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COMPARISON OF IMMEDIATE EFFECT OF MULLIGAN BENT LEG RAISE TECHNIQUE VS. PASSIVE STRETCHING ON HAMSTRING TIGHTNESS IN HEALTHY FEMALE VOLUNTEERS

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ABSTRACT

Background & Objective: Maintenance of flexibility is an essential component of any conditioning program in developing joint mobility, improving athletic performance and preventing injuries. Good flexibility also provides relaxation, ease muscle pain, helping quick recovery, reducing stress, keeping the body feeling loose and agile. When soft tissue adaptively shortness overtimes muscle strength can also be altered and length tension relationship of the muscle also altered. As the muscle shorter it no longer is capable of introducing peak tension and develops tight weakness. Flexibility in hamstring muscle group is necessary for the knee extension as well as many functional activities and in prevention of injury in which the muscle group is elongated over hip and knee simultaneously. The study is aimed to compare the effectiveness of Mulligan Bent Leg Raise technique and passive stretching on hamstring tightness.

Materials and Method: An experimental study was done to compare the Mulligan Bent Leg Raise (MBLR) technique and passive stretching on hamstring muscle tightness. The study was conducted in a physiotherapy college in Vadodara, India and ethical clearance was obtained from Institutional Review Board. Sixty healthy female volunteers after signing informed consent form within the age of 20 - 30 years with tight hamstring muscles were randomly assigned into two groups. Group-1, Receiving Mulligan Bent Leg Raise technique and Group-2, receiving passive stretching with knee extension. Straight Leg Raise was measured with measure tape in centimeters from tip of the heel perpendicular to the plinth before and immediately after intervention. Paired and independent t-test was used to analyze data for significant improvement and homogeneity between groups.

Conclusion: This study concludes that there is significant improvement in Straight Leg Raise in both the techniques but Mulligan Bent Leg Raise Technique is significantly more effective than passive stretching in healthy females with Hamstring muscles tightness or limited Straight Leg Raise.

BACKGROUND AND OBJECTIVE

Maintenance of flexibility is an essential component of any conditioning program in developing joint mobility, improving athletic performance and preventing injuries. Good flexibility also provides relaxation, ease muscle pain, helping quick recovery, reducing stress, keeping the body feeling loose and agile. When soft tissue adaptively shortness overtimes muscle strength can also be altered and length tension relationship of the muscle also altered. As the muscle

shorter it no longer is capable of introducing peak tension and develops tight weakness. Flexibility in hamstring muscle group is necessary for the knee extension as well as many functional activities and in prevention of injury in which the muscle group is elongated over hip and knee simultaneously.[1]

James and Karen et al have concluded that an increase in hamstring tightness may induce prolonged forefoot loading and through the windness mechanism be a factor that increases repetitive injury to the plantar fascia.[2]

Cooney KM., Sanders JO., Concha MC., Buczeh FL., have concluded that available knee extension, defined on the basis of clinical measures of first resistance to hamstring stretch, provides a biomechanical link between physical examination finding and dynamic limitation in terminal swing knee extension.[3]

Various researches[4-9] have been made on different technique for improving hamstring tightness. Mulligan Bent Leg Raise technique being one of the developed technique to train stretch receptor of the muscle spindle to immediate accommodate a greater muscle length. The goal of this technique is to regain and to re-establish normal range of motion of hip and knee joint and mobility of soft tissues around nee joint. The study is aimed to assess the effectiveness of Mulligan Bent Leg Raise technique on hamstring tightness, to assess the effectiveness of passive stretching on hamstring tightness and to compare the effectiveness of Mulligan Bent Leg Raise technique and passive stretching on hamstring tightness.

MATERIALS AND METHOD

An experimental study was done to compare the Mulligan Bent Leg Raise (MBLR) technique and passive stretching on hamstring muscle tightness. The study was conducted in a physiotherapy college in Vadodara, India and ethical clearance was obtained from Institutional Review Board. Sixty healthy female volunteers after signing informed consent form within the age of 20 - 30 years with tight hamstring muscles i.e. subjects with decreased Straight Leg Raise (SLR) test (less than 70 cm) were randomly divided in to two groups thirty each, Group-1: Receiving Mulligan Bent Leg Raise technique with 3 repetition of pain free five second isometric contraction of the hamstring muscles and Group-2: Receiving passive stretching with knee extension with 3 repetition of 30 second hold for hamstring muscles for both sides, first right side was completed and then the left side. SLR was measured with measure tape in centimeters from tip of the heel perpendicular to the plinth before and immediately after intervention.

Procedure

Mulligan Bent Leg Raise Technique

Physical Therapist stands at the side of the subject while the subject is in supine. Firstly stretch the right side and then on the left side. Place subject's flexed knee over Physical Therapist's shoulder and now ask her to push away with her leg and then relax. At this point push her bent knee up as for as you can in the direction of her shoulder on the same side provided there is no pain. It is painful after the direction by taking her leg more medially or laterally. Sustain for thirty seconds and lower the leg to the bed with the bent knee over your shoulder. After being repeated 3 times you expect a marked

improvement when you again to SLR. Place your one hand under her knee and clasp under her heel with other. You flex her hip as for as possible keeping her knee flexed. The heel would now be off the bed. The patient is now asked to push her leg down to the bed against your resistance and then relax. At the point you raise the leg gently as for as you can from the bed maintaining or increasing the knee flexion and introducing some hip-abduction at the same time. There must be no pain if painful after the directions of raised leg medially or laterally or even add some hip rotation. If still painful abandon the technique. As with the knee over your shoulder repeat 3 times and then reassess.[10]

Technique Used For Passive Stretching

With the subject's knee fully extended support the patient's lower leg with your arm or shoulder. Stabilize the opposite extremity along the anterior aspect of thing with your other hand or a belt or with the assistance of other person. With the knee in maximum extension, flex the hip as for as possible. Alter the position. Kneel on the mat and place the subject's heel against your shoulder place both of your hands along the anterior aspects of the distal femur to keep the knee extended. The opposite extremity is stabilized in extension by a belt or lower and held in place by therapist's knee.[1]

RESULTS

Table-1 shows the Comparison of SLR value of Mulligan Bent Leg Raise Technique and passive stretching before and after intervention with paired t-test for both sides separately with its p value. In MBLR group for right side SLR value the mean ± SD before intervention is 63.70 ± 4.18 and after intervention is 79.65 ± 3.57, for left side before is 63.90 ± 3.75 and after is 78.70 ± 2.62 with $p < 0.001$ showing significant reduction in hamstring muscles tightness. In passive stretching group for right side SLR value the mean ± SD before intervention is 63.40±3.48 and after intervention is 72.75 ± 3.71, for left side before is 62.95 ± 3.57 and after is 72.05 ± 3.72 with $p < 0.001$ showing significant reduction in hamstring muscles tightness. Homogeneity of both groups before intervention was tested by using independent t-test, the p value for right side is equal to 0.807 and left side is 0.418 proves the same between groups. Inter group comparison of after intervention values are also done by using independent t-test which was showing $p<0.001$ for both sides conforms significant difference between the effect of two group with more changes in MBLR group than passive stretching group (with respect to mean values shown in table-1) which is shown in Table-2.

DISCUSSION

As a pre-treatment procedure thirty subjects satisfying inclusion criteria were selected for the study. Whole treatment procedure was explained to the all subjects. The subjects were divided in to two groups with fifteen in Mulligan Bent Leg Raise technique group and fifteen in Passive Stretching group. Before the treatment SLR was measured with measure tap from tip of the heel to perpendicular to the plinth.

The first group was given Mulling Bent Leg Raise technique with 3 repetition of pain free five second isometric contractions of the hamstring muscles. The second group was given Passive Stretching with knee extension with the 3 repetition of 30 second hold of the hamstring muscles. After the treatment again SLR was measured. The

difference was seen between pre and post measurement.

Hall T., Hardt S., Schater A. and Wallin L., (2005) have concluded that this study provides preliminary evidence for efficacy of the Mulligan Bent Leg Raise technique in improving SLR 24 hrs after treatment. Pain also improved but not more so than following the placebo.[11]

Halbertsma JP, Mulder I, Goeken LN, Eisma WH have said that the acute effect of repeated passive stretching of short hamstring muscles is negligible. With an instrumental straight-leg raising test, the relevant muscle variables can be examined noninvasively.[12]

Teys P., Bisset L. and Vicenzino B, have concluded that the result of Mulligan's mobilization with movement technique has an immediate positive effect on both Range of Motion and pain in subjects with painful limitation of shoulder movement.[9]

Vicenzino B., Paungmali A., Teys P, have said that there are an increasing no. of reports espousing the clinically beneficial effect of Mulligan's mobilization with movement techniques. The most frequent report effect is that of an immediate and substantial pain reduction accompanied by improved function. Prompted by these dramatic effects are questions regarding the mechanism of action that undergoes mobilization with movement.[13]

CONCLUSION

This study concludes that there is significant improvement in Straight Leg Raise in both the techniques but Mulligan Bent Leg Raise Technique is significantly more effective than passive stretching in healthy females with Hamstring muscles tightness or limited Straight Leg Raise.

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Table-1: Comparison of SLR value of Mulligan Bent Leg Raise Technique and passive stretching before and after intervention for right and left hamstring muscles by paired t-test

Intervention	Right Side				Left Side			
	Before	After	t	p	Before	After	t	p
MBLR	63.70 ± 4.18	79.65 ± 3.57	-28.041	.000	63.90 ± 3.75	78.70 ± 2.62	-28.967	.000
Passive stretching	63.40 ± 3.48	72.75 ± 3.71	-44.803	.000	62.95 ± 3.57	72.05 ± 3.72	-37.993	.000

Table-2: Inter group comparison of SLR value of Mulligan Bent Leg Raise Technique and passive stretching before and after intervention for right and left hamstring muscles by independent t-test

Inter group Comparison	Right Side		Left Side	
	t	p	t	p
Before	.246	.807	.819	.418
After	5.990	.000	6.538	.000