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Impact Of High-Intensity Interval Training On Specific Physical Factors Among College Male Football Players

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ABSTRACT
The aim of this study was to examine the impact of high-intensity interval training on specific physical variables among college male football players. To achieve this goal, 30 subjects were randomly chosen from G.T.N Arts College(Autonomous) Dindigul, aged between 18 and 24 years. These selected individuals were then randomly assigned to two groups, each consisting of 15 participants: an experimental group and a control group. The experimental group underwent a high-intensity interval training regimen, while the control group did not engage in any experimental activities. The physical fitness variables focused on in this study were agility and muscle strength. The research design followed a true random group design, including both pre-tests and post-tests. All 30 subjects were evenly distributed between the experimental group (comprising the high-intensity interval training group) and the control group. Before the six-week experimental period, pre-tests were administered to assess the selected physical variables in all 30 subjects. Following the experimental period, post-tests were conducted, and the scores were diligently recorded. Statistical analysis was carried out with a predetermined significance level set at 0.05 confidence. The results of this study indicated a significant improvement in agility and muscle strength among participants in the high-intensity interval training group.

Keywords: agility, muscle strength, football players.

Introduction

Football

Football is a ball game played on a large rectangular grass or simulated turf field with eleven players on each side, and there is a goal at each end. The objective of the game is to score by maneuvering the ball into the opponent's goal. During regular play, only the goalkeeper is allowed to use their hands or arms to handle the ball; the rest of the team typically employs their feet to kick the ball, occasionally utilizing their torso or head to intercept a ball in midair. The team with the most goals at the end of the match is declared the winner. In the case of a tie, the game may result in a draw, or extra time and/or a penalty shootout may be played, depending on the competition format. Football is one of the most popular sports worldwide, played by individuals of various ages and skill levels.

Football players run swiftly to acquire the ball or score, evade defenders for scoring or passing, and engage in actions such as jumping for heading or receiving the ball throughout the 90-minute game or even longer. Given the prolonged duration of the game, aerobic capacity plays a significant role in sustaining optimal performance. In addition to aerobic capacity, football players require other crucial physical fitness components like speed, agility, explosive strength, coordination, and kinesthetic ability to deliver top-notch performances. The Indian football team has achieved notable success in various areas contributing directly or indirectly to enhanced sports performance, such as physical fitness, psychological fitness, technical and tactical aspects.

Nevertheless, to attain the highest level of performance comparable to leading football teams like Brazil,

Argentina, France, Spain, Germany, England, Uruguay, etc., the Indian team management, including the government of India, must focus on developing football performance through the implementation of various sports schemes and addressing issues such as corruption in the sports field.

The durations of both high-intensity and low-intensity intervals can vary from 10 seconds to 4 minutes. Shorter high-intensity intervals (10-30 seconds) activate the anaerobic system for energy, while longer high-intensity intervals (more than 30 seconds) engage the aerobic system for energy. Typically, a high-intensity interval training workout, which includes warm-up and cool-down, can be completed within 30 minutes, depending on the workout's intensity. The popularity of high-intensity interval training workouts has grown due to their ability to deliver similar health benefits to steady-state moderate-intensity exercise in significantly less time.

In recent years, High-Intensity Interval Training (HIIT) has been advocated as the preferred exercise method when time is limited. In football (soccer), both aerobic and anaerobic metabolism are crucial. Given the prolonged nature of the game, aerobic capacity is essential, while anaerobic power plays a vital role in short bursts of running with and without the ball, kicking, heading, and throwing. Endurance athlete training typically emphasizes long-duration, low- or moderate-intensity exercise during the base or preparation phase, with short-duration, high-intensity efforts as the competitive phase approaches. It has been demonstrated that High-Intensity Training (HIT) produces faster results than traditional training methods. High Resistance Interval Training has also shown significant benefits for elite athletes.

Methodology

The researcher utilized a randomized design, incorporating both pretests and post-tests. A total of 30 male football players (N=30) were randomly assigned to two equal groups, each comprising 15 participants: the experimental group and the control group. Prior to the initiation of any training, a pre-test was administered to evaluate selected physical fitness variables, specifically agility and muscle strength, for all 30 football players. Following this, the experimental group underwent a six-week regimen involving high-intensity interval training, while the control group did not engage in any training activities. Upon the conclusion of the six-week training period, post-tests were conducted to measure the same dependent variables. The data obtained from these tests underwent statistical analysis using the dependent t-test to ascertain if any statistically significant improvements were observed. It is important to note that a significance level was set at 0.05, ensuring a 95% confidence level for all analyses.

Test I

Mean and Dependant T ratio for the Pre and Post Tests on high intensity interval training group and control Group on agility

Group	Test	Mean	Standard deviation	Standard error mean	t- ratio
Experimental group	Pre test	17.66	3.16	0.18	4.76*
	Post test	17.62	3.20		
Control group	Pre test	17.15	3.46	0.19	1.81
	Post test	17.14	3.22		

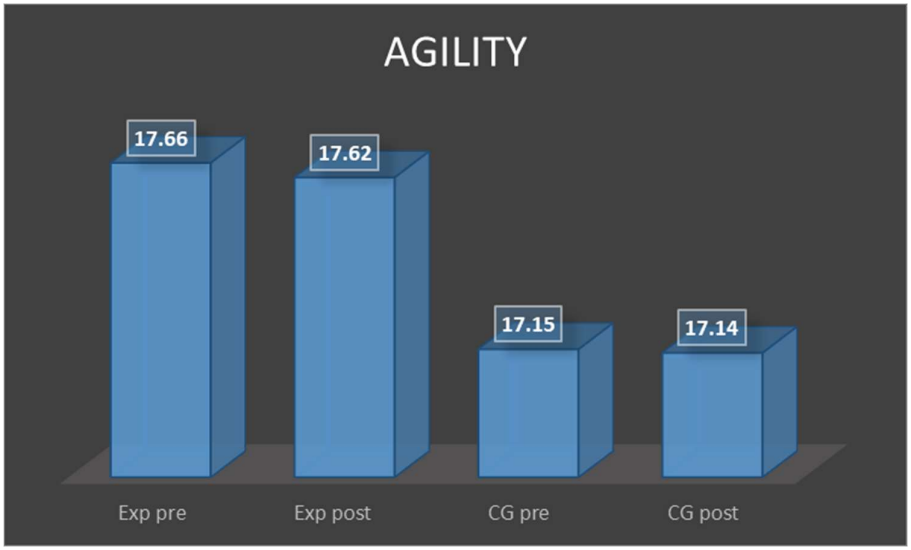
*Significant level 0.05 level degree of freedom (2.14, 1 and 14)

Table I illustrates the calculation of the 't' ratio comparing the means of pre-test and post-test agility scores for college-level football players. The mean agility values for the experimental group were 17.66 before training and 17.62 after, while the control group had means of 17.15 and 17.14 for the respective tests. The computed 't' ratio of 4.76 surpassed 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 result strongly suggests that the agility of the experimental group significantly improved due to the influence of in-and-outs high-intensity interval training. In contrast, the calculated 't' ratio of 1.81 fell short of the critical table value of 2.14, making it statistically non-significant for 1 degree of freedom and 14 participants at a 0.05 level of confidence. This outcome clearly indicates that the agility of the control group did not show significant improvement following the intervention.

The bar diagram shows the mean values of pre test on agility of control group and experimental group.

Bar diagram



Test II

Mean and Dependant T ratio for the Pre and Post Tests on high intensity interval training group and control Group on muscle strength

Group	Test	Mean	Standard deviation	Standard error mean	t- ratio
Experimental group	Pre test	52.01	0.03	0.45	2.28*
	Post test	53.60	0.04		
Control group	Pre test	49.67	0.04	0.06	1.44
	Post test	50.01	0.04		

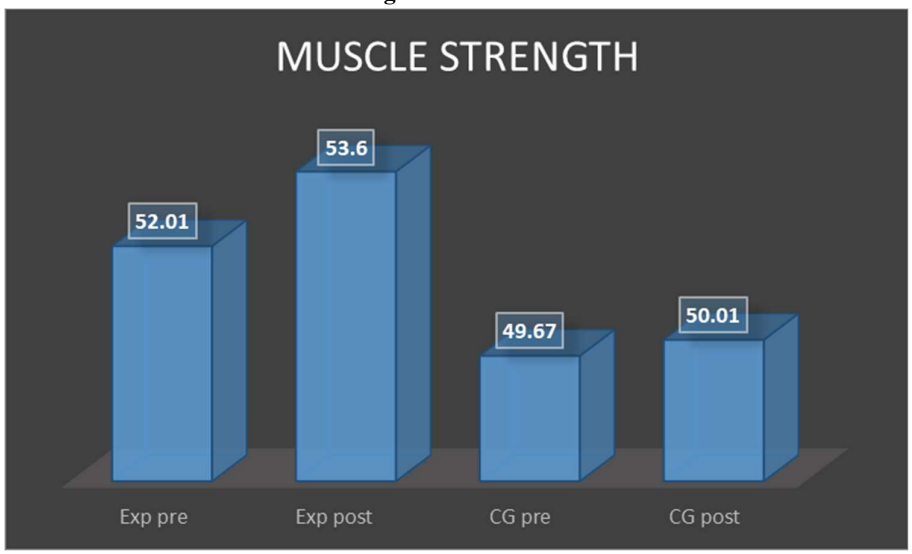
*Significant level 0.05 level degree of freedom (2.14, 1 and 14)

Table II outlines the computation of the 't' ratio, comparing the means of pre-test and post-test muscle strength scores among college-level football players. The mean values for the experimental group were 52.01 before training and 53.60 after, while the control group had means of 49.67 and 50.01 for the respective tests. The calculated 't' ratio of 2.28 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 outcome strongly suggests that the muscle strength of the experimental group significantly improved due to the influence of in-and-outs high-intensity interval training. In contrast, the computed 't' ratio of 1.44 fell short of the critical table value of 2.14, making it

statistically non-significant for 1 degree of freedom and 14 participants at a 0.05 level of confidence. This result clearly indicates that the leg explosive power of the control group did not show significant improvement following the intervention.

The bar diagram shows the mean values of pretest on muscle strength of control group and experimental group.

Bar diagram



Discussion on Finding

The study's findings highlight a significant improvement in the selected variables agility and muscle strength within the experimental group, comprising individuals undergoing game-high intensity interval training. This improvement is compared to the control group. Moreover, the study suggests that the enhancements achieved by the game-high intensity interval training group are notably superior to those observed in the control group. For further insights on this topic, one can refer to the research conducted by R. Saravanan and Pushpa in their study titled "THE EFFECT OF HIGH INTENSITY INTERVAL TRAINING WITH SPECIFIC DRILL TRAINING ON PERFORMANCE VARIABLES AND SKILL PERFORMANCE OF ELITE VOLLEYBALL PLAYERS." In conclusion, the study's results underscore the positive impact of high-intensity interval training on agility and muscle strength, emphasizing its effectiveness in enhancing athletic performance

Conclusions

From the analysis of the data the following conclusions are

1. The experimental group, consisting of individuals who participated in a high-intensity interval training program, demonstrated a notably significant improvement in physical fitness variables, particularly agility and muscle strength, among college-level football players.
2. On the contrary, the control group showed negligible improvement in physical fitness variables, such as agility and muscle strength, among college-level football players.

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