



“A COMPARISON BETWEEN EFFECT OF MUSCLE ENERGY TECHNIQUE AND STATIC STRETCHING ON HAMSTRING FLEXIBILITY IN NURSING POPULATION .”

Physiotherapy

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ABSTRACT

Background: In The case of nursing job in hospitals and clinical settings, inappropriate working postures can contribute to the development of musculoskeletal disorders among workers. Musculoskeletal symptoms in this job may be attributed to high physical demands and inappropriate working postures that have to be maintained for a long period during a working shift. Due to this decrease in Hamstring flexibility .Hence the study aim comparison between effect of muscle energy technique (MET) and static stretching on hamstring flexibility in nursing population.

Aim: A comparison between effect of muscle energy technique (MET) and static stretching on hamstring flexibility in nursing population.

Material and Methods: Permission was taken from institutional ethical committee. 30 Nurses were assessed using HAMSTRING 90/90 STRAIGHT LEG RAISING TEST and Nurses diagnosed with hamstring muscle tightness. aged 25 years to 35 years; practicing since 1 and above years were selected. This study was a pretest - post test experimental study. The subjects were assessed by using range of active knee extension in a position of hip flexion by using “HAMSTRING 90/90 STRAIGHT LEG RAISING TEST” and goniometer was used for measuring range of motion of the knee joint.

Results: Data was analyzed and Out of 30 subjects, 23% were males and 77% were females who participated in our study. Both static stretching and Muscle Energy Technique (MET) groups showed significant improvements in hamstring flexibility. But Muscle Energy Technique (MET) had extremely significant ($p < 0.0001$) gains in knee extension ROM than static stretching after 8th days of treatment.

Conclusion: Both Muscle energy technique (MET) and Static stretching has improved hamstring flexibility in nursing population. Muscle energy technique resulted in better improvement as compared to static stretching on hamstring flexibility in nursing population.

KEYWORDS

Muscle Energy Technique, static stretching, flexibility, hamstring muscle

INTRODUCTION

The job-related factors that threaten health and safety of workers. Musculoskeletal symptoms in this job may be attributed to high physical demands and inappropriate working postures that have to be maintained for a long period during a working shift. This can be the case for nursing job in hospitals and clinical settings, wherever there are high levels of physical and mental demands during this job that threatens health standing of this working party.^{1,2}

There is evidence that inappropriate working postures can contribute to the development of musculoskeletal disorders among workers in different occupational groups.^{3,4} A number of previous studies have also shown a high prevalence of musculoskeletal symptoms in different body areas of nurses, particularly in the low back, the neck, shoulders and knees.^{5,6} The high prevalence of musculoskeletal symptoms in this job may be attributed to high physical demands and inappropriate working postures that have to be maintained for a long period during a working shift.

Nurses are at a high risk of the musculoskeletal pain due to high physical demands, work like such as heavy lifting and prolonged standing. According to a systematic review, 55%, 42%, and 36% of nurses experienced low back pain, a neck pain, and a lower extremity pain in the past year, respectively.⁷

There are a different of technique available for assessment of physical workload of employees during their work. Postural assessment is an important technique for evaluation of work activities in this regard. Many people are suffering from hamstring tightness. Depending on your posture hamstring muscle Which are a muscle group that tightens up quickly. The hamstrings extended on back of thigh. Tightness in this muscle can affect motion in the knee and leg pain . In many cases chronically tight hamstrings are not a result of the muscles being short and for stretch sensation in muscle, a stretching position of body in a constant state of length.

Our postural habits also contribute to their tightness. Work in nurses profession do in a lot of standing and sitting posture. sitting maintains gluteal muscles in lengthened a state causing them to become weak. When standing for long periods shift the hip forward and also disengaging glutes and a hamstring must work harder. The hamstring strains can also be one of the most disabling injuries to the lower extremity. In this study, the outcome measures used are HAMSTRING

90/90 STRAIGHT LEG RAISING TEST (reliability: ≥ 0.91). This test for hamstring muscle tightness diagnosis. Intervention used are Static stretching and Muscle Energy Technique (MET). Subjects were randomly assigned to two equal groups, Static stretching group and Muscle Energy Technique (MET) group.

Static stretching is the type of stretching where you take a muscle to its outer range, hold it until you can feel a gentle stretch in the muscle belly at that point. Stretches are usually held for between 20 and 60 sec. And should be pained free. Static stretches work because as you hold the position, with the muscle under tension, a stretch reflex cause muscle relaxation. Static stretching is most commonly performed type of stretching , partly due to it being the safest method of stretching due to the relatively low level of tension develop. Active stretches involve moving the joint through its range of motion and holding it at the stretch themselves.^{8,9}

Muscle energy technique (MET) may possibly be a manual procedure that uses controlled, voluntary isometric contractions of a target muscles and is wide advocated by authors within treatment that's presently utilised in many alternative manual medical aid professions.¹⁰ MET is claimed to be helpful for protraction a shortened muscle, up vary of motion at a joint and increasing evacuation of fluid from peripheral regions.¹¹ Autogenic Inhibition is a sub-maximal contraction of the muscle is followed by stretching of the identical muscle it is known and if a submaximal contraction of a muscle is followed by stretching of the opposite muscle then this is known as Reciprocal Inhibition MET .¹² Post Isometric Relaxation may possibly be the way utilised in study Post Isometric Relaxation may possibly be the way that was later developed by Karel Lewitt .¹³ Post Isometric Relaxation (PIR) is the effect of the decrease in muscle tone , after a brief period of submaximal isometric contraction of the same muscle.¹²

The aim of this study is to investigate and compares the effectiveness of the muscle energy technique (MET) and the static stretching in increasing a hamstring muscle flexibility in nurses.

Material and Methodology

Participants; 30 Nurses.

INCLUSION CRITERIA:

- Age group – 25 years – 35 years.

- Both Male and female.
- Nurses working since 1 year in this profession.
- Nurses diagnosed with hamstring muscle tightness.

EXCLUSION CRITERIA:

- Patients not willing to participate.
- Fracture of foot bones.
- Ligament injuries.
- Acute or chronic low back pain.
- Subjects who were already involved in any exercise program for lower extremity at the time of study.
- Any recent musculo - skeletal injuries.
- Subject suffering from varicose vein.

OUTCOME MEASURES :

HAMSTRING 90/90 STRAIGHT LEG RAISING TEST

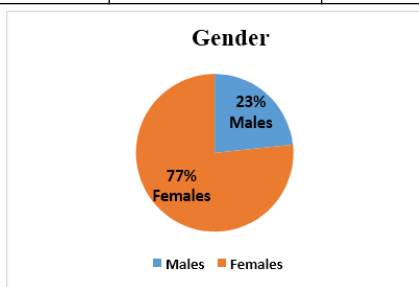
OBJECTIVES:

1. To study the effect of muscle energy technique (MET) on hamstring flexibility using “HAMSTRING 90/90 STRAIGHT LEG RAISING TEST” in nursing population.
2. To study the effect of static stretching on hamstring flexibility using “HAMSTRING 90/90 STRAIGHT LEG RAISING TEST” in nursing population.
3. To study the comparison between effect of muscle energy technique and static stretching on hamstring flexibility using “HAMSTRING 90/90 STRAIGHT LEG RAISING TEST” in nursing population.

RESULTS

Gender wise distribution of subjects in our study.

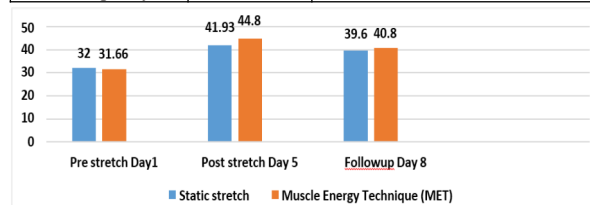
Gender	No. of Subjects	Percentage
Male	7	23%
Female	23	77%
Total	30	100%



Interpretation: Out of 30 subjects ,23% were males and 77% were females who participated in our study.

Comparison of Static stretching and Muscle Energy Technique (MET) score of the subjects.

Days	Static stretch	Muscle Energy Technique (MET)
Pre stretch Day1	32±4.8	31.66 ± 5.1
Post stretch Day 5	41.93±4.5	44.8 ± 5.2
Followup Day 8	39.6±4	40.8 ± 4.5



Interpretation :

Both static stretching and Muscle Energy Technique (MET) groups showed significant improvements in hamstring flexibility. Both treatment groups had extremely significant (p<0.0001) gains in knee extension ROM after 5th and 8th days post stretching exercise. But Muscle Energy Technique (MET) had extremely significant (p<0.0001) gains in knee extension ROM than static stretching after 8th days of treatment. Results of followup test showed significant difference in both groups. The followup values were higher than that of the baseline measurement but lower than that post intervention value.

DISCUSSION

The present study was conducted to find the effect of muscle energy technique (MET) and static stretching on hamstring flexibility in nursing population. In the present study, 30 nurses were selected depending upon the inclusion and exclusion criteria, which included males and females nurses between the age group of 25 to 35 years. The nurses were assessed for muscle energy technique (MET) and static stretching using“ HAMSTRING 90/90 STRAIGHT LEG RAISING TEST”.

The gender distribution of our subjects ,Out of 30 subjects, 23% were males and 77% were females.Group A was static stretching and Group B was Muscle Energy Technique (MET). In Group A-Static Stretching, there were 27% males and 73% females. In Group B- Muscle Energy Technique (MET) there were 20% males and 80% females.

The Age of subjects in our study, out of 30 subjects, in Group A their mean age of 15 subjects is 28.6 ± 3.35 years and in Group B which had 15 subjects their mean age of 15 participants is 30.13 ± 3.04 years with p value < 0.20 .

Comparison mean value of pre and post static stretching reading. The p value was < 0.0001 which is significant . Kieran O’Sullivan et. al.(2009) underwent a study on effect of warm-up, static stretching and dynamic stretching on hamstring flexibility in previously injured subjects which concluded that Warm-up significantly increased hamstring flexibility. Static stretching also increased hamstring flexibility, whereasdynamic did not, in agreement with previous findings on uninjured controls. The effect of warm-up and static stretching on flexibility was greater in those with reduced flexibility post-injury.¹⁴ In our study in subjects were static stretching given, shows marked improvement in the hamstring muscle flexibility.

This occurs as a result of activation of initial stretch reflex which provides resistance to further elongation. But when the stretch is maintained for a prolonged period of time, the golgi tendon organ is activated which is the length tension monitor and brings about relaxation of the tensed muscle and help in further elongation.

Comparison mean value of pre and post Muscle Energy Technique (MET). The p value was < 0.0001 which is significant. Azadeh shadmehr,et al (2009) underwent a study on hamstring flexibility in young women following passive stretch and muscle energy technique which concluded that ten sessions of hamstring stretches in normal young women using either static stretch or MET had similar effect on restoring flexibility to hamstring.¹⁵ In our study Muscle Energy Technique (MET) showed significant improvement in hamstring flexibility. post isometric relaxation is the effect of the decrease in muscle tone in a single or group of muscles, after a brief period of submaximal isometric contraction of the same muscle.¹⁶

Post isometric relaxation works on the concept of autogenic inhibition. The golgi tendon organ, located between the muscle belly and its tendon, senses increased tension when the muscle contracts or stretches. When the muscle contracts, the golgi tendon organ is activated and responds by inhibiting this contraction (reflex inhibition) and contracting the opposing (antagonist) muscle group. This process is known as autogenic inhibition.¹⁶

Both static stretching and Muscle Energy Technique (MET) groups showed significant improvements in hamstring flexibility. Adel Rashad Ahmed (2011) underwent a study on comparative study of Muscle Energy Technique and Dynamic Stretching on Hamstring Flexibility in Healthy Adults which concluded that both the muscle energy technique and dynamic stretching improve hamstring flexibility in healthy adults.¹⁷In our study both treatment groups had extremely significant (p<0.0001) value gains in knee extension ROM after 5th and 8th days post stretching exercise. But Muscle Energy Technique (MET) had extremely significant (p<0.0001) gains in knee extension ROM than static stretching after 8th days of treatment. Results of followup test showed significant difference in both groups . The followup values were higher than that of the baseline measurement but lower than that post intervention value.

Over the past decade, several studies have evaluated changes in hamstring flexibility using various stretching techniques. In the current study, the effect of static stretching and Muscle Energy Technique

(MET) was examined on hamstring flexibility in nursing population. The results showed that both methods significantly improved the hamstring flexibility but there is effectiveness of the Muscle Energy Technique (MET) than static stretching on hamstring flexibility in nursing population.

motion in the lower extremity. *Br sport Med* 33(1999),259-263.

In this study, we observed that three set of muscle techniques with an isometric contraction of 50% and a hold time of 10 sec can significantly improve the hamstring flexibility. The effect of different isometric contraction intensities (i.e. 20%, 60%, 100% MVIC) using PNF technique. The results demonstrated that the hamstring flexibility had considerably improved in all group and there was no significant difference in term of effectiveness between 20% and 100% MVIC. Isometric contraction higher than 70% may reduce the muscles blood flow and oxygen supply that prevent optimal muscle relaxation and increase the of muscle cramps.¹⁸ For this reason, in the present study, used a 50% isometric muscle contraction.

In the present study, three active static stretches were given, 30 seconds each, over a 5 consecutive days and on 8th day period. This protocol to be effective in increasing the hamstring flexibility. Stretching for five and fifteen seconds could improve the passive ROM but it was only the 15 seconds stretch which improved the active ROM.¹⁹ On the other hand, in the study Where subjects were given a 15, 30, or 60 second stretch, it was suggested that a 15-second stretch did not offer a significant advantage for improving hamstring flexibility. These authors concluded that 30-second stretch was long enough to improve the hamstring flexibility.²⁰ The present study showed that both method of Satic stretching and Muscle Energy Technique-(MET) found to produce significantly greater gains in range of motion on both Group A & Group B, suggesting that both these techniques were effective for increasing hamstring flexibility. At the time of follow-up, the values of hamstring flexibility were higher than that of the pre-test but a decline in the values was seen post-test values. Results also suggested that a longer period of intervention may produce further gains in muscle flexibility. It should be noted that all the subjects in this study before treatment, subject experienced heaviness in leg, mild leg pain during work time but after treatment program of Satic stretching and Muscle Energy Technique all the subject experienced relief from Leg pain and heaviness in leg.

REFERENCE

1. Suzuki K, Ohida T, Kaneita Y, Yokoyama E, Miyake T, Harano S. et al. Mental health status, shift work, and occupational accidents among hospital nurses in Japan. *J Occup Health*. 2004;46:448-54. doi: 10.1539/joh.46.448.
2. Dianat I, Sedghi A, Bagherzade J, Asghari-Jafarabadi M, Stedmon AW. Objective and subjective assessments of lighting in a hospital setting: implications for health, safety and performance. *Ergonomics*. 2013;56:1535-45. doi: 10.1080/00140139.2013.820845
3. Teodoroski R, Koppe VM, Merino E. Old scissors to industrial automation: the impact of technologic evolution on worker's health. *Work*. 2012;41:2349-54. doi: 10.3233/WOR-2012-0463-2349.
4. Dianat I, Kord M, Yahyazade P, Karimi MA, Stedmon AW. Association of individual and work-related risk factors with musculoskeletal symptoms among Iranian sewing machine operators. *Appl Ergon*. 2015;51:180-8. doi: 10.1016/j.apergo.2015.04.017.
5. Alexopoulos EC, Burdorf A, Kalokerinou A. Risk factors for musculoskeletal disorders among nursing personnel in Greek hospitals. *Int Arch Occup Environ Health*. 2003;76:289-94. doi: 10.1007/s00420-003-0442-9
6. Tinubu BM, Mbada CE, Oyeyemi AL, Fabunmi AA. Work-related musculoskeletal disorders among nurses in Ibadan, South-west Nigeria: a cross-sectional survey. *BMC Musc Dis*. 2010;11:12. doi: 10.1186/1471-2474-11-12
7. Davis KG, Kotowski SE. Prevalence of musculoskeletal disorders for nurses in 299 hospitals, long-term care facilities, and home health care: A comprehensive review. *300 Factors* 2015; 57(5): 754-792.
8. Depino GM, Webright WE, Arnold BL. Duration of maintained hamstring flexibility following cessation of an acute static stretching protocol. *J athl Train* 2000;39:594-8
9. LYCHOLAT, T. (1990) *The complete book stretching*. UK: The Crowood press.
10. DePino G, Webright W, Arnold B. Duration of maintained hamstring flexibility after cessation of an acute static stretching protocol. *Journal of Athletic Training* 2000, 35(10):56-59
11. Greenman, P.E.: *Principles of Manual Medicine*, third ed. Lippincott Williams and Wilkins, Baltimore, 2003.
12. Chaitow L, Crenshaw K. *Muscle energy techniques*. Elsevier Health Sciences; 2006.
13. Lewit K, Simons DG. Myofascial pain: relief by post-isometric relaxation. *Archives of Physical medicine and rehabilitation*. 1984 Aug;65(8):452-6.
14. Patel PR, Yadav AO. Comparison of Static Stretching Versus Eccentric Training to Increase Flexibility of Hamstring Muscle in Healthy Hospital Nurses. *Indian Journal of Physiotherapy & Occupational Therapy*. 2013 Apr 1;7(2).
15. Shadmehr A, Hadian MR, Naiemi SS, Jalaie S. Hamstring flexibility in young women following passive stretch and muscle energy technique. *Journal of back and musculoskeletal rehabilitation*. 2009 Jan 1;22(3):143-8.
16. Bandy WD, Irion JM, Briggler M. The effect of time and frequency of static stretching on flexibility of the hamstring muscles. *Phys Ther*. 1997, 77(10):1090-1096.
17. Ahmed AR. A comparative study of muscle energy technique and dynamic stretching on hamstring flexibility in healthy adults. *Bulletin of Faculty of Physical Therapy*. 2011;16(1).
18. Chaitow L, Crenshaw K. *Muscle energy techniques*. Elsevier Health Sciences; 2006.
19. J.B.Feland and H.N.Marin, Effect of submaximal contraction intensity in contract-relax proprioceptive neuromuscular facilitation stretching. *Br J Sports Med* 38(2004),E18.
20. J.M.Roberts and K.Wilson, effect of stretching duration on active and passive range of