

EFFECTIVENESS OF POSITIONAL RELEASE TECHNIQUE VERSUS ACTIVE RELEASE TECHNIQUE ON HAMSTRINGS TIGHTNESS

Shraddha Kothawale *, Keerthi Rao.

A.P.J Abdul Kalam college of Physiotherapy, Loni , Maharashtra , India.

ABSTRACT

Background: Hamstrings tightness a form of chronic dysfunction, is a sub-clinical problem often missed and manifests in form of musculoskeletal pain or injuries. Positional Release Technique (PRT) and Active Release Technique (ART) is a manual therapy technique of osteopathic origin. Its efficacy and effectiveness are under-researched, with little evidence available to guide the practitioners about the most useful and efficacious technique to increase the length of shortened muscles. Hence, this study aims at finding out an effective variant Positional Release Technique and Active Release Technique which has an immediate effect on hamstrings flexibility.

Objectives: The objectives of this study were to find out the effectiveness of Positional Release technique and Active Release technique on Hamstring Tightness.

Methodology: Sixty participants with hamstrings tightness meeting the inclusion and exclusion criteria were allocated into four groups: Group A:PRT , Group B:ART , with Twenty nine participants in PRT group and Twenty Eight in ART Group . Pre intervention and post intervention Active knee extension test (AKE) and Sit to reach test was measured using universal goniometer and measuring Scale to determine the effectiveness of the technique.

Results: Pre intervention the mean baseline scores of AKE and Sit to reach test for Group A, Group B, when compared to their post intervention scores showed a highly significant ($p < 0.01$) improvement.

Conclusion: Active Release Technique can be used as an effective physiotherapeutic intervention in reducing hamstrings tightness instantly.

KEY WORDS: Hamstrings tightness, Positional Release Technique, Active Release Technique, Active Knee Extension test, Sit to reach test.

Address for correspondence: Dr. Shraddha Kothawale, A.P.J Abdul Kalam college of Physiotherapy, Loni , Maharashtra , India. **E-Mail:** shrakothawale@gmail.com

Access this Article online	Journal Information
Quick Response code  DOI: 10.16965/ijpr.2017.265	International Journal of Physiotherapy and Research ICV for 2016 86.93 ISSN (E) 2321-1822 ISSN (P) 2321-8975 https://www.ijmhr.org/ijpr.html DOI-Prefix: https://dx.doi.org/10.16965/ijpr 
	Article Information
	Received: 20 Dec 2017 Peer Review: 20 Dec 2017 Revised: None
	Accepted: 15 Jan 2018 Published (O): 11 Feb 2018 Published (P): 11 Feb 2018

INTRODUCTION

Physical activity is defined as any bodily movement produced by skeletal muscles that result in energy expenditure. The energy expenditure can be measured in kilocalories [1]. Modern Physical Education commonly known as there is sports where pursuit of discipline freely formed such as biological, social and physical sciences. The benefits of physical fitness are numerous. The person who is physically fit has greater amount of strength, energy and stamina an

improved sense of well-being, better protection from injury because strong well developed muscles safeguard bones, internal organs and joints. Improves cardio respiratory function, according to Buche and Prentice (1985) [1]. Physical activity benefits many parts of the body- the heart, skeletal muscles, bones, blood (for example, cholesterol levels), the immune system and the nervous system and can reduce many of the risk factors of non-communicable disease (NCDs). There is now overwhelming

evidence that regular physical activity has important and wide ranging health benefits [2]. Lack of flexibility has been suggested as a predisposing factor to hamstring strains. Decreased hamstring flexibility is suggested to be one of the predisposing factors for hamstring strains and hamstring stretches are routinely used as part of a pre-exercise routine, usually after an aerobic warm-up. A wide array of stretching techniques exists for reducing hamstrings tightness. Almost more than ten different stretching techniques are known, ranging from static stretching, dynamic stretching, proprioceptive neuromuscular facilitation, muscle energy techniques, massage, Bowen technique, active release technique, myofascial release and many more. All these techniques differ in their mechanism of action but all aim to reduce muscle tightness [3-5].

The Positional Release Therapy is a type of manual therapy that may be used effectively in treating chronic and sub-acute muscle spasm and pain and disability that is often associated with it. Positional release techniques are based strongly on the work of Dr. Lawrence H. Jones: his work in 1950's resulted in publication of Strain and Counterstrain in 1964. Modern Positional Release Therapy (PRT) makes use of updated positioning and accessory equipment while preserving the original purpose and strategy of strain counterstrain [6].

Study has been done demonstrating that single session of Active release technique treatment is effective in a group of healthy, active male participants in improving hamstring flexibility. Active release techniques (ART) is classified as a multidisciplinary procedure that is practiced by numerous practitioners from a wide range of medical professions and disciplines, including Chiropractors, Physiotherapists, Massage Therapists, Kinesiologists, Occupational Therapists, and Sports physicians [7]. The goals of ART are to restore optimal tissue texture, tension and movement, restore the strength, flexibility, function, and relative translation between soft tissue layers, release any soft tissue restrictions, entrapped nerve, restricted circulatory structures, or lymphatic restrictions. ART is used to find the specific tissues that are restricted, physically work on the soft tissues back to their

normal texture, tension, and length by using various hand positions and soft tissue manipulation methods.

ART and Positional release technique has been proved separately to be effective in improving hamstring flexibility in previous studies. But there is limited study done comparing these two techniques i.e ART and PRT for the hamstring muscle tightness. Hence, the aim of present work is to study and compare the effectiveness of Active release technique and PRT in normal healthy subjects with hamstring tightness.

MATERIALS AND METHODS

Under convenience sampling, 40 Subjects were recruited from the A.P.J .Abdul Kalam college of Physiotherapy, Loni. The subjects were randomly divided into two groups, Group A (Positional release technique) and Group B (Active release technique) leg raise. All subjects read and signed an informed consent form approved by the Institutional review board of the University.

Inclusion criteria: Asymptomatic female participants with hamstrings tightness aged 18-30 years, and hamstrings tightness measured by Active knee extension test (AKE) with popliteal angle less than 70° [8-10].

Exclusion criteria: Any history of lower extremity injury in past 3 months, Subjects involving in any sports and gymnasium activity, Unwilling to participate and sign in the informed consent, Acute or chronic hamstrings strain, limb length discrepancy and acute or chronic low back pain, Upper Motor Neuron lesion and Lower Motor neuron lesion [8].⁸

Outcome measures

Active Knee Extension Test (AKE): Sit to Reach flexibility test were measured pre and post intervention.

Popliteal angle: With the subject supine on plinth, with the help of goniometer angle is measured between thigh and calf.

Sit and reach flexibility test: Sit and Reach test is a wooden device with the following dimensions: length of base 35cm, width 45cm, height 32cm and length 55cm. To standardize the measurement scale of Sit and Reach, a measuring stick was placed on the sit and reach box for each test, with the reading of 23 cm in line with

the heel position of each test. The participants sat on the bed and fully extended two legs so that the sole of the foot was flat against the end of the box. They extended their arms forward, placing one hand on top of the other. With palms down, they reached forward sling hands along the measuring scale as far as possible without bending the knee of the extended leg. Throughout testing, the physiotherapist checked to ensure that the heel remained at the 23 cm mark. Three trials were performed on one side. The forward reach scores were recorded in centimeters to the nearest 0.5 cm using the scale on the box [10].

Statistical Analysis: The statistical analysis was done using t-test to compare between the groups and within the group and level of significance was set up at $p < 0.01$.

RESULTS AND TABLES

Out of these, sixty participants agreed to participate in the study. The participants were divided into two groups Group A- Positional Release Technique for Twenty nine participants and Group B-Active release technique Twenty eight participants. The groups were named as: Group A-PRT group, Group B- ART group.

Table 1: Baseline demographic and clinical data among groups.

Demographic Characteristics	Group A	Group B	P value
Age (years)	20.48 ± 1.29	20.60 ± 1.66	0.54
Weight (kg)	56.31±11.49	55.00±9.24	0.63
Height (cm)	159.44±5.62	162.500±7.92	0.09
BMI (kg/m ²)	21.959±4.09	20.921±3.88	0.33

Table 2: Comparison of AKE among the groups.

Group	Pre Intervention (degrees)	Post Intervention (degrees)	t value	p value	Interference
Group A	55.000±8.098	61.207±8.938	11.332	$p < 0.0001$	Highly significant
Group B	59.179±7.024	66.571±6.636	17.211	$p < 0.0001$	Highly Significant

Test applied: Paired t test

Table 3: Comparison of Sit to reach test among the groups.

Groups	Pre Intervention (degrees)	Post Intervention (degrees)	T value	p value	Interference
Group A	15.517±4.469	21.448±3.531	14.609	$p < 0.0001$	Highly Significant
Group B	15.429±4.717	23.607±4.932	19.947	$p < 0.0001$	Highly Significant

Test applied: Paired t test

Table 4: Intra-group comparison of sit to reach test among the groups.

	Groups	N	Mean	Standard Deviation	T value	P value
Post Intervention	A	29	15.42	3.531	-0.82	0.007
	B	28	24.53	4.662		

Test applied: Unpaired t test

The group treated with Active release technique showed significant improvement in Popliteal angle ($p < 0.01$) and sit and reach flexibility test. ($p < 0.01$) as compared to Positional Release Technique Result also showed a significant difference within the groups post-intervention.

DISCUSSION

The result of the present study demonstrated that PRT and ART increases immediate post-intervention hamstring flexibility and range of motion. Both the groups showed improvement in Popliteal angle and sit and reach flexibility measurements. The reduction in spasm is due to PRT which acts on the muscle spindle mechanism and its associated reflex mechanism (which controls spasm) to promote a more normal firing of the spindle and a more normal level of tension in the muscle, which results in a more normal relationship within the various soft tissue surrounding the area. PRT technique works to reduce the hyperactivity of the myotatic reflex arc and to reduce the overwhelming afferent nerve impulses within the arc that may lead to an overflow of neurotransmitter into the associated dermatome, resulting in referred pain. This phenomenon is known as “facilitated segment”. PRT sets the stage for normal processes to occur more efficiently. Reduction in localized spasm increases range of motion, increases circulation and improves lymph drainage and increases the potential for more normal biomechanics [6].

Heggannavar et al. (2014) suggested that the role of PRT is to relieve the somatic dysfunction, which may be expressed as decreased joint play, loss of ROM and postural asymmetry. The muscle has to be held in the position of ease for 90 seconds. During this period, PRT affects proprioceptive activity and helps to normalize tone and set the normal length-tension relationship in the muscle. Thus there is elongation of the involved muscle fibre to its normal state [11].

The Active Release Technique group showed

marked improvement in Active Knee extension and sit to reach test after five days of intervention.

ART unique to other manual therapy. Patient's active movement puts the A in ART. Therapists use their hands to evaluate the underlying soft tissue. Benefits include breaking up of scar tissue. Muscle is able to lengthen which can increase ROM and strength. Muscle, tendon, ligaments are able to move more freely, which takes pressure off the nerve and can relieve pain [12]. This is supported by a study done by George JW (2006) et al which showed that there was increased flexibility and ROM of hamstring muscle immediately after the ART treatment [13].

Active release technique releases the scar tissue and adhesions to allow full lengthening of the muscle and to regain flexibility for functional use. Active Release Technique (ART), developed by Dr. Michael Leahy, proposed a mechanism to explain increased tissue stiffness or tension called the cumulative injury cycle. In this cycle, repetitive micro-injury in a tight muscle leads to an increase in the friction and tension within the myofascial structures. Active release technique (ART) offers a much better approach. It is an advanced massage technique, designed specifically to release and relieve tension found in muscles, tendons and fascia (the muscle covering). ART treatment works by breaking up adhesions and restoring integrity to the soft-tissue. In principle this is achieved by maintaining contact on the adhesion, with the muscle in a shortened position and elongating the muscle along its fibre orientation to break up the adhesion. The effect of Active release technique depends upon soft tissue injuries; the cumulative injury cycle is a self-perpetuating cycle that describes how acute injuries and soft tissue injuries can become chronic problems. As we follow the cycle around, it is very easy to see how each factor leads to, or continues to perpetuate, the cycle of injury [14].

CONCLUSION

This project serves as a part of my M.P.T. curriculum and I take this opportunity to extend my sincere gratitude and appreciation to all those who made this dissertation possible. I am ever grateful to my research guide Dr. Keerthi Rao,

Vice-Principal, College of Physiotherapy, Loni for her guidance, consistent encouragement, wisdom and patience. My sincere thanks go to Dr. Subhash Khatri, Principal, along with all the teaching staff for their unconditional support and motivation throughout the completion of this dissertation. I thank all the participants for their tolerance and co-operation.

Conflicts of interest: None

REFERENCES

- [1] Caspersen CJ, Powell KE, Christenson GM. Physical activity, exercise and physical fitness: definitions and distinctions for health-related research. *Public health Reports* 1985;100(2):126-131.
- [2] Carlson SA, Fulton JE, Pratt M, Yang ZE, Adams K. Inadequate Physical Activity and Health Care Expenditures in the United States. *Progress in Cardiovascular Diseases* 2015;57(4):315-323.
- [3] Kisner C, Colby L. *Therapeutic Exercise: Stretching*. 4th edition. New Delhi: Jaypee Brothers; 2002;171-215.
- [4] Page P, Frank C, Lardner R. *Muscle length testing. The Janda Approach: Restoration of Muscle Balance*. USA: Human Kinetics; 2010;93-110.
- [5] Standring S. *Gray's Anatomy: The Anatomical Basis of Clinical Practice*. Pelvic girdle, Gluteal region & thigh. 40th edition. Edinburgh: Elsevier; 2008:1349-1386.
- [6] Richard N. Pierce, *Positional Release Techniques* www.goeata.org.com.
- [7] Cindy Pirog *Active Release Technique (ART) PTA 236* Spring 2013.
- [8] Kage V, Ratnam R. Immediate effect of active release techniques versus mulligan bent leg raise in subjects with hamstring tightness: A randomized clinical Trial. *International Journal of Physiotherapy and research* 2014;2(1):301-304.
- [9] Smith M, Fryer G. A comparison of two muscle energy techniques for increasing flexibility of the hamstrings muscle group. *J Bodywk & Mvt Ther.* 2008;12:312-317.
- [10] Bakirtzoglou P, Ioannou P & Bakirtzoglou F. Evaluation of hamstring flexibility by using two different measuring instruments *Sport Logia* 2010;6(2):28-32.
- [11] Heggannavar A, Behere A. Effect of positional release therapy versus static stretching on subjects with hamstring tightness. *Romanian Journal of Physical Therapy* 2014;20(34).
- [12] Kage V, Bindra R. Effect of active release technique versus myofascial release on subjects with plantar fasciitis. 2015;101:702.
- [13] George JW, Tunstall AC, Tepe RE, Skaggs CD The effect of active release technique on hamstring flexibility: a pilot study. *Journal of Manipulative and Physiological Therapeutics* 2006;29(3):224-7.
- [14] Abelson B., Abelson K. *Release your pain*. 2nd ed. by Rowan Tree books Ltd. 2012.