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Original Research Paper Physical Education

CORRELATIONAL STUDY ON AEROBIC POWER AND CELLULAR BODY COMPOSITION

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ABSTRACT **Background:** In soccer aerobic power and cellular body composition has an important role. **Objective:** The objectives of the study were to observe the status of aerobic power and cellular body composition of district level Indian soccer players. Also observe the relationship between them. **Method:** In the present study 20 Indian district level soccer players age between 18-25 years were conveniently selected from Birbhum district of West Bengal as subjects. To measure aerobic power Queen's College Step test was employed and to measure cellular body composition Bio-scan analyser was used (Maltron Bio-scan 915 Analyser, Maltron International Ltd. PO box 15, Raylegh Essex, SS69 SM, UK.www.matonint.Com). The data were analysed by applying descriptive statistics to determine the status of aerobic power and cellular body composition and Pearson Product moment method of correlation to observe relationship between selected variables of Indian Soccer players. **Result:** The mean aerobic power of district level Indian soccer players in was 51.32±5.18 ml/kg/min whereas, mean total body protein mass was 10.83±2.30 kg, total body mineral mass was 3.80±0.81 kg, total body potassium was 113.44±17.82 gm, total body calcium was 919.61±146.78 gm and body glycogen mass was 435.72±44.82 gm respectively. Also there were positive significant relationship between aerobic power and total body potassium (0.539) and total body calcium (0.472) of district level Indian soccer players respectively. **Conclusion:** From the findings it may be concluded that aerobic power is directly proportional to total body potassium and total body calcium of district level Indian soccer players.

KEYWORDS : Aerobic Power, Cellular Body Compositions, Soccer Player

Introduction:

In elite outfield players, the average work rate during a soccer match as assessed from variables such as heart rate is approximately 70% of maximal oxygen uptake (VO2 max). Aerobic energy production appears to excuse for more than 90% of total energy consumption.
Human body composed with 75% of water and 30% of solid mass. Solid mass extracted from muscles, bones, internal organs, etc. Inside this solid mass there are different types of tissue and cell. These cells are composed with many molecules and obviously different types of atoms.

During a competitive match, a top-class player perform 150-250 intense actions as demonstrated by reduced muscle creatine phosphate and pH levels, and by increased muscle lactate concentrations. Muscle glycogen is reduced 40-90% during a game and is probably the most important substrate for energy production. Muscle triglycerides, blood free fatty acids and glycogen are also progressively utilized as substrates for oxidative metabolism, likely for compensating the lowering of muscle glycogen (Bangsbo J., 2007).

During an intermittent exercise, well trained athletes can regularly make use of the system of oxygen transport without creating high lactate levels in the muscles and in the blood. Even if there are differences depending on the players position, time and motion analyses of soccer matches demonstrate, that soccer players may cover as much as 10-12 km during a match lasting 90 minutes (actual playing time 55-62 minutes), involving a combination of high intensity sprinting, prolonged running at more moderate speed and periods walking (FIFA, 1989; Meyer et al., 2000; Tumilty, 2000).

Body composition is an important aspect of fitness for soccer players. An excess body fat act as dead mass in activities when body mass is lifted repeatedly against gravity in running and jumping during play (Ekblom, 1994). From the ancient time it has been believed that suitable physique has an important aspect to achieve success in particular sports.

Objectives of the Study:

The objectives of the study were to observe the status of aerobic power and selected cellular body compositions of district level Indian soccer players and to establish the relationship between them.

Methodology

Selection of Subjects:
To achieve the objectives of the study, twenty (20) male Indian soccer players were taken conveniently as subjects for this study. The subjects were selected from Birbhum district of West Bengal and all of them were the member of district team. The age ranges of the subjects were 18-25 years. Out of twenty subjects two were drop out.

Criteria measure:

To measure the aerobic power Queen's college test was employed. The selected cellular body compositions were protein mass, mineral mass, total body potassium, total body calcium and glycogen mass respectively. To measure these selected cellular body composition, Bio-scan analyser was used (Maltron Bio-scan 915 Analyser, Maltron International Ltd. PO Box 15, Raylegh Essex, SS69 SM, UK.www.matonint.com). The tests were taken in two consecutive days at the same time (4-6 pm) and two distinct sessions (morning & noon).

Statistical Techniques:

Data were analysed using Microsoft Excel 2010 and IBM SPSS statistical software package (version 21.0; IBM Corp., Armork, NY). Analyses included standard descriptive statistics and Pearson product moment method of correlation. All tests were two tailed and a P value of <0.05 was required for statistical significance.

Results:

The findings pertaining to descriptive statistics of aerobic power and selected cellular body compositions of district level Indian soccer players has been presented in Table I.

Table 1: Descriptive Statistics of Aerobic Power and Selected Cellular Body Compositions of District Level Soccer Players

Parameters	Mean	Standard Deviation	Standard Error of Mean
Aerobic Power (ml/kg/min)	51.32	5.18	1.22
Protein Mass (kg)	10.83	2.30	0.54
Mineral Mass (kg)	3.80	0.81	0.19
Total Body Potassium (gm)	113.44	17.82	4.20

Total Body Calcium (gm)	919.61	146.78	34.60
Glycogen Mass (gm)	435.72	44.82	10.57

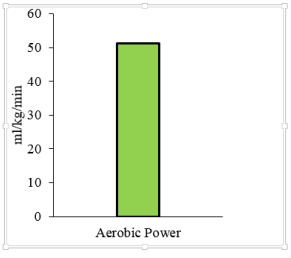
The mean aerobic power of district level Indian soccer players in was 51.32±5.18 ml/kg/min whereas, mean total body protein mass was 10.83±2.30 kg, total body mineral mass was 3.80±0.81 kg, total body potassium was 113.44±17.82 gm, total body calcium was 919.61±146.78 gm and body glycogen mass was 435.72±44.82 gm respectively.

Table 2: Correlational Table of Aerobic Power and Selected Cellular Body Compositions

Cellular Body Compositions	Aerobic Power
PROTEIN (kg)	0.428
MINERAL (kg)	0.426
TBK (gm)	0.539*
TBCa (gm)	0.472*
GLYCOGEN (gm)	0.279
*. Significant at 0.05 level r0.05 (16) = 0.468	

Table 2 shows that there were positive significant relationship between aerobic power and total body potassium (0.539) and total body calcium (0.472) of district level Indian soccer players respectively.

The graphical representation of means for aerobic power and selected cellular body compositions of district level Indian soccer players has been presented in Figure I, II & III.



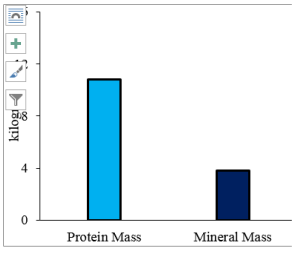


Figure I: Aerobic PowerFigure II: Protein Mass and Mineral Mass

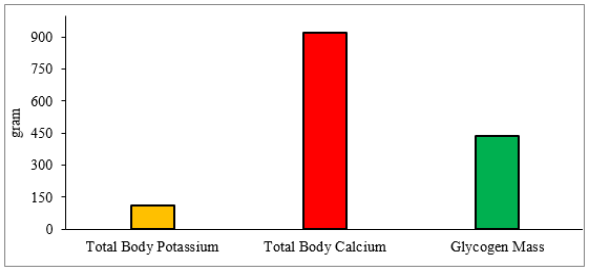


Figure III: Total Body Potassium, Total Body Calcium and Glycogen Mass

Discussion:

In the body the minerals are classified as trace minerals (those requiring less than 100 mg per day) and major minerals (those required in amount greater than 100 mg per day).

The calcium is major minerals in the body. In this study the researcher observed a positive relationship with aerobic power and calcium mass in the body. Calcium is the most abundant mineral in the body combines with phosphorus to form bones and teeth. Calcium and Sodium represent about 75% of body's total minerals content of about 2.5% of body mass. In ionized from calcium plays an important role in muscle action, blood clotting, nerve impulse transmission, activation of several enzymes synthesis of calciferol and fluid transport across cell membranes.

Also researcher observed a positive relationship with aerobic power and total potassium mass of the body. The minerals potassium, sodium and chlorine, collectively termed electrolytes, dissolve in the body as electrically charged particles poled ions. Sodium and chlorine represents the chief minerals contents in blood plasma and extra cellular fluid. Electrolytes modulates fluid exchange within the bodies various fluid compartments, allowing for a constant, well regulated exchange of nutrients and waste product between the cell and its external fluid environment. Potassium represents the chief intra cellular minerals. Establishing proper electrical gradients across cell membranes represents the most important function for sodium and potassium ions. A different in electrical balanced between the cells interior and exterior allows nerve impulse transmission, muscles stimulation and contraction and proper gland functioning. Electrolytes also maintain plasma membrane permeability and regulate the acid and base qualities of body fluid particularly blood.

Both the two minerals are very important for nerve conduction and muscle contraction. From this study it may be postulated that if there is any shortage of these two minerals the aerobic power and capacity of soccer players may be disturbed. With this research the present research group highlighted and strongly recommend the importance of measurement of cellular body composition for the improvement of soccer performance in particular and sports performance in general.

Conclusion:

In light of the other findings, the present study may be concluded that aerobic power is directly proportional to total body potassium and total body calcium of district level Indian soccer players.

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