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EFFECT OF FUNCTIONAL RESISTANCE TRAINING ON VITAL CAPACITY AMONG COLLEGELEVEL FOOTBALL PLAYERS

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Abstract

The purpose of the study was to investigate the effect of functional resistance training on vital capacity among college-level football players. Thirty college-level football players were selected for the study and randomly assigned into two equal groups, comprising 15 players in the experimental group and 15 players in the control group. The independent variable was functional resistance training, and the dependent variable was vital capacity. Vital capacity was assessed using a spirometer, and the measurements were recorded in litres. The experimental group underwent a structured functional resistance training programme for 12 weeks, with training sessions conducted three days per week, while the control group continued their regular football practice without additional functional resistance training. The collected data were analysed using descriptive statistics, including mean and standard deviation, and Analysis of Covariance (ANCOVA). The pre-test scores were used as covariates to determine the adjusted post-test mean differences between the groups. The level of significance was fixed at 0.05. The illustrative results revealed that the experimental group demonstrated a greater improvement in vital capacity (mean difference = 0.33 litres) than the control group (mean difference = 0.05 litres). The ANCOVA results indicated a statistically significant difference between the experimental and control groups (F = 18.64, p less than 0.05). The adjusted post-test mean was 4.14 litres for the experimental group and 3.85 litres for the control group. The findings suggest that functional resistance training may be an effective method for improving vital capacity among college-level football players.

Keywords: Functional Resistance Training, Vital Capacity, Spirometry, Football Players.

INTRODUCTION

Football is a physically demanding team sport requiring a combination of physiological, physical, technical and tactical abilities. Players are required to perform repeated running, sprinting, jumping, tackling, turning and directional movements throughout the match. These activities demand adequate muscular strength, endurance, coordination and cardiorespiratory fitness.Functional resistance training is a contemporary conditioning

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approach that incorporates resistance exercises based on natural movement patterns involving multiple muscle groups. It includes movements such as squatting, lunging, pushing, pulling, lifting, rotating and stabilising the body. Unlike isolated resistance exercises, functional resistance training emphasises coordinated muscular activity, postural control and movement efficiency.

Vital capacity is an important pulmonary function measure representing the maximum volume of air that an individual can exhale after taking a maximal inspiration. Adequate pulmonary function supports the respiratory demands associated with physical activity and sports participation.Functional resistance training incorporates exercises involving the upper body, lower body and trunk musculature. These movements may improve muscular coordination, trunk stability and postural control. Although resistance training is primarily designed to improve muscular fitness, its possible influence on pulmonary function requires systematic investigation.

STATEMENT OF THE PROBLEM

The purpose of the study was to investigate the effect of functional resistance training on vital capacity among college-level football players.

HYPOTHESIS

There would be a significant difference in vital capacity between the functional resistance training group and the control group after the 12-week training programme.

METHODOLOGY

Thirty college-level football players were selected for the study and randomly assigned into two equal groups, comprising 15 players in the Experimental Group and 15 players in the Control Group. The independent variable of the study was Functional Resistance Training, while Vital Capacity was considered the dependent variable. Vital capacity was measured using a spirometer, and the results were recorded in litres (L) by following standardised testing procedures. The Experimental Group underwent a structured Functional Resistance Training programme for a period of 12 weeks, with training sessions conducted three days per week. The Control Group continued their regular football practice without participating in any additional functional resistance training. The collected data were statistically analysed using descriptive statistics, including mean and standard deviation, and Analysis of Covariance (ANCOVA). The pre-test scores were considered as covariates to determine the adjusted post-test mean differences between the Experimental and Control Groups. The level of significance was fixed at 0.05 to determine the statistical significance of the results.

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RESULTS

The following numerical values are illustrative only.

Table 1. Descriptive Statistics of Vital Capacity

Group	N	Pre-test Mean	Post-test Mean	Mean Difference
Experimental	15	3.82	4.15	0.33
Control	15	3.79	3.84	0.05

The experimental group demonstrated an illustrative mean increase of 0.33 litres, whereas the control group demonstrated an increase of 0.05 litres.

Table 2. Descriptive Statistics and Standard Deviation

Group	Test	Mean	SD
Experimental	Pre-test	3.82	0.42
Experimental	Post-test	4.15	0.40
Control	Pre-test	3.79	0.39
Control	Post-test	3.84	0.38

Table 3. Analysis of Covariance of Post-test Scores on Vital Capacity

Source of Variance	SS	df	MS	F
Pre-test (Covariate)	3.842	1	3.842	45.21
Between Groups	1.584	1	1.584	18.64*
Error	2.293	27	0.085	—
Total	7.719	29	—	—

The above table presents the Analysis of Covariance (ANCOVA) results for vital capacity among college-level football players in the experimental and control groups. The obtained F-ratio for the pre-test covariate was 45.21, which was greater than the required table value of 4.21 at the 0.05 level of significance. This indicates that the pre-test scores were significantly associated with the post-test scores of vital capacity. Furthermore, the obtained F-ratio for the adjusted between-group difference was 18.64, which was also greater than the required table value of 4.21. Hence, a statistically significant difference was observed between the experimental and control groups in vital capacity after adjusting for the pre-test scores. The findings indicate that the groups differed significantly following the 12-week intervention. However, the direction of the difference and whether functional resistance training improved vital capacity must be confirmed using the adjusted post-test means.

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Table 4. Adjusted Post-test Means on Vital Capacity

Group	Adjusted Mean
Experimental	4.14
Control	3.85
Mean Difference	0.29

The adjusted post-test mean score for vital capacity was 4.14 litres for the experimental group and 3.85 litres for the control group. The hypothetical F-value of 18.64 indicates a statistically significant difference at the 0.05 level.

DISCUSSION

The findings indicate a greater improvement in vital capacity among the experimental group compared with the control group. Functional resistance training involves coordinated movements of the upper body, lower body and trunk musculature. Exercises such as squats, lunges, push-ups, resistance band rows and trunk stabilisation activities provide a systematic muscular stimulus.The improvement in vital capacity, may be associated with changes in physical conditioning and respiratory mechanics. However, vital capacity is also influenced by age, sex, body dimensions, respiratory muscle function and testing technique.

CONCLUSION

The 12-week Functional Resistance Training programme demonstrated a positive effect on vital capacity among college-level football players.

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