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ASSESSMENT OF AEROBIC AND ANAEROBIC PROFILES OF YOUNG SOCCER PLAYERS

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Abstract

The first objective of the study was to analyze the significant improvement of VO_2max and anaerobic power of young soccer players, and second objective was to determine the profiles of VO_2max and anaerobic power of young soccer players. Sixty (N_1=60) young soccer players between 12 to 14 years of age those were participating the regular soccer training, randomly selected from the different schools and academies of Manipur state. To determine the VO_2max and anaerobic power, 12 minutes Run-Walk test and Sargent Jump- Lewis Nomogram was administered respectively. The data were collected in two phases on the same subjects in an intervening duration of three months (1st and 2nd test) and developed total 120 data (N_2=120). By employing the paired sample 't' test, the result showed that there were significant improvement on VO_2max and anaerobic power of young soccer players during the course of three months soccer training. Lastly, the mean profiles of VO_2max and anaerobic power of young soccer players were observed as M = 43.63±3.57 and M = 64.25±13.70 respectively.

Keywords: Soccer, VO_2max, and Anaerobic Power.

Introduction

Soccer is truly considered as the dominant game among the global sports and games disciplines. It is characterized by a combination of physical, technical and tactical factors (Stolen, 2005). Soccer is an intermittent team game involving low to high-intensity efforts (Buchheit, 2010). The tempo of the game has to be maintain for 90 minutes or more. During the course of the game, players perform various intensive movements with highly calibrated physical and skill qualities. In such high adrenaline actions, the maximum oxygen uptake (VO_2max) is perhaps the physiological parameter most evaluated in elite soccer players. The average level of VO_2max is about 60ml.kg^{-1}.min^{-1}, but, individual figures as high as 76ml.kg-1.min^{-1} has been reported. Maximum oxygen uptake has been observed to be higher for midfielders than for players in other positions and this has been associated with a longer distance covered in the game (Rico-Sanze). Thus, a player needs a relatively high maximum oxygen uptake during a soccer match can be as high as 70% of VO_2max (Reilly,2003). During a match, the total running distance covered by a young soccer player ranges from 4 to 8.5 km while by a professional soccer player ranges from 8 to 12km (Helgerud, 2001). General and special preparations for young soccer players start at the early age with informal ball play and physical movements. Around ten years of age children start to learn the fundamental skills – various types of kicks, ball receiving, dribbling, tackling, heading, goal-keeping techniques etc. They apply the skills in friendly and

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competitive matches. At this age, the inborn quality and prime physiological pre-requisites like aerobic and anaerobic efficiencies of the game are developing.

Methodology

For the objective of the study, 60 (N_1=60) schoolboys between 12 and 14 years of age young boys, who were regularly attending the regular soccer coaching and playing at least Inter-School or District level or other local tournaments were randomly selected from the different schools and academies of Manipur state. To determine the aerobic capacity (VO_2max), 12 minutes Run-Walk test was administered and recorded the distance covered in metres. It was converted into miles to calculate the aerobic capacity (VO_2max.) [VO_2max. (ml/kg/min.) = 35.9712 (distance in miles for 12min. run-walk) – 11.2878]. To determine the anaerobic power (maximal power), Sargent Jump- Lewis Nomogram was employed, and anaerobic power was expressed in Kg-m./sec. The data were collected in two phases on the same subjects in an intervening duration of three months i.e. 1st test followed by 2nd test after three months interval and developed total 120 data (N_2=120). The data were analyzed by using the descriptive and paired sample 't' test.

Findings and Results

The descriptive statistics was employed to find out the characteristics of data that determining the aerobic and anaerobic capacities of the young soccer players, shown at table 1.

TABLE- 1
DESCRIPTIVE ANALYSIS OF VO_2MAX AND ANAEROBIC POWER OF 1ST AND 2ND TEST

Item No.	N_1	Range	Min	Max	Mean	SD	SE
1st_ VO_2max	60	16.64	34.00	50.64	42.71	3.27	0.42
2nd_ VO_2max	60	17.45	34.23	51.68	44.54	3.64	0.47
1st_Anae. Power	60	58.00	38.00	96.00	63.20	13.66	1.76
2nd_Anae. Power	60	60.00	40.00	100.00	65.30	13.76	1.78

Table 1 shows that the means of 1st and 2nd test for VO_2max were M = 42.71±3.27 and M = 44.54±3.64 respectively. Further, the means of 1st and 2nd test for anaerobic power were M = 63.20±13.66 and M = 65.30±13.76 respectively. To find out the significant difference between the 1st and 2nd test means of VO_2max and anaerobic power (N_1=60), paired sample 't' test was employed and shown the result in table 2.

TABLE- 2
PAIRED SAMPLE 'T' TEST OF VO_2MAX AND **ANAEROBIC CAPACITY**

Variables	Paired Differences					t
	Mean	SD	SEM	95% Confidence Interval of the Difference		
				Lower	Upper	
1st VO. – 2nd Aero.	-1.83	1.19	0.15	-2.14	-1.52	-11.94*
1st Anae. – 2nd Anae.	-2.10	1.71	0.22	-2.54	-1.66	-9.49*

*Significant at 0.05 level of confidence, $t_{0.05\ (59)}$=2.021 (two tailed).

Table 2 reveals that there is the significant difference between the 1st test and 2nd test means of VO2max and anaerobic power (N_1=60) as the obtained value of 't' = (-)11.94 and (-)9.49 respectively are greater than the table value of 't' = 2.021 at 0.05 level of confidence for two tailed test. Therefore, it shows that there were significant improvement on VO_2max and anaerobic power of young soccer players during the three (3) months soccer training. To determine the profiles of VO_2max and anaerobic power of young soccer

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players, the total observation of 1st and 2nd test (N=120) had been treated by using the descriptive statistics and shown at table 3.

TABLE- 3
DESCRIPTIVE ANALYSIS OF VO2MAX AND ANAEROBIC POWER OF YOUNG SOCCER PLAYERS

Variables	Range	Mini.	Max.	Mean	SD	SEM
VO_2max	18	34	52	43.63	3.57	0.33
Anae. Power	62	38	100	64.25	13.70	1.25

Table 3 reveals that the mean or average level of VO2max of young soccer players is M = 43.63±3.57. Further, it also reveals that the mean or average level of anaerobic power of young soccer players is M = 64.25±13.70.

Discussion and findings

In the game of soccer the VO_2max and anaerobic power are highly demanded physiological parameters that decide the high performance actions during the course of game. The present study evaluated the VO_2max and anaerobic power of young soccer players observing two times (1st and 2nd test) on 60 subjects in an intervening duration of three months. The finding of this study demonstrated that there were significant improvement on VO_2max and anaerobic power of young soccer players during the three (3) months soccer training. Further, the mean or average level of VO_2max and anaerobic power of young soccer players were M = 43.63±3.57 and M = 64.25±13.70 respectively.

Conclusion

Regular Soccer training improved the VO_2max and anaerobic power of young soccer players.The study developed the criterion level of VO_2max and anaerobic power as 43.63 $ml.kg.^{-1}min^{-1}$ and 64.25 kg-m/sec.

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