



Influence of Different Types of Stretching with Precise Football Training Parcels on Variety of Motion of Football Players

Dr. K. Rajendran

Assistant Professor, Department of Physical Education and Sports Sciences, Annamalai University, Chidambaram, Tamilnadu, India.

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Abstract

The purpose of the study is to find out the effect of static, dynamic, and proprioceptive neuromuscular facilitation stretching with football training on range of motion of football players. To achieve the purpose of the study, forty eight male football players were randomly selected as subjects and their age ranged from 13 to 17 years. The selected subjects were randomly assigned into four equal groups of 12 subjects each. Group-I performed static stretching with football training, group-II performed dynamic stretching with football training, group-III assigned proprioceptive neuromuscular facilitation stretching with football training and group-IV was act as control. The selected biomotor variable flexibility was assessed by sit and reach test. Random group design was used as experimental design. Training programme was administered to the football players for twelve weeks with six training units per week. The data collected from the four groups prior to and post experimentation on flexibility was statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). Since four groups are involved, whenever the obtained 'F' ratio value was found to be significant for adjusted post test means, the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. In all the cases the level of confidence will be fixed at 0.05 for significance. The result of the study reveals that due to the effect of static, dynamic, and proprioceptive neuromuscular facilitation stretching with football training the range of motion of football players have significantly improved.

Keywords: Static, dynamic, and PNF stretching, Football training and Range of motion.

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Introduction

Many athletes perform stretching exercises as part of a warm-up prior to physical activity in order to prevent injuries and enhance their performance through an increase in flexibility (Alter, 1997; Herbert and Gabriel, 2002). However, recent investigations have reported that acute stretching may reduce athletic performance by decreasing muscle strength (Behm *et al.*, 2004; Evetovich *et al.*, 2003; Kokkonen *et al.*, 1998), muscle endurance (Franco *et al.*, 2008; Nelson *et al.*, 2005), vertical jump (Church *et al.*, 2001; Cornwell *et al.*, 2001; Young and Behm, 2003), and sprint performance (Nelson *et al.*, 2005). This is important, as the muscle force presented in different outputs (maximal, endurance, and explosive) constitutes a determining factor of the performance achieved in sport.

Despite the use of various stretching techniques, including static stretching, ballistic stretching, proprioceptive neuromuscular facilitation (PNF), and dynamic stretching (Alter, 1997), few studies have investigated the influence of the type of stretching on game performance. Marek *et al.*, (2005) investigated the

differences between static and PNF stretching on isokinetic leg extension in recreationally-active males and females and reported negative effects of equal magnitude from both stretching protocols. Conversely, Yamaguchi and Ishii, (2005) reported static stretching applied in moderate duration did not affect post-stretching performance, whereas dynamic stretching increased the power developed in the leg press. In contrast, Unick *et al.*, (2005) compared the influence of static and ballistic stretching on vertical jump and found no significant effects on jump performance. Finally, Franco *et al.*, (2008) investigated the effects of different types and durations of stretching on muscular endurance and found negative effects with one set of 40s of static stretching and PNF stretching. Therefore, the purpose of the present investigation was to examine and compare the effects of three different stretching exercises on range of motion of football players.

Methodology

To achieve the purpose of the study, forty eight male football academy players from Chidambaram, Tamil Nadu, India were selected as subjects and their age ranged from 13 to 17 years. The selected subjects were randomly assigned into three experimental groups and a control group of 12 subjects each. In this experimental study three independent variables such as static

Correspondence

Dr.K.Rajendran,
E-mail:drkr978@gmail.com, Ph. +9194433 28490

stretching with football training, dynamic Stretching with football training and Proprioceptive Neuromuscular Facilitation Stretching with football training are selected, while one group is kept control to assess the difference. The dependent variable selected for this study is range of motion and it was assessed by sit and reach test.

Training program was administered to the football players for twelve weeks with six training units per week. The experimental group-I performed static stretching with football training, group-II performed dynamic stretching with football training, group-III performed proprioceptive neuromuscular facilitation stretching with football training. The subjects of experimental groups performed these stretching exercises before performing the football training for the period of 12 weeks.

Random group design is used as experimental

design. The data collected from the four groups prior to and post experimentation on selected dependent variables is statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). Since four groups are involved, whenever the obtained 'F' ratio value is found to be significant for adjusted post test means, the Scheffe's test is applied as post hoc test to determine the paired mean differences, if any. In all the cases the level of confidence is fixed at 0.05 for significance.

Result

The descriptive analysis of the pre and post test data showing mean and standard deviation, range, mean differences and percentage of improvement on range of movement of experimental and control groups are presented in table-I.

Table I. Descriptive analysis of the pre and post test data on range of motion of experimental and control groups

Group	Test	Mean	Standard Deviation	Range	Mean Differences	Percentage of changes
Static stretching group	Pre test	32.30	2.67	12.00	6.90	21.36%
	Posttest	39.20	2.04	14.00		
Dynamic stretching group	Pre test	31.90	3.14	17.00	10.70	33.54%
	Posttest	42.60	3.17	13.00		
PNF stretching group	Pre test	33.50	3.81	16.00	13..10	39.10%
	Posttest	46.60	2.95	12.00		
Control Group	Pre test	31.10	2.69	15.00	0.20	0.64%
	Posttest	30.90	2.88	14.00		

Table t-ratio at 0.05 level of confidence for 11 (df) =2.20
*Significant

Table-I showed that the mean, standard deviation, range and mean difference values of the pre and post test data collected from the experimental and control groups on range of motion. Further, the collected data was statistically analyzed to find out the percentage of changes between the pre and post data. It was observed that percentage of changes in range of motion of static stretching with football training, dynamic

stretching with football training, PNF stretching with football training and control groups were 21.36%, 33.54%, 39.10% and 0.64% respectively. The pre and post test data collected from the experimental and control groups on range of motion is statistically analyzed by using analysis of covariance and the results are presented in table-II.

Table II. Analysis of Covariance on Range of Motion of Experimental and Control Groups

	Static Stretching	Dynamic Stretching	PNF Stretching	Control Group	S o V	Sum of Squares	Df	Mean squares	'F' ratio
Pre test Mean SD	32.30	31.90	33.50	31.10	B	30.00	3	10.00	1.26
	2.67	3.14	3.81	2.69	W	348.40	44	7.92	
Post test Mean SD	39.20	42.60	46.60	30.90	B	1336.48	3	445.49	69.72*
	2.04	3.17	2.95	2.88	W	281.30	44	6.39	
Adjusted	39.13	42.81	45.69	31.67	B	1039.04	3	346.35	133.21*

Post test Mean					W	111.67	43	2.60	
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(The required table value for significance at 0.05 level of confidence with degrees of freedom 3 and 44 is 2.82 and degree of freedom 3 and 43 is 2.82)

*Significant at .05 level of confidence

Table-II shows that the pre-test means on range of motion of static, dynamic, and PNF stretching with football training and control groups are 32.30, 31.90, 33.50 and 31.10 respectively. The obtained 'F' ratio value is 1.26 of range of motion is less than the required table value of 2.82, it is said to be insignificant for the degrees of freedom 3 and 44 at 0.05 level of confidence. The post-test means on range of motion of static, dynamic, and PNF stretching with football training and control groups are 39.20, 42.60, 46.60 and 30.90 respectively. The obtained 'F' ratio value is 69.72 of range of motion is greater than the required table value of 2.82 and it is found to be statistically significant for the degrees of freedom 3 and 44 at 0.05 level of

confidence. The adjusted post-test means on range of motion of static, dynamic, and PNF stretching with football training and control groups are 39.13, 45.69, 42.81 and 31.67 respectively. The obtained 'F' ratio value is 133.21 of range of motion is greater than the required table value of 2.82 and found to be significant for the degrees of freedom 3 and 43 at 0.05 level of confidence. The result of the study reveals that significant differences exist between the adjusted post test means of experimental and control groups on range of motion. To determine which of the paired means had a significant difference, the Scheffe's test was used as post-hoc test and the results are presented in the table-III.

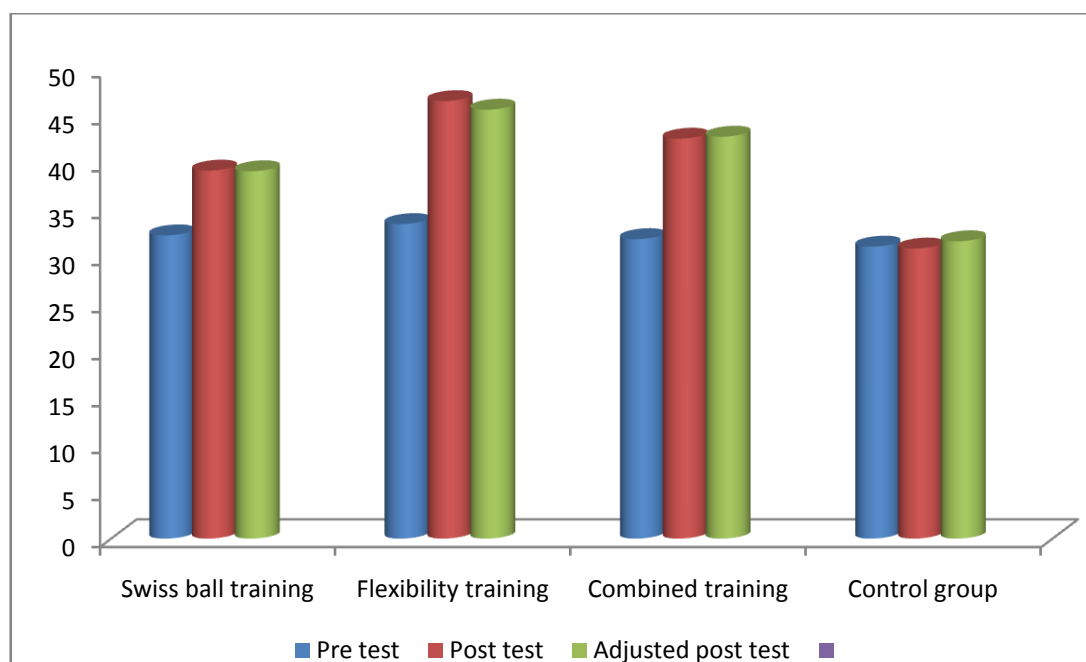
Table III. Scheffe's post hoc test for the differences among paired means of experimental and control groups on range of motion

Static Stretching	Dynamic Stretching	PNF Stretching	Control Group	Mean Difference	Confidence Interval
39.13	42.81			3.68*	1.91
39.13		45.69		6.56*	1.91
39.13			31.67	7.46*	1.91
	42.81	45.69		2.88*	1.91
	42.81		31.67	11.14*	1.91
		45.69	31.67	14.02*	1.91

*Significant at .05 level

From table-III the Scheffe's post hoc analysis proved that significant mean differences exist on range of motion between static and dynamic stretching groups, static and PNF stretching groups, static and control groups, dynamic and PNF stretching groups, dynamic and control groups, PNF stretching groups and control groups. Since, the mean differences 3.68, 6.56, 7.46, 2.88, 11.14 and 14.02 are greater than the confident interval value of 1.91 is said to be significant at 0.05 level of confidence.

The multiple mean comparisons shown in table-III proved that due to the effect of static, dynamic and PNF stretching with football training the range of motion of the football players have significantly improved. Higher improvement in range of motion is observed by PNF stretching with football training followed by dynamic and static stretching with football training. For easy understanding the bar diagram is given below in figure-I.

Figure I. Diagram showing the mean values on range of motion of experimental and control groups

Discussion on Findings

PNF stretching (or proprioceptive muscular facilitation) is one of the most effective forms of flexibility training for increasing range of motion (Cornelius & Hinson, 1980; Holt, Travis & Okia, 1970). PNF techniques can be passive and active they have facilitated muscular inhibition. It is believed that this is why PNF is superior to other forms of flexibility training (Cornelius & Hinson, 1980; Holt, Travis & Okia, 1970; Sady, Wortman, & Blanke, 1982; Tanigawa, 1972).

Conclusion

It proved that due to the effect of static, dynamic and PNF stretching with football training the range of motion of the football players have significantly improved. Higher improvement in range of motion is observed by PNF stretching with football training followed by dynamic and static stretching with football training.

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