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Effects of High Intensity Interval Training on Specific Physical Factors in Male College Athletes

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Abstract

The objective of this study was to investigate the effects of high-intensity interval training on specific physical variables among male college athletes. To accomplish this objective, 30 subjects aged between 18 and 24 years were randomly selected from Trichy Districts. These individuals were then randomly assigned to two groups, with each group comprising 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 participate in any experimental activities. The physical fitness variables focused on in this study were speed and leg explosive power. The research design adhered to a true random group design, incorporating both pre-tests and post-tests. The 30 subjects were evenly distributed between the experimental group (consisting of the high-intensity interval training group) and the control group. Pre-tests were conducted before the six-week experimental period to assess the selected physical variables in all 30 subjects. Following the experimental period, post-tests were administered, and the scores were meticulously recorded. Statistical analysis was performed with a predetermined significance level set at a 0.05 confidence interval. The findings of this study revealed a significant improvement in speed and leg explosive power among participants in the high-intensity interval training group.

Keywords: Speed, Leg Explosive Power, Athletes

Introduction

Athletes

Athletes are individuals who engage in organized physical activities or sports, showcasing a high level of skill, prowess, and dedication in their chosen disciplines. Defined by their exceptional physical abilities, athletes participate in competitive events, ranging from team sports to individual pursuits, with the aim of achieving excellence and success. Their commitment to rigorous training regimens, the pursuit of peak performance, and the demonstration of sportsmanship distinguishes them within the realm of athletics. Whether on the track, field, court, or in the water, athletes epitomize the embodiment of discipline, resilience, and a relentless pursuit of achievement, serving as inspirational figures and sources of motivation for aspiring competitors and sports enthusiasts worldwide. The durations of both high-intensity and low-intensity intervals can range 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, inclusive of 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 capacity 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 employed a randomized design, encompassing both pretests and post-tests. A total of 30 male athletes (N=30) were randomly allocated to two equal groups, each consisting of 15 participants: the experimental group and the control group. Before any training commenced, a pre-test was administered to assess selected physical fitness variables, specifically speed and leg explosive power, for all 30 athletes. Subsequently, the experimental group underwent a six-week regimen involving high-intensity interval training, while the control group refrained from participating in any training activities. At 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 determine 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 Speed

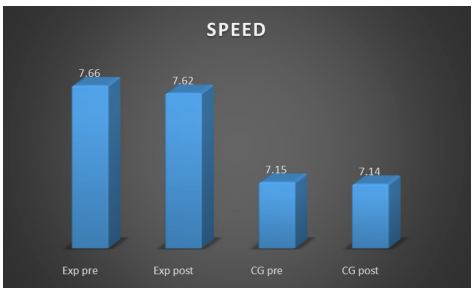
Group	Test	Mean	Standard Deviation	Standard Error Mean	t- ratio
Experimental group	Pre test	7.66	2.16	0.18	3.76*
	Post test	7.62	2.20		
Control group	Pre test	7.15	2.46	0.19	1.61
	Post test	7.14	2.22		

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

Table I depicts the computation of the 't' ratio comparing the means of pre-test and post-test speed scores for college-level athletes. The mean speed values for the experimental group were 7.66 before training and 7.62 after, while the control group had means of 7.15 and 7.14 for the respective tests. The computed 't' ratio of 3.76 exceeded the critical table value of 2.14, signifying statistical significance for 1 degree of freedom and 14 participants at a 0.05 level of confidence. This outcome strongly suggests that the speed of the experimental group significantly improved due to the influence of in-and-outs high-intensity interval training. Conversely, the calculated 't' ratio of 1.61 fell below 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 unequivocally indicates that the speed of the control group did not exhibit significant improvement following the intervention.

The bar diagram illustrates the mean values of pre-tests on speed for both the control group and the experimental group.

Bar Diagram



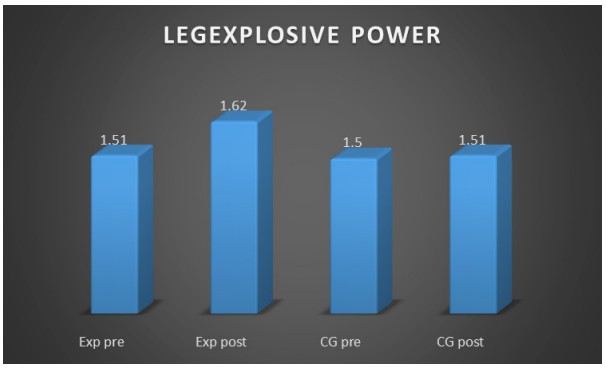
Test II Mean and Dependant 'T' – Ratio for the Pre and Post Tests on High Intensity Interval Training Group and Control Group on Leg Explosive Power

Group	Test	Mean	Standard deviation	Standard error mean	t- ratio
Experimental group	Pre test	1.51	0.03	0.45	21.00*
	Post test	1.62	0.04		
Control group	Pre test	1.50	0.02	0.06	1.37
	Post test	1.51	0.03		

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

Table II delineates the computation of the 't' ratio, comparing the means of pre-test and post-test leg explosive power scores among college-level athletes. The mean values for the experimental group were 1.51 before training and 1.62 after, while the control group had means of 1.50 and 1.51 for the respective tests. The calculated 't' ratio of 21.00 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 outcome strongly suggests that the leg explosive power of the experimental group significantly improved due to the influence of in-and-outs high-intensity interval training. Conversely, the computed 't' ratio of 1.37 fell below 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 indicates that the leg explosive power of the control group did not exhibit significant improvement following the intervention.

The bar diagram illustrates the mean values of pre-tests on leg explosive power for both the control group and the experimental group.



Bar Diagram

Discussion on Finding

The study's findings underscore a significant improvement in the selected variables speed and leg explosive power within the experimental group, consisting of individuals undergoing game-high-intensity interval training, as 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 (Saravanan and Pushpa., 2022) 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 emphasize the positive impact of high-intensity interval training on speed and leg explosive power, highlighting its effectiveness in enhancing athletic performance.

Conclusions

From the Analysis of the Data the following Conclusions are

1. The experimental group, comprising individuals who engaged in a high-intensity interval training program, exhibited a notably significant improvement in physical fitness variables, specifically speed and leg explosive power, among college-level athletes.
2. In contrast, the control group demonstrated negligible improvement in physical fitness variables, including speed and leg explosive power, among college-level athletes.

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