then they will be given pre and post interventional, readings will be recorded and exercise intervention will be given

for two weeks. After the result has been obtained, data collection and statistical analysis will be done then the conclusion will be given and research paper will be created according to the study and published.

2.3 Participant Timeline

Each patient will be required to complete 2 weeks of rehabilitation after enrolment in the study. The evaluations will be performed at baseline and at their last session.

2.4 Intervention Design

Group A: Suboccipital Muscle Inhibition

Technique: The therapist sits at the head end of the table, palms beneath the subject's head, pads of his fingertips on the posterior arch of the atlas, which will be palpated by the therapist between the external occipital protuberance and the spinous process of the axis vertebra. The therapist locates the gap between the occipital condyles and the spinous process of the C2 vertebra with the middle and ring fingers of both hands the therapist then rests the base of the skull on his or her hands, with toward the therapist. The pressure will be held at the same level for two minutes until tissue relaxation was achieved. The subject is asked to keep his eyes closed during the SMI technique to prevent eye movements disturbing the suboccipital muscle tone. The treatment was given for 6 days a week for two weeks the metacarpophalangeal joints flexed at 90 degrees. Pressure will be exerted in upward direction [14].

Group B: Cranio-cervical flexion exercise

(CCFE): Jull et al. defined a technique for training the deep craniocervical flexor muscles. The exercise targets the longus capitis and longus colli muscles of the upper cervical area, rather than the sternocleidomastoid and anterior scalene muscles that are superficial neck flexor muscles, which flex the neck but not the head. Furthermore, the exercise is designed to target the deep cervical flexors rather than the entire neck flexors, as is the case with a head lift. The exercise involved placing a towel roll suboccipitally to track the subtle flattening of the cervical lordosis that happens when the longus colli muscle contracts. The physical therapist identified the objective degree of flexion that the subject could sustain retraction for 10 seconds, without using dominating superficial neck flexor muscles, or a quick, jerky craniocervical flexion movement. The physical therapist used palpation

to monitor the contribution of the superficial muscles during the exercise. The subject's training began at the highest level he or she could reach with proper craniocervical flexion and no dominant use or replacement of the superficial muscles (sternocleidomastoid, hyoid, and anterior scalene muscles). The participants were instructed to perform a slow, coordinated craniocervical flexion. Then they were taught to maintaining increasingly greater ranges of craniocervical flexion. At each stage, the patient was instructed to complete three sessions of ten repetitions with a ten-second hold and a one-minute rest in between. The treatment was given for two weeks [15].

Stretch your hamstrings on the edge of your bed: Sit on the edge of a bed and place one leg along the bed's edge while the other leg is placed down with the foot resting on the floor for this stretch. Bend forward at the hips while maintaining a straight spine. Maintain as much straightness on the bed as possible without causing pain. Hold this stretch for 30 second .Repeat 3 times on each leg. Aim to perform this exercise twice daily.

And followed by this two respective technique convectional treatment will be given:

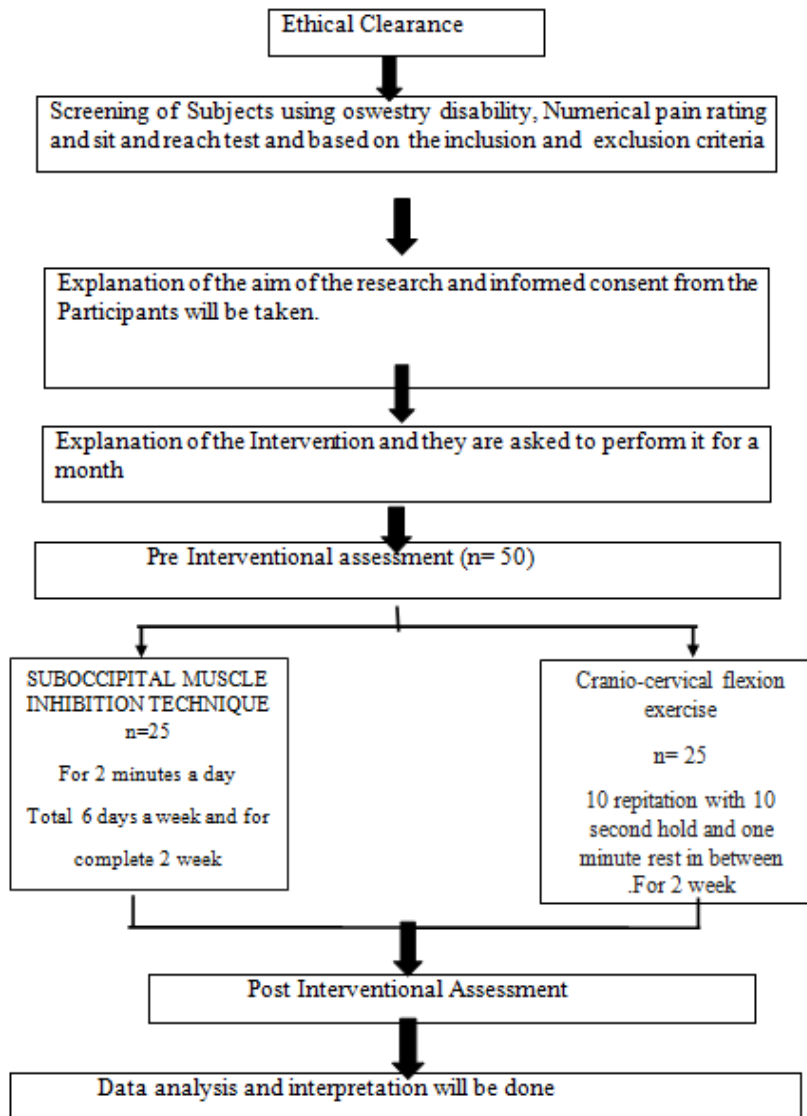


Fig. 1. Flowchart of study design Outcome measure

2.5 Primary

Sit and Reach Test (SRT): It is a single task clinical outcome measure that assesses dynamic equilibrium. It measures the maximum distance a person can reach forward when sitting in a fixed position, which is used to assess a patient's stability. The sit and reach test is a standard flexibility test that assesses the flexibility of the lower back and hamstring muscles [16].

2.6 Secondary

Numeric pain rating scale: The Numeric Pain Rating Scale (NPRS), a single-dimensional measure of pain severity in adults, is an outcome measure. The NPRS is a segmented numeric variant of the visual analogue scale (VAS) in which a participant chooses a number (0–10 integers) that best describes the severity of his or her pain [17].

Oswestry Disability Index (ODI): The most widely used outcome test for low back pain is the Oswestry Disability Index (ODI). The test is regarded as the 'gold standard' in terms of low back functional outcome measurement. The extent of perceived impairment in ten daily activities of daily living is investigated using a questionnaire [18].

3. EXPECTED RESULTS

Once the study is completed statistical analysis will be done using student paired t test and will be represented in the form of research paper.

4. DISCUSSION

The study protocol aims to evaluate hamstring tightness and severity of hamstring tightness in undergraduate students using sit and reach test. We hypothesize that as an intervention suboccipital muscle inhibition technique and cranial cervical technique is less time and energy consuming with efficient amount of results. The research will help to prevaricate the effectiveness of hamstring tightness on students with hamstring tightness and help improving the flexibility of hamstring tightness.

Sit and reach test [16] is a single task clinical outcome measure that assesses dynamic equilibrium. It measures the maximum distance a person can reach forward when sitting in a fixed position, which is used to assess a patient's

stability. The sit and reach test is a standard flexibility test that assesses the flexibility of the lower back and hamstring muscles.

5. CONCLUSION

The expected outcome include detection of hamstring tightness and improvement in hamstring tightness which will be evaluated using sit and reach test. Suboccipital muscle inhibition technique and cranial cervical technique will be given as an intervention to the participants to improve hamstring flexibility and work efficiently.

CONSENT

As per international standard or university standard, respondents' written consent will be collected and preserved by the author(s).

ETHICAL APPROVAL

The Institutional Ethics Committee (IEC) Clearance will be obtained from Datta Meghe Institute of Medical Sciences, Deemed to be University, Sawangi (Wardha).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
<https://www.sdiarticle4.com/review-history/74798>