



IMMEDIATE EFFECT OF ACTIVE RELEASE TECHNIQUE ON HAMSTRINGS TIGHTNESS IN FEMALES DOING 6 TO 8 HOURS OF SITTING JOB

Physiotherapy & Rehabilitation

**Dr Deeksha
Kamble**

Dr Shobha Bhave Professor.

**Dr Umanjali
Damke** Principle And Professor.

**Dr Nilesh Shravan
Sakharkar*** Lecturer. *Corresponding Author

ABSTRACT

Introduction-hamstring muscle group resides in the posterior compartment of the thigh, consists of semitendinosus, semimembranosus and biceps femoris muscles (1). It acts as flexors of the knee and the extensors of the hip joint (2). Lack Hamstring flexibility contributes to reduced range of motion of knees and hips, impaired postural balance, increased risk of musculoskeletal and soft tissue injuries. Numerous factors influencing the hamstring flexibility includes the age, gender, race, tissue temperature, stiffness and awkward posture (3,4). **Objective**- to compare Pretreatment and Post treatment Popliteal angle after giving Active release Technique to tight hamstring muscle in females doing 6-8 hours sitting job **Methodology**- total 70 female subjects screened 60 subjects fulfilled inclusion criteria and were included in the study 10 did not report so they were excluded thus total of 50 subjects participated in the study. Subject was assessed for hamstring tightness using the Active Knee Extension test (Popliteal angle). **Results**- the mean value of popliteal angle pre-treatment (27.92 ± 4.00) was decreased post treatment (15.24 ± 3.19). The difference was highly significant (p value <0.0001). **Discussion**- the present study aimed to evaluate immediate effect of active release technique on hamstring tightness in females doing 6-8 hours of sitting job. It was found from our study that Extended hours of sitting causes hamstrings tightness and it was seen that there is a tendency of increase in hamstring tightness with increase in the sitting hours. **Conclusion**- the present study concluded that Active Release Technique is effective in improving hamstring flexibility in working women doing 6-8 hours of sitting job.

KEYWORDS

INTRODUCTION

Hamstring muscle group resides in the posterior compartment of the thigh, consists of semitendinosus, semimembranosus and biceps femoris muscles (1). It acts as flexors of the knee and the extensors of the hip joint (2). Lack Hamstring flexibility contributes to reduced range of motion of knees and hips, impaired postural balance, increased risk of musculoskeletal and soft tissue injuries. Numerous factors influencing the hamstring flexibility includes the age, gender, race, tissue temperature, stiffness and awkward posture (3,4). Tight hamstrings are associated with a dysfunctional motor control pattern and this pattern leads to a submaximal firing pattern of postural muscles resulting in function of hamstrings as stabilizers rather than their main function of prime movers. This change in primary function leads to the presentation of hamstring tightness (5). Now a days most of the professions require prolonged sitting on chairs like bank clerks, accountants, computer/ visual display unit users, stock exchange worker, architects, industrial workers, etc (6). Recent studies shows that the people with prolonged hours of chair sitting are more prone to develop hamstring tightness as during prolonged sitting hamstring muscle becomes inactive and is consequently held at shortened length (3,7). Prolonged sitting posture has negative impacts on biomechanical and physiological perspective that is 50% of the body's muscles contract to hold the body motionless while resisting gravity and the static forces costs more energy than dynamic movements (8,9). Sitting for longer duration hours may be a contributing factor for reduced hamstring flexibility (10,9). Sedentary life style is associated with muscle shortening as well as obesity, which is linked to chronic health problems (11).

Employed women are two to five times more likely than men to report musculoskeletal problems. Higher prevalence among the women reflects the accumulation of many factors related to domestic work load, office work load and biological difference which makes them susceptible to numerous musculoskeletal problems (7,12).

Several researchers have identified importance of hamstring flexibility as crucial marker for optimal physical fitness and quality of life (3,13).

Many physiotherapy interventions (static, ballistic stretching and proprioceptive neuromuscular facilitation, mulligan bent leg) have

been used in clinical practice to improve the flexibility of hamstring muscle (3).

While going through the literature, we observed that ART has been relatively unexplored. Various studies support its benefits on adductor strain, tennis elbow, snapping hip and on carpal tunnel syndrome (14,15,16,17). But only few studies have investigated the use of active release technique on hamstring tightness on women of age group of 25-40 years.

Hence this study is intended to evaluate the effect of active release technique for hamstring tightness in females doing 6-8 hours of sitting job

AIM-

To study the immediate effect of active release technique on hamstrings tightness in females doing 6-8 hours of sitting job.

OBJECTIVE-

To compare Pretreatment and Post treatment Popliteal angle after giving Active release Technique to tight hamstring muscle in females doing 6-8 hours sitting job

METHODOLOGY

Permission and approval to carry out the research work was obtained from Head of the institution and Institutional ethical committee.

Inclusion Criteria:

Females between age group 25-40 years, those who have prolonged sitting of 6-8 hours per day, females having hamstrings tightness more than 20 degrees.

Exclusion Criteria:

Females with acute or chronic low back pain, hamstring injury, history of surgery of the knee, hip or lumbosacral region, pregnant women, spinal Neurological abnormality, any spinal and lower limb deformity

PROCEDURE-

Total 70 female subjects screened 60 subjects fulfilled inclusion criteria and were included in the study 10 did not report so they were excluded thus total of 50 subjects participated in the study. Written

informed consent was taken from the participants, explaining the study procedures, possible benefits of the study, right to withdraw from the study, confidentiality in detail in a language they understand. Pre participation evaluation form consist of personal database, history and popliteal angle was taken. Subjects underwent screening process to establish the presence of hamstring tightness by measuring popliteal angle.

MEASUREMENT OF POPLITEAL ANGLE-

Subject was assessed for hamstring tightness using the Active Knee Extension test (Popliteal angle). The subject was taken in supine position with hips flexed 90° and knee flexed. A cross bar was used to maintain the proper position of hip and thigh. The testing was done on the involved lower extremity and subsequently opposite lower extremity and the pelvis was strapped down to the table for stabilization and control on accessory movements. Landmarks used to measure hip and knee range of motion was greater trochanter, lateral condyle of femur and the lateral malleolus marked by a skin permanent marker. The fulcrum of the goniometer was centered over the lateral condyle of the femur with the proximal arm secured along the femur using greater trochanter as a reference. The distal arm was aligned with the lower leg using the lateral malleolus as a reference. The hip and knee of the involved extremity being tested was placed into 90° flexion with the anterior aspect of thigh in contact with the horizontal cross bar frame at all times to maintain hip in 90° flexion. The subject was then asked to extend the involved lower extremity as far as possible until a mild stretch sensation is felt. A full circle goniometer was then used to measure the angle of knee extension. (FIG NO 1)



Fig No 1- Measurement Of Popliteal Angle

INTERVENTION:

Subjects received single session of Active release technique and it was given in 3 steps. Step 1: Subjects lies prone on the plinth and feet's hanging on the end of the table. Therapist stands on side of involved leg and then knee will be flexed so as to shorten the hamstrings. Gentle tension was given manually (with the use both thumb) by the therapist on the origin of hamstrings longitudinally & asked the patient to extend his knee. (Fig no 2)



Fig no 2- Starting Position Of Intervention End Position Of Intervention

Step 2: Subjects lies prone on the plinth and feet's hanging on the end of the table. Therapist stands on side of involved leg and then the knee was flexed so as to shorten the hamstrings. Gentle tension was given manually (with the use of both thumb) by the therapist on the insertion of hamstrings longitudinally & asked the patient to extend his knee. (fig no 3)

Steps 3: Again patient taken in prone position and gentle tension was applied along the length of the muscle manually (with the use of both thumb) by the therapist and asking the patient to extend his knee. This

contact was held for a short time (5-20s) and performed 3-5 times. (fig no 4)

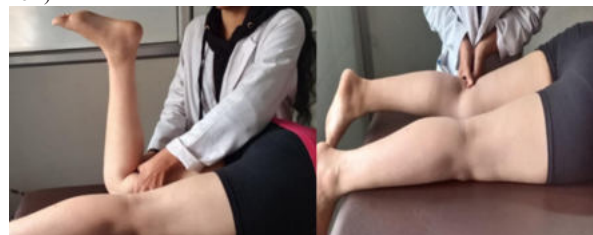


Fig no 3- Starting Position Of Intervention End Position Of Intervention

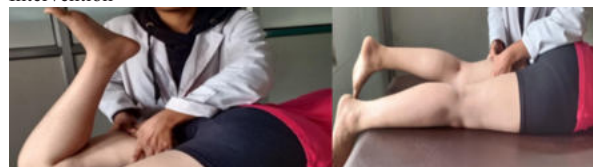


Fig No 4- Starting Position Of Intervention End Position Of Intervention

RESULTS

Table No.1 Age Distribution Of Study Population.

AGE IN YEARS	NO. OF CASES	PERCENT %
25 – 30	21	42
31 – 35	17	34
36 – 40	12	24
TOTAL	50	100

Table No 2: Comparison Of Pre Treatment Popliteal Angle With Post Treatment Popliteal Angle

	POPLITEAL ANGLE	
	PRE TREATMENT	POST TREATMENT
MEAN	27.92	15.24
SD	4.00	3.19
t-VALUE	26.1766	
P-VALUE	<0.0001, HS	

The mean value of popliteal angle pre-treatment (27.92 ± 4.00) was decreased post treatment (15.24 ± 3.19). The difference was highly significant (p value <0.0001).

DISCUSSION

The present study aimed to evaluate immediate effect of active release technique on hamstring tightness in females doing 6-8 hours of sitting job. Our study included 50 working female doing 6-8 hours of sitting job with hamstrings tightness more than 20 degree on active knee extension test (popliteal angle). Result of the study demonstrated that active release technique increases hamstrings flexibility and range of motion immediately post intervention.

Ghulam Fatima in there study studied effect of extended sitting can cause hamstring. It was a cross-sectional study comprised over a period of 24 weeks, 200 students who have more than 6 hours of sitting and their age range between 16 and 30 years was selected in the study and it was seen that as the sitting hour's increases there was higher tendency of hamstring tightness. Highly significant difference between mean of SLR angle and chair sitting hours per day, i.e., $P = 0.000$ was seen (10). In our study we also found higher hamstring tightness in female doing 6-8hours of sitting job.

Sandeep S in their research stated that the working females with sitting jobs of more than 8-10 hours may have preponderance for the development of hamstring tightness (3).

Active release technique is proposed by **Dr. P. Michael Leahy**. He proposed when movement occurs, muscles, tendons, fascia, and nerves also have to move. Some of this movement will occur relative to other fiber bundles in the same muscle, some across other tissue structures. If layers of tissue that need movement across each other are adhered to each other, movement will be restricted, as symbolized in the "fascial sweater" Tissues within a muscles a structure can't freely elongate, there will be restricted movement. As a muscle shortens, fibers can broaden and separate laterally from each other (i.e., they are cross-linked together) and then movement will be restricted.

There was immediate increase post-intervention hamstring flexibility and range of motion, this was supported by **James W. George et al (2006)** who reported increase in flexibility and ROM of hamstring muscle immediately after the ART treatment. Active release technique releases the scar tissue adhesions to allow full lengthening of the muscle and to regain flexibility for functional use (17).

Shraddha Kothawale 2018 in there study compared the effect of positional release technique and active release technique on asymptomatic female subjects with aged group of 18-30years having hamstrings tightness measured by Active knee extension test (AKE). Popliteal angle less than 70 were included in the study. They stated that Active Release Technique group showed marked improvement in Active Knee extension and sit to reach test after five days of intervention. They concluded Active release technique (ART) offers a much better approach than other techniques, it is an advanced massage technique, designed specifically to release and relieve tension found in muscles, tendons and fascia (18).

T murugadoss (2019) carried out a comparative study on effectiveness of muscle energy technique and ART in management of hamstrings tightness among athletes. They found that group treated with ART showed significant reduction of tightness than treated with muscle energy technique as ART is a combination of site specific manual pressure with precise patient movements (19).

Hariharasudhan Ravichandran conducted a case study on Active Release Technique in Hamstrings Strain: Rehabilitation and Return to Play in 2017 explained that repetitive micro-injury in tight muscles leads to an increase in the friction and tension what is termed the “chronic cycle,” or it leads to the “inflammation cycle” whereby a tear or crush injury ensues, followed by inflammation. Both of these cycles lead to the same result. An accumulation of adhesions and fibrosis within the tissue this in turn increases the tightness of the tissue. Active release technique restores free and unimpeded motion of all soft tissue, it re-establishes optimal texture, resilience and function of soft tissues (20).

It was found from our study that Extended hours of sitting causes hamstrings tightness and it was seen that there is a tendency of increase in hamstring tightness with increase in the sitting hours. Since work environments have become increasingly automated and computerized, many workers may be living more sedentary life style and spending a greater proportion of their living in sitting. The prolonged sitting causes the hamstring to go for the shortened position which predisposes to hamstring tightness. Active Release Technique causes significant improvement in hamstring flexibility. It can be used in adjunct to conventional techniques to increase the flexibility of hamstring muscle.

CONCLUSION

The present study concluded that Active Release Technique is effective in improving hamstring flexibility in working women doing 6-8 hours of sitting job.

LIMITATIONS-

This study analyzed the immediate effect of active release technique on females having on hamstring tightness. Further studies can be carried out to examine long term effect of intervention

Large sample can be taken to ensure more reliability and external validity of results.

In future, studies can be done on different occupational individual having hamstring tightness.

Study can be carried out with different muscle groups.

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