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A Comparative Analysis of Motor Fitness Components of Sprinters: A Key to Towards Success

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Abstract

Thus the aim of this study was to determine the comparative analysis of motor fitness components of sprinters. To obtain data, the investigators had selected sixty (N=60), Male Inter-College and Inter-University Level Sprinters between the age group of 18-25 years (Mean ± SD: age 20.683±2.02 years, height 5.7449±26.3 m, body mass 76.400±14.3 kg) were selected. The subjects were purposively assigned into three groups: Group-A: Sprinters (n_1=60) Inter-College (n_{1a}=30) and Inter-University (n_{1b}=30). To determine the significant differences of motor fitness components between Inter-College and Inter-University Sprinters, unpaired t-test was employed for data analyses. To test the hypothesis, the level of significance was set at 0.05. To conclude, it is significant to mention in relation to motor fitness components that insignificant differences occur between Inter-College and Inter-University Sprinters on the sub variable agility, balance and flexibility. However, the significant differences occur between Inter-College and Inter-University Sprinters on the sub variable speed and explosive strength.

Keywords: Agility, balance, speed, explosive strength and flexibility.

Introduction

Today, all the events of Athletics are competitive in nature; the performance of athletes in different events has taken a great leap over the last twenty years. Technology has enhanced the level of performance greatly through improved equipment and nutritional product. Back in the 1980's it was good enough to be fitter than your opponent that would secure the victory. Today, everybody is as fit, and technically, tactically advanced as their opponents. The playing fields have been leveled once again. The performance of players is influenced by many factors such as level of physical fitness, physiological and psychological abilities, technique, tactics, physique, body size, body composition and application of bio-mechanical principles[1].

The relationship of sports performance with the physical, psychological and physiological abilities has been the thrust area for researchers from decades. There have been thousands of attempts by the researchers to develop a consistent Physical and psychological and physiological profile of athletes, to be reliably used to differentiate athletes and to predict the sports performance[2,3]. Scientists and physiologists have been of the view that body composition and physical components of an athlete have a lot to do with his performance. More than the technique and tactics of a player or a team physical and physiological characteristic helps him for better performance.

Prediction in human performance and sports has long been a popular topic of debate. Is there such a thing as natural athletes? What physical attributes are most important for high level of athletic performance? Is it possible to measure athletic potential and predict future athletics success[4]. Early researcher operated on the theory that as there were tests for assessing the innate ability of intelligence in the cognitive domain, there must also be a way to measure innate motor ability in the psychomotor domain. These early researchers concentrated from the early 1920's to the early 1940 on determining the physical components that are basic to and necessary for a successful human performance.

The results of various research studies show that motor fitness components of athletes differ from game to game position to position, male to female athletes and they affect the sports performance. Johnson[5] found in his study the successful wrestlers had better balance than the unsuccessful wrestlers. Malhotra and Subraminiam[6] have claimed that a high level of general fitness with motor abilities like strength, aerobic endurance, speed of moment, jumping ability, agility flexibility etc. are the essential qualities required to be developed by the Basketballers. Optimum physical performance is a combination of all the components of motor fitness; depending on the specific demands of the sports or activities. Some components will require more attention than other, but each should be present as an integrated part of training programme[7]. Physical and physiological characteristics of elite athletes are different among sports. In selection of athletes for a particular sport, the focus should be on those traits and abilities which have the most significant influence on sport performance, such as physiological and anthropometric characteristics.

Selection of Subjects: For the purpose of the present study, sixty (N=60), Male Inter-College and Inter-University Level Sprinters between the age group of 18-25 years (Mean ± SD: age 20.683±2.02 years, height 5.7449±26.3 m, body mass 76.400±14.3 kg) were selected. The subjects were purposively assigned into three groups: Group-A: Sprinters (n_1=60), Inter-College (n_{1a}=30) and Inter-University (n_{1b}=30).

Selection of Variables: A feasibility analysis as to which of the variables could be taken up for the investigation, keeping in view the availability of tools, adequacy to the subjects and the legitimate time that could be devoted for tests and to keep the entire study unitary and integrated was made in consultation with experts. With the above criteria in mind, the following variables were selected for the present study:

Motor Fitness Components: Agility, balance, speed, explosive strength, flexibility.

Statistical Technique Employed: To determine the significant differences of motor fitness components between Inter-College and Inter- University Sprinters, unpaired t-test was employed for data analyses. To test the hypothesis, the level of significance was set at 0.05.

Results and Discussion

Results: The results of Motor Fitness Components of Inter-College and Inter-University level Sprinters are presented in the following tables and their interpretations are given accordingly. Graphical representation of each variable is also presented for mean comparison. Further discussion of finding is initiated for better understanding of results.

Agility: A glance at table-1 shows the results of Inter-College and Inter-University sprinters with regard to motor fitness components. The descriptive statistics shows the Mean and SD values of Inter-College sprinters on the variable of agility as 16.3203 and 1.31924 respectively. However, Inter-University sprinters had Mean and SD values as 16.1090 and 2.60597 respectively. The‘t’-value .396 as shown in the table above was found statistically insignificant (p>0.05). It has been observed from the above results that Inter-University sprinters have demonstrated better on the variable agility than the Inter-College sprinters though insignificantly.

Balance: The descriptive statistics shows the mean and SD values of Inter-College sprinters on the variable balance as 17.8173 and 8.40997 respectively. However, Inter-University sprinters had Mean and SD values as 20.4000 and 5.73916 respectively. The ‘t’-value 1.389 as shown in the table above was found statistically insignificant (p>0.05). It has been observed from the above results that Inter-University sprinters have demonstrated better on the variable Balance than the Inter-College sprinters though insignificantly.

Speed: The descriptive statistics shows the Mean and SD values of Inter-College sprinters on the variable of speed as 5.9990 and .25460 respectively. However, Inter-University sprinters had mean and SD values as 5.8837 and .14464 respectively. The‘t’-value 2.157 as shown in the table above was found statistically significant (p<0.05). It has been observed from the above results that Inter-University sprinters have demonstrated better on the variable speed than the Inter-College sprinters significantly.

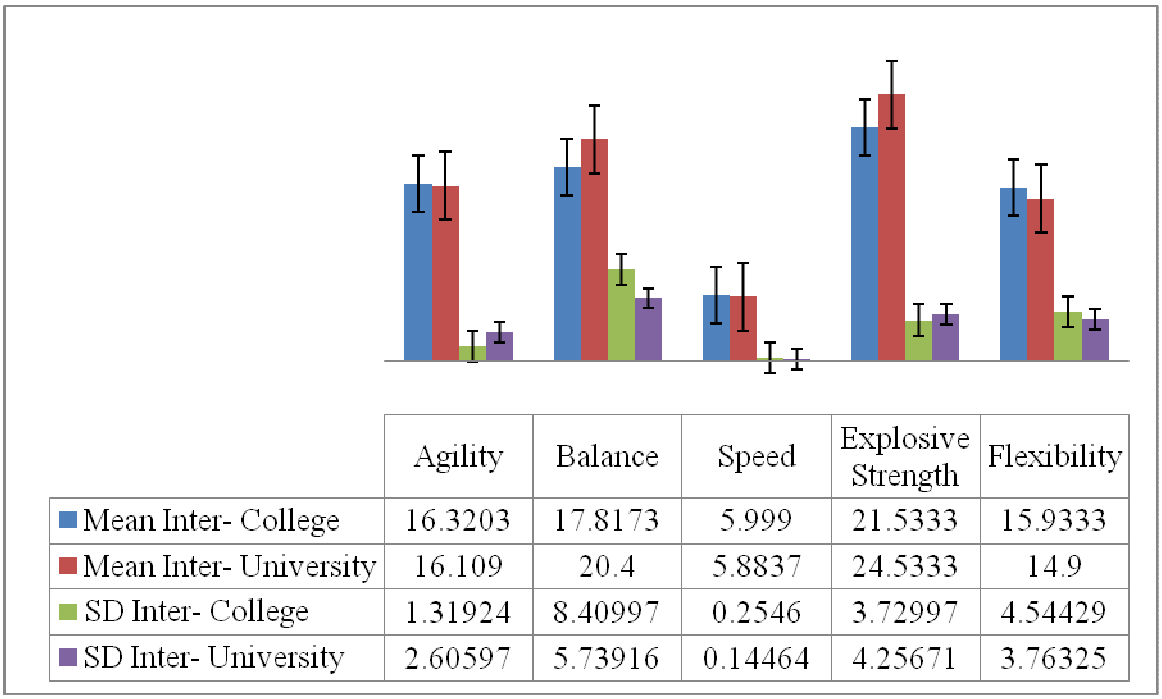
Explosive Strength: The descriptive statistics shows the mean and SD values of Inter-College sprinters on the variable of explosive strength as 21.5333 and 3.72997 respectively. However, Inter-University sprinters had Mean and SD values as 24.5333 and 4.25671 respectively. The ‘t’-value 2.903 as shown in the table above was found statistically significant (P<.05). It has been observed from the above results that Inter-University sprinters have demonstrated significant better on the variable explosive strength than the Inter-College sprinters significantly.

Flexibility: The descriptive statistics shows the Mean and SD values of Inter-College sprinters on the variable of flexibility as 15.9333 and 4.54429 respectively. However, Inter-University sprinters had mean and SD values as 14.9000 and 3.76325 respectively. The ‘t’-value .959 as shown in the table above was found statistically insignificant (p>0.05). It has been observed from the above results that Inter-College sprinters have demonstrated better on the variable flexibility than the Inter-University sprinters. The comparison of mean scores of both the groups on motor fitness components has been presented graphically in figure-1.

Table-1
Significant Differences in the Mean Scores of Inter-College and Inter-University Sprinters on the Variable Motor Fitness Components

Variables	Mean		SD		Mean Difference	t-value	p-value
	Inter- College	Inter- University	Inter- College	Inter- University			
Agility	16.3203	16.1090	1.31924	2.60597	.21133	.396	.693
Balance	17.8173	20.4000	8.40997	5.73916	2.58267	1.389	0.170
Speed	5.9990	5.8837	.25460	.14464	.11533	2.157*	.035
Explosive Strength	21.5333	24.5333	3.72997	4.25671	3.00000	2.903*	.005
Flexibility	15.9333	14.9000	4.54429	3.76325	1.03333	.959	.341

*Significant at 0.05 level, $t_{.05}$ (58)



	Agility	Balance	Speed	Explosive Strength	Flexibility
Mean Inter- College	16.3203	17.8173	5.999	21.5333	15.9333
Mean Inter- University	16.109	20.4	5.8837	24.5333	14.9
SD Inter- College	1.31924	8.40997	0.2546	3.72997	4.54429
SD Inter- University	2.60597	5.73916	0.14464	4.25671	3.76325

Figure-1
Graphical Representations in the Mean Scores of Inter-College and Inter-University Sprinters on the Variable Motor Fitness Components

Discussion of Findings: The analysis highlighted that some sub variable of motor fitness components of Inter-College and Inter-University sprinters, throwers and jumpers differ significantly. It is evident from the results of table- 3 that significant differences were found with regard to motor fitness components of Inter-College and Inter-University sprinters in the sub-variables; speed and explosive strength. When compared to the mean values of both the groups, it has been found that Inter-University sprinters have performed significantly better on speed and explosive strength than their counterparts. However, no significant differences have been observed on the sub-variables; agility, balance and flexibility. The results of previous studies conducted on motor fitness components showed that higher level of motor fitness components i.e. speed and explosive strength give us the one up on our opponents. Saravanan and Singh[8] found significant difference on the diurnal rhythm on speed among groups during different times of the day, while the diurnal rhythm on strength endurance differs among different groups. Brechue[9] observed that sprint times and strength per body mass were significantly lower in lineman compared with linebackers-tight ends and backs. Marques[10] conducted a study on different positions of volley ballplayers and concluded that Differences were found in bench press maximal strength among three groups blockers.

Conclusions

Based on the findings of this study, the following conclusions were drawn:

To conclude, it is significant to mention in relation to motor fitness components that insignificant differences occur between Inter-College and Inter-University Sprinters on the sub variable agility, balance and flexibility. However, the significant differences occur between Inter-College and Inter-University Sprinters on the sub variable speed and explosive strength.

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