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Acute effects of different types of warm-up exercise on selected fitness variables

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Abstract

The purpose of this study was to compare the acute effects of warm-up with dynamic and static stretching on flexibility, standing broad jump and vertical jump performance. This was a randomized, within-subject study, which investigated flexibility and standing broad jump performance following different warm-up protocols. The dependent variables were tested with sit and reach test (SR) and standing broad jump (SBJ). 45 college students, ages 18-27 (age = 21.8 ± 2.1 years) were recruited from the department of physical education and sports, Manonmaniam Sundaranar University, Tirunelveli, Tamil Nadu, India. The collected data was statistically analyzed by ANOVA and it was tested by 0.05 level of confidence to find the significant difference between the selected groups. The result shown that, there was significant difference exists on flexibility and standing broad jump performance between experimental groups and control groups.

Keywords: Static stretching, dynamic stretching, flexibility and standing broad jump

Introduction

Players are encouraged to participate in warm-up before vigorous physical activity. Warm-up prior to exercise is considered a basic component of any training program component. It has been suggested that preparing the body for movement with a warm-up may prevent injury, increase flexibility, and enhance performance during exercise, or sports. Different types of warm-up including stretching exercises, which increase tendon flexibility, improve joint range of motion, and function (Thompson, Gordon, & Pocatello, 2010) [1].

There are a variety of theories and studies on the efficacy of the different forms of warm-up exercise. Two modes of stretching that may be used in a warm-up include dynamic stretching (DS) and static stretching (SS). Static stretching has become less popular since research has shown that it may hinder performance (Behm & Chaouachi, 2011) [2].

Several minutes of low-intensity aerobic exercise followed by static stretching is generally recommended for young fitness participants. While static stretching has been found to enhance flexibility (increasing range of motion in the joints) and reduce muscle tension (Anderson, B., 2000) [4].

Flexibility is basically the range of motion at a particular joint. Flexibility is one of the most important motor components. Without adequate flexibility, performing sports activities become more difficult. It may also enhance performance in aerobic training and muscular conditioning as well as in sport. The Standing long jump, also called the Broad Jump, is a common and easy to administer test of explosive leg power. The standing long jump was also once an event at the Olympic Games.

Purpose of the study

The purpose of the study was to compare acute effects of warm-up with dynamic and static stretching exercise on flexibility and standing broad jump performance.

Methodology

To achieve the purpose of the study students, ages 18-27 (age = 21.8 ± 2.1 years) were recruited from the department of physical education and sports, Manonmaniam Sundaranar University, Tirunelveli, Tamil Nadu, India. An a priori power calculation was performed

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following a pilot study to attempt to determine sample size necessary with power of 0.8 and alpha = 0.05 and a moderate effect size. It was determined that 45 subjects would be sufficient to meet the previous criteria. The participants were divided into three groups, 15 Dynamic stretching group (DSG), 15 Static stretching group (SSG), 15 control group (CG), and they were test

Dynamic stretch and Static stretch were selected as variables for this study and they were tested by stroke balance, isometric leg strength, and sit & rich test. The collected data were statistically analyzed by independent t test and it was tested by 0.05 level of confidence to find the significant differences between kho-kho and kabaddi players. Flexibility

and explosive strength were tested using sit and reach and standing broad jump immediately after immediately after dynamic and static stretching exercise. The collected data were statistically analyzed by dependent t test and it was tested by 0.05 level of confidence to find the significant differences between dynamic and static stretching groups.

Analysis of Data

The selected variables were compared between Dynamic and static stretching groups and presented in the table. The mean values on selected variables between Dynamic and static stretching groups were represented in picture.

Table I: The Summary of An Analysis of Variance on Standing Broad Jump

Variables	Mean & Standard Deviation			Source of variance	Sum of Squares	Df	Mean Squares	'T' ratio
	Dynamic	Static	Control					
Standing broad jump	1.97	1.93	1.80	Between	0.07	2	1.017	0.774
				Within	0.027	57	23.451	

*Significant at .05 level. (Table value required for significance at .05 level with df 2 & 32 is 3.29).

Table above shows that the obtained “F” ratio value is greater than the required table value for significance at .05 level of confidence with df 2 & 39. Hence, it was concluded that there

was significant difference in improvement exist among experimental and control groups.

Standing Broad Jump

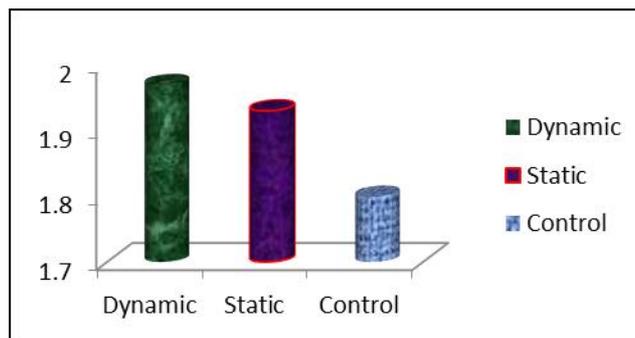


Figure II: Mean values and adjusted post mean values of Dynamic, Static and control group

Table II: The summary of an analysis of variance on flexibility

Variables	Mean & Standard Deviation			Source of variance	Sum of Squares	Df	Mean Squares	'T' ratio
	Dynamic	Static	Control					
Sit and Reach Test	15.35	15.45	15.25	Between	24.26	2	12.13	4.59
				Within	84.52	32	2.64	

*Significant at 0.05 level (Sit and reach test in inches). (The table value required for 0.05 level of significance with df 2 and 32 is 3.29).

Table above shows that the obtained “F” ratio value is greater than the required table value for significance at .05 level of confidence with df 2 & 39. Hence, it was concluded that there was significant difference in improvement exist among

experimental and control groups. The ordered and adjusted mean values of sit and reach test are graphically illustrated through bar diagram for better understanding in Figure II.

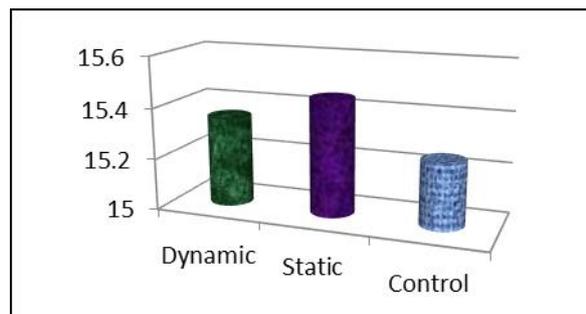


Fig II: Mean values and adjusted post mean values of Dynamic, Static and control group

Discussion on findings

Our findings support previous investigations that found that an acute bout of static stretching can reduce power performance in adults (Cornwell, A., 2001 & Young, W., 2001)^[5, 6]

Cornwell *et al.* (2001)^[5] reported that pre-event static stretching significantly reduced jump height by about 4.4%. Dynamic stretching would be expected to be superior to static stretching due to the closer similarity to movements that occur during subsequent exercises (Torres *et al.*, 2008)

Conclusions

From the analysis of the data, the following conclusions were drawn.

1. There was significant improvement on explosive power and flexibility due to the effect of dynamic and static stretching exercises.
2. There was significant difference between experimental and control groups on explosive power and flexibility.

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