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A comparison on selected motor fitness components & physiological characteristics between sprinters & jumpers

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Abstract
Today's many sports are played by the peoples in the world, but athletic is one of the most popular sports. Because of its tradition, its universality and prestige, as well as the wide range of skills and qualities that encompasses, it is the basic sports "par excellence". The purpose of the present study was to compare the selected motor fitness parameter, physiological characteristics between state level male sprinters and jumpers in West Bengal to achieve this objectives, total 40 athletes, (20 sprinters and 20 jumpers) were selected randomly from different athletics academy and coaching clubs areas in West Bengal. Their age ranged from 18 to 26 years as per their matriculation records. For the present study selected motor fitness component and physiological characteristics were selected as the measuring criteria. Mean and SD were used as descriptive statistics. Statistical t-test showed significant difference of leg explosive strength (2.2112>2.021) between sprinters and jumpers as the absolute value of the calculated t exceeds the critical value. Lastly the physiological characteristics showed similar uniqueness for both sprinters and jumpers.

Keywords: Motor fitness, Physiology, Sprinters and Jumpers

Introduction

Sports hold the prominent place in the modern scientific age. Today sports have become integral part of our human and social life. The game and sports have been indispensable to mankind and have been part of his culture. It is quite certain that physical activities have been a basic necessity of life, more than fun and diversion, for his survival depended on fitness. Gradually along with process of evolution, such activities have become more of play and part of culture of our people. They used sports and games as a means of transmitting the cultural heritage of their tribes. Games, sports and physical activities persisted despite the rise and fall of ancient civilizations as a culture heritage, which was passed on from one generation to another generation.

Athletics is a collection of sporting events that involve competitive running, jumping, throwing, and walking. The most common types of athletics competitions are track and field, road running, cross country running, and race walking. Today's many sports are played by the peoples in the world, but athletic is one of the most popular sports. Because of its tradition, its universality and prestige, as well as the wide range of skills and qualities that encompasses, it is the basic sports "par excellence". In addition, athletic constitute the most important element of the modern Olympic games.

According to Dr. Ivan Bayli, Dr. Richard Way, and Dr. Colin Higgs, motor skill and athletic development can be broken down into five categories: Stamina, Strength, Speed, Skill, and Flexibility. These categories are always trainable, but improve at a greater pace if the proper workouts are applied during the right periods of development. These periods are referred to as optimal windows of trainability. By training during the sensitivity period, strength and aerobic development can reach higher potentials than would be achieved by training according to chronological age. Your chronological age is your age in years, while your biological age is your age in relation to developmental landmarks such as your growth spurt and other developmental events. Coaches can take advantage of sensitive training periods by monitoring

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the rate at which an athlete is growing, and training in the proper developmental windows to optimize results.

An athlete's motor fitness is a combination of five different components, each of which is essential for high levels of performance. Motor fitness, also termed motor ability refers to a person's performance abilities as affected by the factors of agility, balance, speed, explosive strength, and flexibility. All the five components of motor fitness are essential for competing at high levels of sports performance. That's why the concept is seen as an essential part of any athlete's training regime. (Singh M. *et. al.* 2014) [6]

Physiological parameter is the very essential for good performance of all athlete and sports man. Human physiology, a branch of general physiology, is concerned with how the human body works. It is common to approach the study of human physiology through an organ-system approach. Organ-systems are collections of cells, tissues and organs, which have dedicated functions in the body. The physiology is very important for sports man.

Combining those referred elements, the researcher wanted to view actual effects of said component upon the track and field athletes namely sprinters and jumpers.

Objectives
The purpose of the present study was to compare the selected motor fitness component and physiological characteristics between male adult state level sprinters and jumpers in West Bengal.

Methodology
The data were collected from different athletic coaching centers and academy in southern region districts of West Bengal, who have participated in state championship as well as national meet were selected as the subjects of this study. All subjects were participating regular in their respective events. Their age ranged from 18-26 years old. There 40 athletes were selected randomly for the study, out of 20 were sprinters and 20 were jumpers. The study was confined to the selected motor fitness components namely agility, speed, leg explosive strength, and physiological characteristics namely blood pressure, resting heart rate. The data of selected subject for motor fitness components were recorded by different measures and data were observed by the preforming Zig Zag run, 50 yard dash, standing broad jump and for physiological parameter were recorded by sphygmomanometer, palpation method is at wrist and the neck.

Statistical Analysis
The obtain data in form of digital score were treated statistically to get results and to draw conclusions. The Mean and SD was used as descriptive statistics. The significance of statistical difference between the groups were measured by applying 't'-test.

Results and Discussion
In Table: 01 the personal data of the subjects were presented.

Table 1: Showed the personal data of the subjects and 't' test results.

Personal Data Variable	Sprinters		Jumpers	
	Mean	± SD	Mean	± SD
Age (Years)	21.2	2.82	21.35	3.03
Height(cm)	1.67	0.03	1.68	0.04
Weight (kg)	59.2	3.30	58.1	3.98

Table value of 't' at 0.05 level with (38 df) =2.02

From Table-01 it was seen that Mean Age and SD of the sprinters for the present study were 21.2 & ±2.82 respectively. It was also found that Mean and SD of Height of the sprinters were 1.67 & ±0.03 respectively. In the same way it was also observed that Mean and SD of Weight of sprinters were 59.2 & ±3.30.

And it was seen that the Mean Age and SD of the jumpers for the present study were 21.35 & ±3.03 respectively. It was also observed that Mean Height and SD of the jumpers were 1.68 & ±0.04 respectively. In the same way it was found that Mean Weight and SD for the same group of subjects were 58.1 &

±3.98 respectively.

From table-01 it was clear that there was jumper's age is more than sprinters. Jumpers are taller than the sprinters and sprinters are heavier than the jumpers. It is evident from different studies that sprinters are strongest contender for the track and field event compare to other athletes.

(V. Vucetic et al.) The present study shows exactly the same as previous works did.

From table-02 shows the motor fitness parameter data such as agility, speed and leg explosive strength of the sprinters and jumpers were presented.

Table 2: Analysis of mean, SD and t-test results of agility, speed and leg explosive strength between Sprinters and jumpers

| Motor fitness Component	Sprinters		Jumpers		t – test
	Mean	± SD	Mean	± SD	
Agility	23.36	1.19	22.28	1.77	1.0064
Speed	6.38	0.43	6.55	0.34	1.34825
Leg explosive strength	2.41	0.11	2.63	0.42	2.2112*

Table value of 't' at 0.05 level with (38 df) =2.02

From Table no 02, it was found that the mean agility and SD of sprinters were 23.36 and. ±1.19. The mean agility and SD of jumpers were 22.28 and ±1.77. As we know that the performance of agility is recorded in shortest possible time and from table-2 it is evident that the mean performance level of jumpers (22.28) was more agile than the sprinters (23.36).

From Table no 02, it was found that the mean speed and SD of sprinters were 6.38 and. ±0.43. The mean speed and SD of jumpers were 6.55 and ±0.34. As we know that the performance of speed is recorded in shortest possible time and

from table no-2 it is evident that the table showed not significant results but the mean performance level of sprinters (6.38) was speedier than the sprinters (6.55).

From Table no 02, it was found that the mean leg explosive strength and SD of sprinters were 2.41 and. ±0.11. The mean leg explosive strength and SD of jumpers were 2.63 and ±0.42. This table is found significant result and jumpers are more leg strength than sprinters. For better understanding it was presented graphically in graph -01.
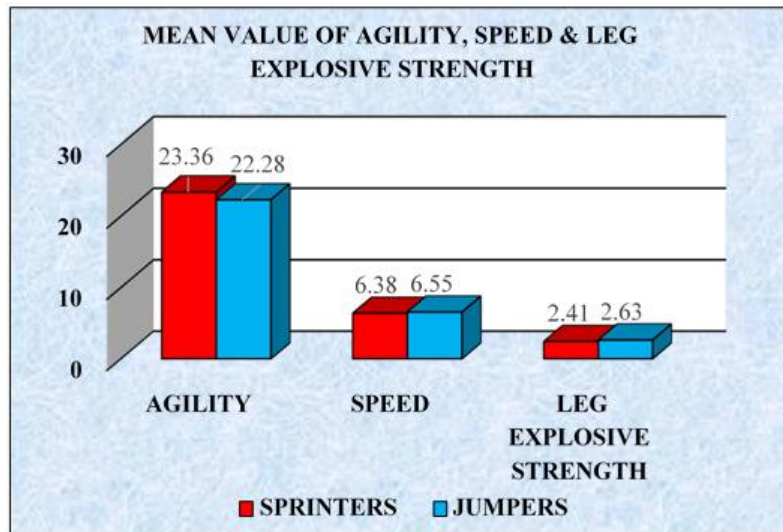
From the graph value, it was clear that the jumper's absolute mean value of the agility is better than sprinters. So jumpers are more agile than sprinters. I think it was the effect of training and some genetic factors. Here agility was measured by Zig Zag run test, as the running was key factor for the this test, it automatically gives jumpers a better half since running is a key part of the jumping event. Apart from this it is evident from the different studies that jumpers are more agile than the sprinters. (Singh Manjit. *et al*.)

From the graph value, it was clear that the sprinters absolute mean value of the speed is better than jumpers. So jumpers are more speed than sprinters. Running speed is more essential in running events. As the sprinting ability of sprinters is better than jumpers so the reflation of the results states exactly the same as the other researches did previously (Rakshit S and Dr. Bag S).

From the graph value, it was clear that the absolute value of the calculated t exceeds the critical value (2.2112>2.0212), consequently the means are significantly different. Basically jumping performance directly related with leg explosive strength but sprinting performance also depends upon lower extremity and better running style so in that case jumpers are having more advantage than the sprinters in terms of leg explosive strength. One of the researches the research made by (J. L. Markstrom & C. J. Olsson and S. C. Hollings & G. J. Robson) shows the same outcomes like as present one.

In Table: 03 the physiological characteristics of the subjects were presented.

Table 3: Showed the physiological characteristics of the subjects and 't' test results.

Physiological Characteristics		Sprinters		Jumpers		t – test
		Mean	± SD	Mean	± SD	
Blood Pressure (Mm/hg.)	Systolic	122.9	5.64	121.95	5.56	0.53577
	Diastolic	68.8	5.29	67.8	5.44	0.58872
Resting heart rate(in counts)		61.05	3.10	60.85	4.75	0.14555

Table value of 't' at 0.05 level with (38 df) =2.02

From Table-03 it was seen that Mean systolic B.P. and SD of the sprinters for the present study were 122.9 & ±5.64 respectively. It was also found that Mean Diastolic B.P. of the sprinters was 68.8 & ±5.29 respectively. In the same way it was observed that Mean systolic B.P. and SD of jumpers were 121.95 & ±5.56 and Mean Diastolic B.P. of the throwers was 67.8 & ±5.44 respectively.

And it was seen that the Mean resting heart rate and SD of the sprinters were 61.05& ±3.10 respectively. It was also observed that Mean resting heart rate and SD of the jumpers were 60.85 & ±4.75 respectively.

Here all physiological characteristics showed the same results i.e. absolute value of the calculated t is smaller than critical value, so the means are not significantly different. As all the athletes go throw hard training schedule so the selected physiological characteristics were showed not much difference.

Conclusion
Within the limitations of the present study and on the basis of findings the following conclusions are drawn:

Personal Data
The collected data divulge that mean age, height and weight of the sprinters and jumpers were almost identical.

Motor fitness parameter
1. The findings of the study revealed that there was no significant difference in agility of sprinters and jumpers and jumpers are more agile than sprinters.
2. The results of the study revealed that there was no significant difference in speed between sprinters and jumpers and sprinters are speedy than jumpers.
3. The findings of the study revealed that there was significant difference in leg explosive strength between sprinters and jumpers and jumpers are better leg explosive strength than sprinters.

Physiological characteristics
The collected data reveal that three physiological variables were showed not much difference between sprinters and jumpers.

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