

EFFECTIVENESS OF MULLIGAN'S BENT LEG RAISE AND TWO LEG ROTATION TECHNIQUES TO IMPROVE HAMSTRING FLEXIBILITY IN RECREATIONAL FOOTBALL PLAYERS***Abhishek K. Taru and **Maman Paul**

*MPT (Ortho) Student, Department of Physiotherapy, GNDU, Amritsar

**Assistant Professor, Department of Physiotherapy, GNDU, Amritsar

Abstract: The purpose of this investigation was to find out the effectiveness of Mulligan's bent leg raise and two leg rotation techniques to improve hamstring flexibility in recreational football players. A total number of 40 football players between the age group of 18 to 28 years were recruited in the study according to the inclusion and exclusion criteria. Statistical analysis of data using the "Statistical Package for the Social Sciences" (SPSS) version 22.0 as quantitative tool were utilized for all statistical procedures. The values when compared between the groups were $t = 3.101$, $p = 0.0044$, found in post Two Leg Rotation v/s Bent Leg Raise on Right limb and $t = 2.632$, $p = 0.0137$, was in post Two Leg Rotation v/s Bent Leg Raise on Left limb, respectively using unpaired t-test, hence considered significant.

Keywords: *Hamstring, Flexibility, Football, Players.*

Introduction

The tightness of a muscle is a limiting factor for optimal performance which includes daily activities of an individual [1]. The term muscle tightness refers to the adaptive shortening of the contractile and the noncontractile elements of the muscle [2]. Hamstring muscle is the most common group of muscle to get involved due to overuse stress placed on it [3]. Hamstring muscle is a postural muscle and is bi-articular, tending to shorten even under normal circumstances. Since it is a superficial two-joint muscle, it tends to get very tight which further leads to muscle imbalance giving rise to a few postural problems. The prevalence and incidence of hamstring tightness in normal individuals in day-to-day life is high owing to lack of regular exercise and limited activity [4]. Muscular flexibility is an important aspect of normal human function. Limited flexibility has been shown to predispose a person to several musculoskeletal overuse injuries and significantly affect a person's level of function [5]. 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 [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 [7]. Mulligan's method was proven to improve hamstring mobility. It's particularly useful for people who have a substantial symmetrical deficit in straight leg raise (SLR) [8]. Two-leg rotation (TLR) is a simple method that could be used on anyone who has tight hamstrings, low back pain, and restricted or uncomfortable Straight Leg Raise (SLR) [9].

Study Population

A total number of 40 football players between the age group of 18 to 28 years were recruited in the study according to the inclusion and exclusion criteria. The subjects were equally and randomly divided into 2 groups as follows:

- Group-A: This group includes 20 subjects receiving Mulligan's Bent leg raise technique.

- Group-B: This group includes 20 subjects receiving Mulligan’s Two leg rotation technique.

Study Design

Design : Experimental design.
 Source of Data : Guru Nanak Dev University, Amritsar.
 Sample Size : 40.

Statistical Analysis

Statistical analysis of data using the “Statistical Package for the Social Sciences” (SPSS) version 22.0 as quantitative tool were utilized for all statistical procedures.

Results

Present study was conducted to compare the effect of Two Leg Rotation v/s Bent Leg Raise on hamstring tightness. Intra-group analysis was done using paired t-test within the groups and unpaired t-test for comparison between the two groups.

Table-1: Showing pre and post values of Two Leg Rotation on right limb.

	Pre	Post	t value	p value
Two Leg Rotation (right) Mean + SD	84 ± 8.7	92 ± 4.4	5.17	0.0001

Table-1 showed the pre and post values of Two Leg Rotation on right limb. The mean of pre value is 84 and standard deviation value is 8.7. The mean of post value is 92 and standard deviation value is 4.4. The t value is 5.17 and p value is 0.0001.

Figure-1: showing pre and post values of Two Leg Rotation on right limb.

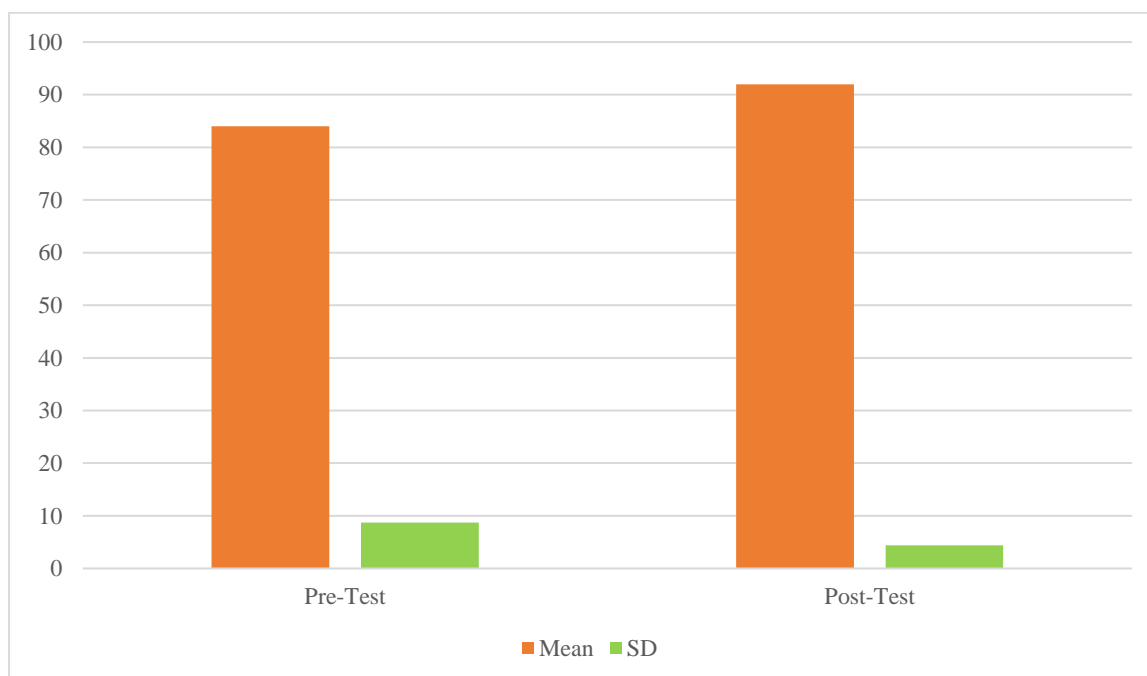


Table-2: showing pre and post values of Two Leg Rotation on Left limb.

	Pre	Post	t value	p value
Two Leg Rotation	81.8 ± 8.4	93.2 ± 10.4	7.020	0.0002

(left) Mean + SD				
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Table-2 showed the pre and post values of Two Leg Rotation on left limb. The mean of pre value is 81.8 and standard deviation value is 8.4. The mean of post value is 93.2 and standard deviation value is 10.4. The t value is 7.020 and p value is 0.0002.

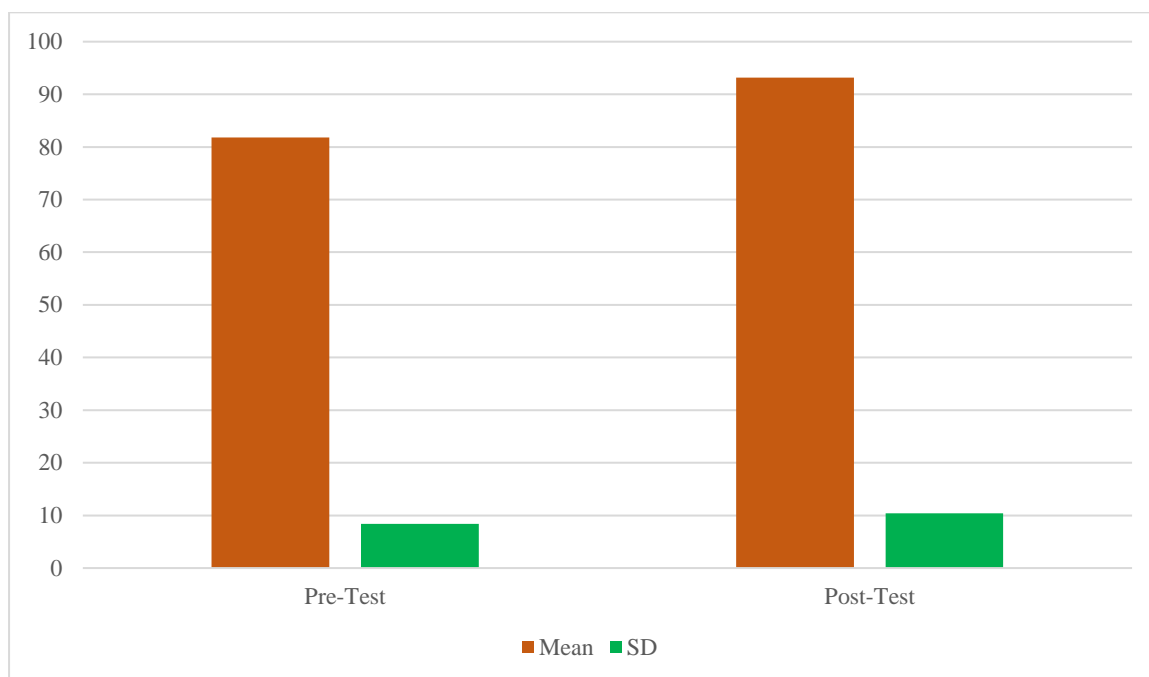


Figure-2: Showing pre and post values of Two Leg Rotation on Left limb.

Table-3: Showing pre and post values of Bent Leg Raise on Right limb.

	Pre	Post	t value	p value
Bent Leg Raise (right) Mean + SD	81 ± 6.6	81.5 ± 7.5	3.340	0.0049

Table-3 showed the pre and post values of Bent Leg Raise on right limb. The mean of pre value is 81 and standard deviation value is 6.6. The mean of post value is 81.5 and standard deviation value is 7.5. The t value is 3.340 and p value is 0.0049.

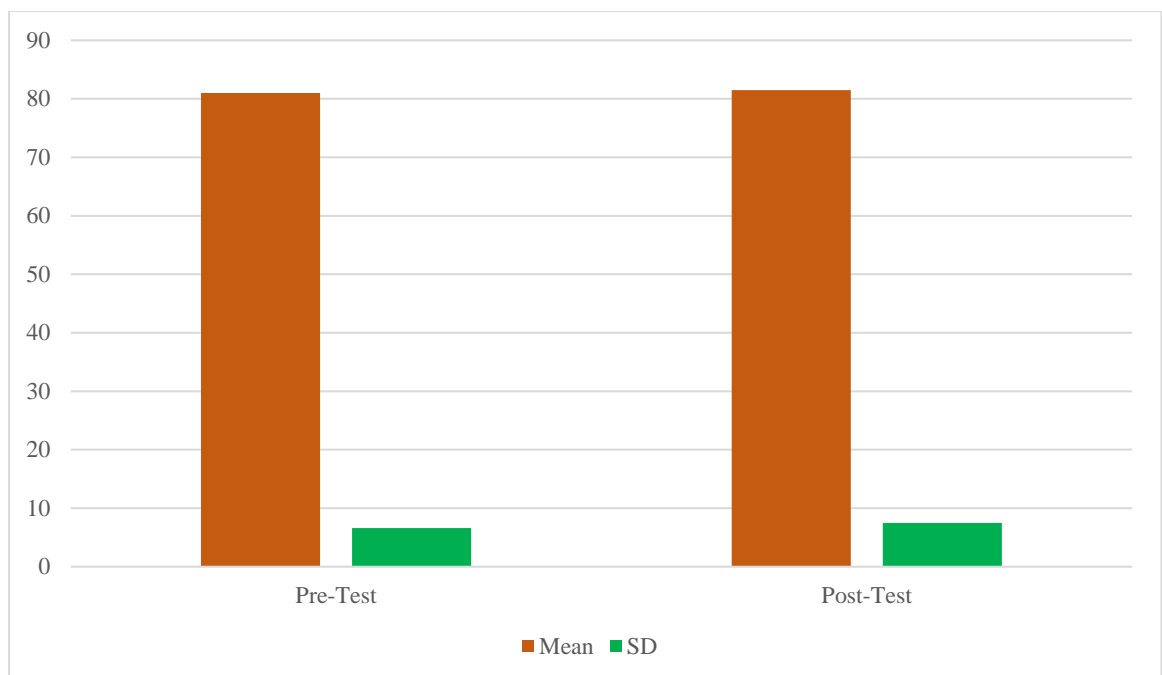


Figure-3: Showing pre and post values of Bent Leg Raise on Right limb.

Table-4: Showing pre and post values of Bent Leg Raise on Left limb.

	Pre	Post	t value	p value
Bent Leg Raise (left) Mean + SD	79.4 ± 8.0	84.2 ± 7.9	4.146	0.0010

Table-4 showed the pre and post values of Bent Leg Raise on left limb. The mean of pre value is 79.4 and standard deviation value is 8.0. The mean of post value is 84.2 and standard deviation value is 7.9. The t value is 4.146 and p value is 0.0010.

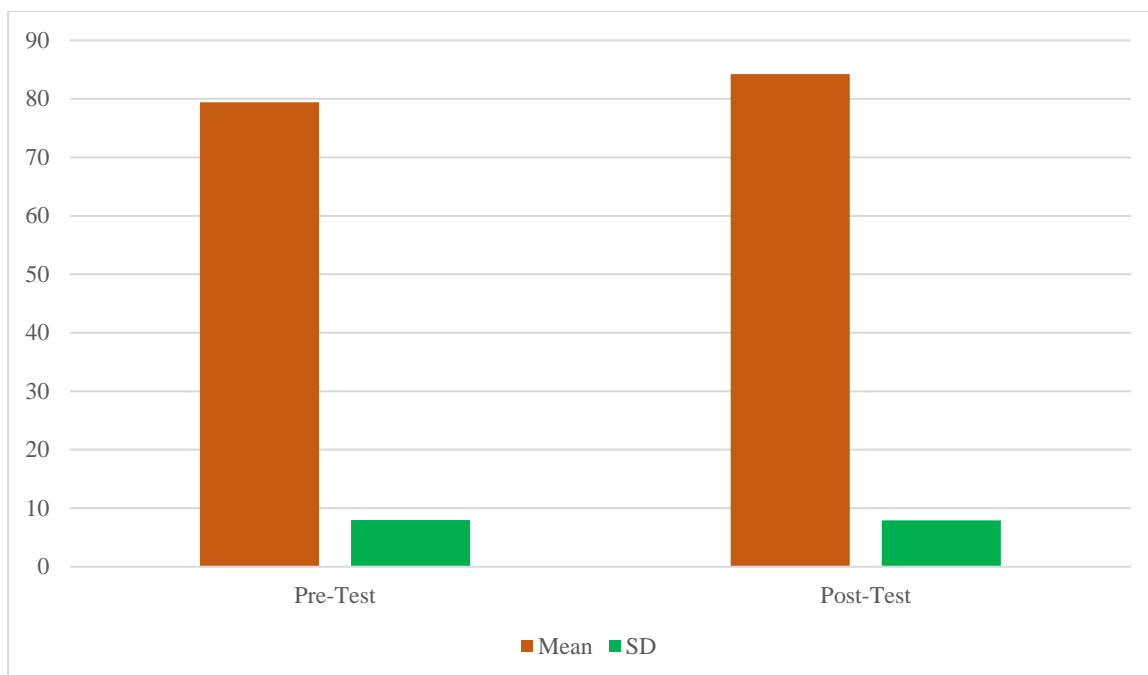


Figure-4: Showing pre and post values of Bent Leg Raise of Left limb.

Table-5: Showing comparison of Two Leg Rotation v/s Bent Leg Raise post values on Right limb.

	Two Leg Rotation	Bent Leg Raise	t value	p value
Right Mean + SD	92 ± 4.4	85.9 ± 7.5	3.101	0.0044

Table-5 showed the comparison of Two Leg Rotation v/s Bent Leg Raise on right limb. The mean value of Two Leg Rotation is 92 and standard deviation value is 4.4. The mean value of Bent Leg Raise is 85.9 and standard deviation value is 7.5. The t value is 3.101 and p value is 0.0044.

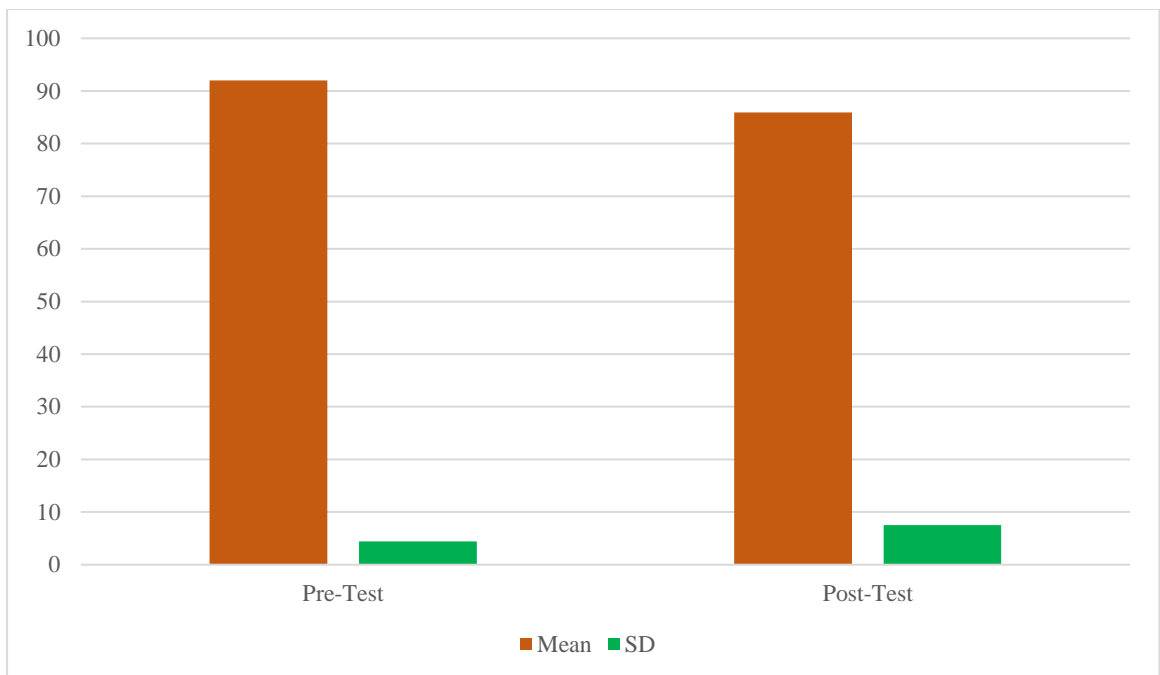


Figure-5: showing comparison of Two Leg Rotation v/s Bent Leg Raise post values on Right limb.

Table-6: showing comparison of Two Leg Rotation v/s Bent Leg Raise on Left limb.

	Two Leg Rotation	Bent Leg Raise	t value	p value
Left Mean + SD	93.2 ± 10.4	84.2 ± 7.9	2.632	0.0137

Table-6 showed the comparison of Two Leg Rotation v/s Bent Leg Raise on left limb. The mean value of Two Leg Rotation is 93.2 and standard deviation value is 10.4. The mean value of Bent Leg Raise is 84.2 and standard deviation value is 7.9. The t value is 2.632 and p value is 0.0137.

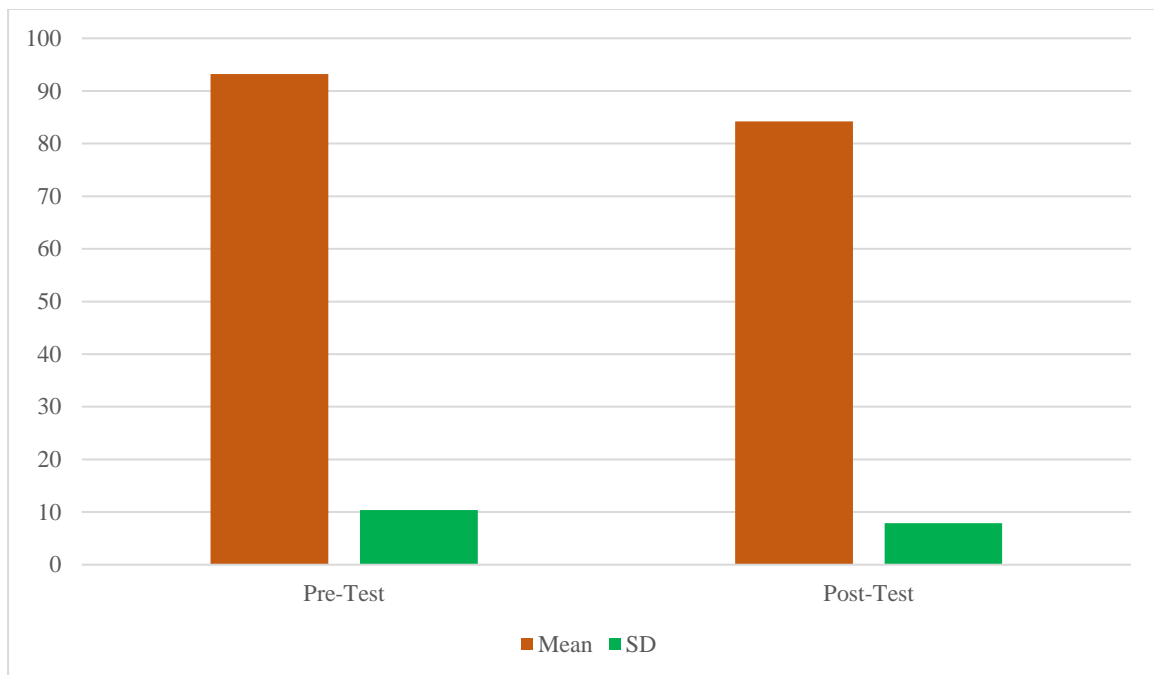


Figure-6: showing comparison of Two Leg Rotation v/s Bent Leg Raise on Left limb.

The values when compared between the groups were $t = 3.101$, $p = 0.0044$, found in post Two Leg Rotation v/s Bent Leg Raise on Right limb and $t = 2.632$, $p = 0.0137$, was in post Two Leg Rotation v/s Bent Leg Raise on Left limb, respectively using unpaired t-test, hence considered significant.

Conclusion

The results of the study show that both Two leg rotation and Bent leg raise techniques are effective in increasing hamstring flexibility. The study has shown a significant difference in Two leg rotation and Bent leg raise techniques. The Two leg rotation technique was more effective than the Bent leg raise technique on recreational football players. So, hamstring related injuries can be prevented by using Two leg rotation technique in recreational football players.

Hence, based on the result of the present study it can be concluded that Two leg rotation technique is more effective to improve hamstring flexibility than Bent leg raise technique in recreational football players of age group 18 to 28 with hamstring tightness.

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Corresponding Address:

Dr. Maman Paul

Assistant Professor,

Deptt. of Physiotherapy,

Guru Nanak Dev University,

Amritsar, Punjab (India).