Effect of Soccer Training on Body Composition and Physical Fitness Variables among Footballers

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Abstract

The aim of this study was to examine the effects of soccer training on selected body composition and physical fitness variables among footballers. Forty male students of various institutions in Pondicherry (Age 20.03±0.99: Height 167.55±6.67: Weight 70.15±6.42: BMI 24.93±0.56) were randomly assigned into either experimental group (Exp:N=20, Age 19.85±0.99: Height 165.85±6.17: Weight 68.30±6.31: BMI 24.77±0.59) or control group (Con:N=20, Age 20.20±1.01: Height 169.25±6.87: Weight 72.00±6.12: BMI 25.09±0.49) . The experimental group participated in the soccer training program for 12 weeks (three sessions a week) whereas the control group maintained their regular routine activities. All the subjects were evaluated before (pre) and after (post) the training period on the selected variables namely Body weight, BMI, cardiovascular endurance, explosive power, and muscular endurance. The obtained data were statistically analyzed using ANCOVA to find out significant difference if any. The results show a significant change in body weight, BMI, cardiovascular endurance, explosive power, and muscular endurance. In conclusion, the soccer training program resulted in positive changes in the selected variables among footballers.

Key words: Soccer training, Body composition, Physical fitness.

Introduction

Soccer performance has dramatically progressed over the past few years. Performance levels which are unimaginable before are now common and the number of athletes capable of outstanding results is increasing. One factor is that soccer is a challenging field, and intense motivation has encouraged long, hard hours of work. Also, coaching has become more sophisticated, partially from the assistance of sport specialists and scientists. A broader base of knowledge about athletes and players now exists, which is reflected in training methodology. Most scientific knowledge, whether from experience or research, aims to understand and improve the effects of exercise on the body. Research from several sciences enriches the theory and methodology of training, which has become a branch of science. The player is the subject of the science of training. Theoretically, training induced muscle adaptations are divergent and can even be antagonistic to improvements in strength[5,6,7] or endurance.[8,9] Strength training has been reported to cause muscle fiber hypertrophy, associated with an increase in contractile protein, proportional to an increase in maximal contractile force.[10] Strength training also reduces mitochondrial density and decreases the activity of oxidative enzymes, which can impede endurance capacity, but has minimal effect on capillary density or the conversion from fast (type II) to slow twitch (type I) fiber types.[8,10] The development of the various components of muscular strength is now integrated into the training programs of various endurance disciplines. Various studies have shown the benefit

of adding strength training to improve endurance performance.[1–4] Speed and strength are integral components of fitness found in varying degrees in virtually all athletic movements. Simply put the combination of speed and strength is power. For many years coaches and athletes have sought to improve power in order to enhance performance.

Soccer, the game evokes an out pouring passion and emotion unparallel within the realm of sport. Soccer is a common language among peoples of diverse backgrounds and heritages, a bridge that spans economic, political, cultural and religious barriers. Known as "football" throughout most of the world, soccer is the national sport of many countries in Asia, Africa, Europe and South America. Football is fast, quick, aggressive and attractive. There are four physical abilities, which are relevant to an understanding of the nature of football skill. They are speed, strength, endurance and mobility. The greater or lesser degree of proficiency is possible within each one of them. It has been found that male elite soccer players cover 8–12 km during a game, depending on team role,[11–13] nutritional status,[14,15] and aerobic capacity.[16,17] Within this aerobic context a sprint bout occurs about every 90 seconds,2 each lasting an average of two to four seconds.[11,12,18] Sprinting constitutes 1–11% of the total distance covered in a match,[11,12] corresponding to 0.5–3.0% of effective playing time—that is, the time when the ball is in play.[11,18–20] Recent studies shows that improvement in aerobic capacity in elite junior soccer players increased the distance covered, the play intensity, the number of sprints, and ball involvement during a game.[17] During a game, professional soccer players perform about 50 turns, comprising sustained forceful contractions to maintain balance and control of the ball against defensive pressure.[21]. Although it has been suggested that these abilities are concerned with the quantities of work done in soccer, they can affect all other levels of skill response. Each level may determine the degree of proficiency shown at other levels. They can therefore affect the quality of movement both above and below the level of skill. With the modern game becoming more and more physical and fast, never has the need for a player to have good all-round ability and acceptable technique been greater. Therefore the objectives of this study was to examine the effects of cross training involving soccer practice and plyometric training on performance related variables among football players.

Methods

Forty male students of various institutions in Pondicherry were randomly assigned into either Experimental group (Exp:N=20) or Control group (Con:N=20) . The baseline characteristics of the subjects were as follows: mean (SD) age 20.03 (0.99) years; height 197.55 (6.67) cm; body weight 70.15 (6.42) kg and body mass index 24.93 (0.56) kg / m^2. They were all beginners in football and they did not do any physical activity outside of their studies. All subjects gave written consent after having being informed about the study protocol, without being informed of the goal of the study. The experimental group participated in the soccer Training program for 12 weeks (three sessions a week) whereas the control group maintained their regular routine activities. The criterion variables selected for this study were body

weight, BMI, Cardiovascular Endurance, Explosive Power, and Muscular Endurance. The subjects of both the groups were tested on selected variables 24 hours before and after the training period. The selected variables were measured before (Pre) and after (Post) for both the groups using standard tests and procedures. The experimental group trained three non-alternative days in a week for 12 weeks. The training includes a combination of general and specific conditioning, plyometrics, drills with and without ball etc. The duration of the sessions was 60 min which includes 5 min each for warm-up and warm down. Excluding this 10 min the active training duration was 50 min.

The data collected from experimental and control groups prior to and after completion of the training period on selected variables were statistically examined for significant differences if any, by applying analysis of covariance (ANCOVA). The pre test and post test means of experimental and control groups were tested for significance by applying ANOVA. As both the groups (EXP and CON) were selected from the same population and no attempt was made to equate the groups on the selected dependent variables or any other common variables, initial differences may exist, and there is a possibility of affecting the post test mean. For eliminating any possible influence of pre test means the adjusted post test means of experimental and control group were tested for significance by using ANCOVA. All the data were analyzed using SPSS statistical package. The level of confidence was fixed at 0.05 level of significance as the number of subjects was limited and also as the selected variables might fluctuate due to various extraneous factors.

Table.1 shows the body weight, BMI, cardiovascular endurance, explosive power, and muscular endurance among the experimental and control group before (Pre) and after (post) the soccer training period. There was a significant change in body Weight, BMI, cardiovascular endurance, explosive power and muscular endurance (P?0.05). The pre test means of all the variables does not show any significant difference. After the training the experimental group (68.30±6.30 vs 66.30± 6.03kg) shows a decrease of 2.00 Kg (2.93%) in body weight. In the case of BMI, experimental group (24.77±0.59 vs 24.05 ± 0.09kg / m^2) shows a decrease of 0.77 (2.91%). cardiovascular endurance among experimental group (1862.00 ±41.11 vs 2260.50± 41.11 mts) shows an increase of 398 (21.37%) which was significant, whereas in the case of explosive power among experimental group (39.25 ±3.58 vs 62.00 ± 1.69) shows a significant increase of 22.75 (57.96%). Muscular endurance among experimental group (31.55 ±3.44 vs 47.15 ± 3.47) shows a increase of 15.6 (49.45%) which was significant whereas the control group shows no significant difference in all the above-mentioned variables.

Results & Discussion

Table-I

Analysis of Covariance for the Selected Variables among Experimental & Control Groups with Percentage of Gain

Body Weight		**ConGroup**	**Exp Group**	**SOV**	**SOS**	**df**	**MS**	**F-Ratio**
	PRE TEST	72.00(6.12)	68.30(6.30)	B	136.90	1	136.90	3.54
				W	1468.20	38	38.64	
	POST TEST	71.90(6.17)	66.30(6.03)	B	313.60	1	313.60	8.43*
				W	1414.00	38	37.21	(P ? 0.05)
	AD PO TEST	69.19	71.11	B	30.31	1	30.31	26.85*
				W	41.77	37	1.13	(P ? 0.05)
	GAIN	0.10?	2.00?					
	% OF GAIN	0.014%?	2.93%?					
BMI	**PRE TEST**	25.09(0.49)	24.77(0.59)	B	1.05	1	1.05	3.60
				W	11.09	38	0.292	
	POST TEST	25.09(0.55)	24.05(0.09)	B	10.18	1	10.18	25.10*
				W	14.94	38	0.393	(P ? 0.05)
	AD PO TEST	24.75	25.11	B	0.812	1	0.812	7.462*
				W	4.09	37	0.11	(P ? 0.05)
	GAIN	0.00?	0.77?					
	% OF GAIN	0.00%?	2.91%?					
Car.Vas.Endurance	**PRE TEST**	1854.50 (42.11)	1862.00 (41.11)	B	562.50	1	562.50	0.325
				W	65815.00	38	1731.97	
	POST TEST	1868.50 (43.22)	2260.50 (32.52)	B	1648360	1	1648360	1126.78*
				W	55590	38	1462.90	(P ? 0.05)
	AD PO TEST	1990.25	1726.25	B	22738.89	1	22738.89	20.54*
				W	40954.76	37	1106.89	(P ? 0.05)
	GAIN	14?	398?					
	% OF GAIN	0.76%?	21.37%?					
Leg Exp Power	**PRE TEST**	39.45(2.42)	39.25(3.58)	B	0.40	1	0.40	0.43
				W	354.70	38	9.33	
	POST TEST	40.10(2.36)	62.00(1.69)	B	4796.10	1	4796.10	1140.50*
				W	159.80	38	4.21	

	AD PO TEST	49.26	29.44	B	126.56	1	126.56	20.67*
				W	226.56	37	6.12	(P ? 0.05)
	GAIN	0.65?	22.75?					
	% OF GAIN	1.65%?	57.96%?					
Muscular Endurance	**PRE TEST**	30.55(3.03)	31.55(3.44)	B	10.00	1	10.00	1.09
				W	349.90	38	9.21	
	POST TEST	31.15(3.12)	47.15(3.47)	B	2560.00	1	2560.00	235.49*
				W	413.10	38	10.87	(P ? 0.05
	AD PO TEST	37.85	24.26	B	256.62	1	256.62	1485.31*
				W	6.39	37	0.17	(P ? 0.05
	GAIN	0.60?	15.6?					
	% OF GAIN	1.59%?	49.45%?					

Conclusions

On the basis of the findings it was concluded that soccer training program could produce favorable changes in body weight, BMI, cardiovascular endurance, explosive power , and muscular endurance. Physical activity should be viewed as providing stimuli that promote specific and varied adaptations depending on the type, intensity and duration of exercise performed. Even though it has been suggested that the total work load (training volume and duration of participation) is the key factor that determines the effect of exercise training on performance there is a need for more information. Further studies are needed to clarify the effects of different types of training with variations in duration and intensity on performance related variables among different games in general and football in particular.

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