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Research Article

Influence of Interval, Circuit and Combined Training on Selected Skill Related Physical Fitness Variables and Performance Variables among High School Football Players

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INTRODUCTION

Soccer requires peak physical conditioning of its players to be played at the highest level. The only way to achieve this level of conditioning is training specifically for soccer and the amount of running done in a match. The benefits of this training vary from better performance on the pitch (soccer field) for longer amounts of time to a decreased chance of injury or cramping before, during and after a match. Also, the better conditioned a player is, the more likely he is to perform with the same amount of skill necessary when passing, dribbling and shooting at the end of the game as the beginning.

Interval training is a type of physical training that involves bursts of high-intensity work interspersed with periods of low-intensity work. The high-intensity periods are typically at or close to near-maximum exertion, while the recovery periods may involve either complete rest or activity of lower intensity. Interval training provides benefits to any healthy person such as improving fitness, health, speed and stamina; it's a very demanding type of activity and certainly not one you would want to fly into without adequate preparation.

Circuit training is a form of conditioning combining resistance training and high-intensity aerobics. It is designed to be easy to follow and target strength building as well as muscular endurance. An exercise "circuit" is one completion of all prescribed exercises in the program. When one circuit is complete, one begins the first exercise again for another circuit. Circuit training is an arrangement of exercises that requires the athlete to spend some time completing each exercise before moving on. It is an excellent way to improve mobility and, at the same time, build strength and stamina.

The purpose of the present study was to analyses the influence of interval, circuit and combined training on selected skill related physical fitness variables and performance variables among High School football players.

A well designed and well supervised interval, circuit and combined training programmes will be beneficial to the High School football players. The aim of the present study is to contribute to the training methods, which are listed below:

1. The ultimate aim of research in physical education is to help the physical education and sports professionals to train their sports persons based on the new concepts in improving their performances.
2. The study would add knowledge in the area of interval, circuit and combined training.
3. The results of the study may provide the standards of the football players in various selected physical fitness and performance parameters.

4. The conclusions of this study will pave a way to train football players with interval, circuit and combined training.
5. This study might motivate other professionals and scholars to take up similar studies.

METHODOLOGY

For the present study, 60 football players studying in the High Schools of East Godavri and West Godavari Districts of Andhra Pradesh were randomly selected as subjects during the academic year 2021-2022. The selected subjects were divided into three experimental groups and a control group with fifteen subjects (n=15) in each group. Experimental group I (ITG=15) underwent interval training, Group II (CTG=15) underwent circuit training, Group III (COMG=15) underwent combined training and Group IV served as control group (CG=15). All subjects were informed about the nature of the study and their consent was obtained to co-operate till the end of the experiment and testing period. Pilot study groups and experimental groups (namely, ITG, CTG and COMG) were trained-up in which three modes of training were given independently with separate subjects in each group. The subjects were free to withdraw their consent in case they felt any discomfort during the period of their participation, but there were no dropouts. A qualified physician examined the subjects medically and declared them fit for the study.

The variables were selected after considering the feasibility and availability of proper techniques and instruments. In this experimental study, three experimental (IGT, CTG, and COMG) groups with different loads of training were given while one group was kept as control group to assess the difference.

Criterion Variables

Dependent Variables

Variables	
Physical Fitness Variables	Speed
	Agility
	Explosive Power
	Balance
	Co-ordination
	Cardio-respiratory endurance
Performance Variables	Kicking
	Dribbling
	Passing

Independent Variables

The following training methods were selected as independent variables.

1. Interval training
2. Circuit training
3. Combined interval and circuit training.

Selection of Tests

Variables		Test	Unit of Measurement
Physical Fitness Variables	Speed	50 meters dash	In Seconds
	Agility	30' shuttle run	In Seconds
	Explosive Power	Sargent vertical jump	In Centimeters
	Balance	Stroke stand	In Seconds
	Co-ordination	Alternate Hand Wall Toss Test	In Number of Catches in 30 Seconds
	Cardio-respiratory endurance	9minutes run/walk	In Meters
Performance Variables	Kicking	Mor. Christian Skill Test	In Meters
	Dribbling	Punt for distance	In Seconds
	Passing	Mor. Christian Skill Test	In Points

Training Programme

During the training period, the experimental groups underwent their respective training programmes three days per week on alternate days for twelve weeks in addition to their regular physical education activities. Experimental Group I (ITG) underwent interval training and Group II (CTG) underwent circuit training and group III (COMG) underwent combination of interval and circuit training. Before the commencement of the experimentation and at the middle of the training period (after fifth week), the investigator recorded the target heart rate for interval training, 1RM tests for circuit and target heart rate and 1RM for combined training subjects.

Collection of Data

The data on selected dependent variables for pre-tests and post-tests were collected two days before and after the training programme respectively. On the first day speed, agility, balance, co-ordination and explosive power were tested whereas cardio respiratory endurance, kicking, passing and dribbling were tested on the second day.

Experimental Design

The experimental design used for this study was pre-test and post-test random group design involving sixty subjects, who were divided at random into four groups of fifteen each. This study consisted of three experimental groups. Group I underwent interval training and Group II underwent circuit training and Group III underwent combined training, and Group IV acted as control group. All the subjects were tested prior to and after the experimentation on physical fitness and performance parameters.

Statistical Techniques Used

The data collected from the four groups before and after the experimental period were statistically examined for significant improvement by using analysis of covariance. Whenever the 'F' ratio for adjusted post-test was found to be significant, Scheffe's test was used as post-hoc test to determine which of the paired means differed significantly. In all cases the criterion for statistical significance was set at 0.05 level of confidence ($P<0.05$).

RESULTS OF THE STUDY

The results of the study revealed that there existed significant difference among the football players of experimental groups such as interval training, circuit training and combined interval and circuit training and control group on physical fitness variables such as speed, agility, explosive power, balance, coordination and cardio respiratory endurance and performance variables such as dribbling, kicking and passing. It is found that the experimental groups performed better on physical fitness variables such as speed, agility, explosive power, balance, coordination and cardio respiratory endurance and performance variables such as dribbling, kicking and passing than the control group. This might be due to the effect of specified training given to the experimental groups.

When compared with interval training and circuit training group, circuit training group performed better on physical fitness variables such as speed, agility, explosive power, balance, and coordination and performance variables such as kicking and passing than that of interval training group.

When compared with interval training and circuit training group, interval training group performed better on physical fitness variable **cardio respiratory endurance** and performance variable **dribbling** than that of circuit training group.

Further, the analysis of the study revealed that the football players of combined interval and circuit training group performed better on physical fitness variables such as speed, agility, explosive power, balance, coordination and cardio respiratory endurance and performance variables such as dribbling, kicking and passing than the football players of interval training, circuit training groups and control group.

CONCLUSIONS

From the results of the present research work, the following conclusions were drawn.

There was significant difference among the football players of experimental groups such as interval training, circuit training and combined interval and circuit training groups and control group on physical fitness variables such as speed, agility, explosive power, balance, coordination and cardio respiratory endurance and performance variables such as dribbling, kicking and passing. The result of the present study showed that the interval training, circuit training and combined interval and circuit training groups performed better on physical fitness variables such as speed, agility, explosive power, balance, coordination and cardio respiratory endurance and performance variables such as dribbling, kicking and passing than the control group. This might be due to the effect of specified training (interval training, circuit training and combined interval and circuit training) were given to the experimental groups. Further, this study also revealed that the football players of combined interval and circuit training group performed better on physical fitness variables such as speed, agility, explosive power, balance, coordination and cardio respiratory endurance and performance variables such as dribbling, kicking and passing than the football players of interval training, circuit training groups and control group.

When compared interval training with circuit training group, the football players of circuit training group performed better on physical fitness variables such as speed, agility, explosive power, balance, and coordination and performance variables such as kicking and passing than that of interval training group, and the football players of interval training group performed better on physical fitness variable cardio respiratory endurance and performance variable dribbling than that of circuit training group.

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