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Effect of core strength training on physical fitness variables for Women College level basketball players

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Abstract

The study aimed to explore the influence of core strength training on physical fitness variables for women college level basketball players. The hypothesis posited that eight weeks of core strength training would significantly impact selected physical fitness variables in women college level basketball players. For this investigation, 30 randomly selected women college level basketball players from Coimbatore district, Tamil Nadu, India, aged between 18 to 24 years, were chosen as subjects. The research employed a pretest-posttest random group design, incorporating an experimental group (Group 'A') and a control group (Group 'B'), and each comprising fifteen participants. Group 'A' underwent core strength training, while Group 'B' received no training. Muscular strength and leg explosive power were assessed using the modified sit-ups and standing broad jump, respectively. Before the eight-week experimental period commenced, we conducted pre-tests to assess the selected physical fitness variables in all 30 subjects. Subsequently, post-tests were carried out at the conclusion of the experimental period, with scores meticulously recorded. Statistical analysis was conducted with a predetermined level of significance set at a confidence level of 0.05. The study results revealed a significant improvement in Muscular strength and leg explosive power among participants in the core strength training group.

Keywords: Core strength training, muscular strength, leg explosive power.

Introduction

Core strength training is a fundamental aspect of fitness that targets the muscles in the central region of the body, encompassing the abdomen, lower back, pelvis, and hips. These muscles collectively form the core, a crucial component in providing stability, balance, and support for a diverse array of movements. The significance of a robust core extends beyond aesthetics, as it plays a pivotal role in maintaining good posture, preventing injuries, and enhancing overall athletic performance. At the core of this training regimen are specific muscle groups that are systematically engaged to develop strength and endurance. The rectus abdominis, often referred to as the "Six-pack" muscle, runs vertically along the front of the abdomen and is a primary focus of core exercises. The oblique's, comprising internal and external muscles on the sides of the abdomen, contribute to rotational movements and lateral stability. The transverse abdominis, a deep muscle that wraps around the torso, acts as a natural corset, providing support and stability to the spine. Finally, the erector spine, situated along the spine, facilitates back extension and aids in maintaining an upright posture.

A variety of exercises are designed to target these core muscles effectively. Planks, a staple in core strength training, involve maintaining a push-up position with the body forming a straight line from head to heels. Russian twists, where individuals sit on the floor, lean back slightly, and rotate the torso from side to side, engage the oblique's and contribute to rotational strength. Leg raises, executed by lying on the back and lifting the legs toward the ceiling without bending the knees, target the lower abdominal muscles. Bicycle crunches, involving a combination of leg and torso movements, are effective in engaging multiple core muscles simultaneously Cofano, *et al.*, (2017) ^[1].

Methodology

The objective of this study was to investigate the impact of core strength training on physical fitness variables among women college level basketball players.

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It was hypothesized that eight weeks of core strength training would significantly influence selected physical fitness variables in women college level basketball players. For the present study, 30 women college level basketball players from Coimbatore District, Tamil Nadu, India, were randomly selected as subjects, with ages ranging from 18 to 24 years.

A pretest–posttest random group design, incorporating an experimental group (Group ‘A’) and a control group (Group ‘B’), was employed. Subjects were randomly assigned to two equal groups of fifteen each. Group ‘A’ underwent core strength training, while Group ‘B’ received no training. Muscular strength and leg explosive power were assessed using the modified sit ups and standing broad jump,

respectively. Subsequently, the experimental group underwent an eight-week regimen involving core strength training, while the control group did not partake in any training activities. After the completion of the eight-week training period, post-tests were conducted to measure the same dependent variables. The data obtained from these tests were subjected to statistical analysis using the dependent t-test to determine if any statistically significant improvements were observed. It is noteworthy that a level of significance was set at 0.05, ensuring a 95% confidence level for all analyses.

Results

Table I: Mean and Dependent ‘T’ Ratio for the pre and post tests on core strength training group and control group on muscular strength and leg explosive power

S.No	Group	Variables	Pre-Test Mean & SD	Post-Test Mean & SD	Standard error mean	T-Ratio
1	Core strength training	Muscular strength	18.80 ± 1.00	20.00 ± 1.02	0.23	10.25*
2		Leg explosive power	1.50 ± 0.03	1.52 ± 0.06	0.12	2.55*
1	Control Group	Muscular strength	18.75 ± 1.06	18.85 ± 1.08	0.24	0.28
2		Leg explosive power	1.51 ± 0.04	1.52 ± 0.05	0.10	1.37

*Significant level 0.05 level degree of freedom (2.14, 1 and 14)

Table I displays the computation of the t ratio comparing the means of pre-test and post-test agility scores for women college-level basketball players. The mean muscular strength and leg explosive power values for the experimental group were 18.80 before training and 20.00 after and 1.50 before training and 1.52 after, while the control group had means of 18.75 and 18.85 and 1.51 and 1.52 for the respective tests. The calculated t ratio of 10.25 and 2.55 exceeded the critical table value of 2.14, indicating statistical significance for 1 degree of freedom and 14 participants at a 0.05 level of confidence. This finding strongly suggests that the muscular strength and leg explosive power of the experimental group

significantly improved due to the influence of in-and-outs core strength training. Conversely, the computed t ratio of 0.28 and 1.37 fell short of the critical table value of 2.14, rendering it statistically non-significant for 1 degree of freedom and 14 participants at a 0.05 level of confidence. This result clearly demonstrates that the muscular strength and leg explosive power of the control group did not exhibit significant improvement following the intervention.

The bar diagram shows the mean values of pre-test on muscular strength and leg explosive power of experimental group and control group.

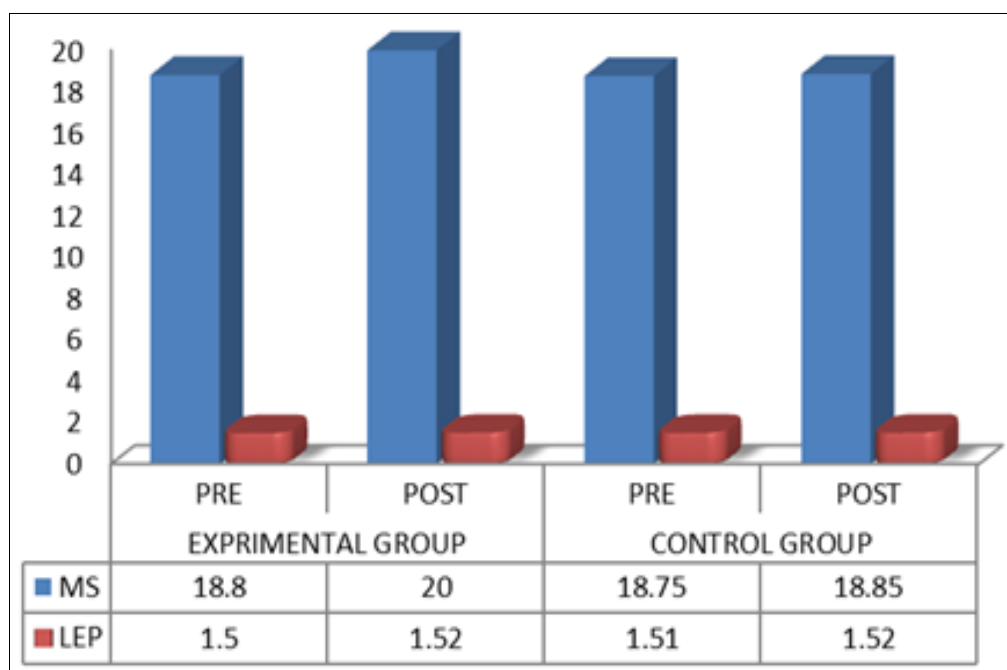


Fig 1: The bar diagram shows the mean values of pre-test on muscular strength and leg explosive power of experimental group and control group

Finding of results

The study’s findings reveal a significant improvement in the selected variables, namely muscular strength and leg explosive power, within the experimental group, which

consisted of individuals undergoing core strength training, in comparison to the control group. Furthermore, the study indicates that the enhancements achieved by the core strength training are notably superior to those observed in the control

group. For further insights into this topic, one can refer to the research conducted by Italo Sannicandro in their study titled Core Stability Training and Jump Performance in Young Basketball Players. In conclusion, the study's results underscore the positive impact of core strength training on muscular strength and leg explosive power, emphasizing their effectiveness in enhancing athletic performance.

Conclusions

Within the limitations of the present study, the following conclusions were drawn

1. The experimental group, comprised of individuals who underwent core strength training, achieved a notably significant improvement in physical fitness variables, specifically muscular strength and leg explosive power, among women college-level basketball players.
2. In contrast, the control group exhibited insignificant improvement in physical fitness variables, specifically muscular strength and leg explosive power, among women college-level basketball players.

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