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A comparative study of JCR test between sprinters and throwers

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Abstract
In present study, an attempt has been made to compare physical fitness among inter-university male sprinters and throwers. For this study, cooper's JCR motor fitness test is applied to sprinters and throwers to compare their physical fitness performance. 20 Sprinters and 20 Throwers at Inter university competition (Patiala, 2015-16) were selected randomly for this study. The age group of the subjects was between 19 to 28 years. For analysis of the data Mean & SD were calculated and to examine the significance difference between the group mean of different physical fitness components, independent samples t-test was applied and level of confidence was set at 0.05 level. The result reveals that the Vertical-jump performance of sprinters is high as compared to Throwers. The result indicates that there are insignificant differences between sprinters and throwers in Chin-ups, throwers performed better than sprinters. Result found that Sprinters have shown their dominance and their superiority on Shuttle-Run compare to throwers.

Keywords: physical fitness, sprinters, throwers, vertical-jump, chin-ups and shuttle-run

Introduction
As we enter the 21st century, one of the greatest accomplishments we can celebrate is our continuous pursuit of fitness since the beginning of humankind. Throughout prehistoric time, the quest for fitness was driven by a need to survive through the arduous tasks of hunting and gathering. In previous years, fitness was commonly defined as the capacity to carry out the day's activities without undue fatigue. However, as automation increased leisure time, changes in lifestyles following the industrial revolution rendered this definition insufficient. In current contexts, physical fitness is considered a measure of the body's ability to function efficiently and effectively in work and leisure activities, to be healthy, to resist hypo kinetic diseases, and to meet emergency situations. There are five main components of physical fitness in sports:-

Speed
Speed is the ability to move quickly across the ground or move limbs rapidly to grab or throw. Speed is not just how fast someone can run, but is dependent on their acceleration, maximal speed of movement, and also speed maintenance. Speed is one of the main fitness components, important for success in many sports. The sprint events are like synonyms of speed. The throwing events in athletics can be said to be acyclic movement exercises performed at maximum speed. According to the laws of physics, release velocity has the greatest influence on distance attained in any throwing event. This is both a guiding and target parameter. Therefore, release velocity should always be maximized while the values of the other factors should be optimal. When we use the word speed we are speaking in terms of acceleration, velocity, frequency, and time of reaction to a signal. Achieving high release velocity values in any throwing event requires great accelerations and velocities of the body's kinetic chain.

Strength
Strength is the maximal force you can apply against a load. Strength is one of the main fitness components, important for success in many sports. Throwing events require great strength and throwers are usually the biggest athletes in any athletic competition. Previously, it was thought that throwers needed to have a large body mass, but a good power-to-weight ratio is important for throwers to generate speed onto the implement both prior to and during the release. Long levers also help in propelling the implement as the release of the implement can occur further ahead of the throwers body. Speed is related to muscle mass. Although the general public may make fun of bodybuilders as muscle-bound and unable to run, the fact is there is a relationship between muscle mass and running. Sprinters must develop impressive strength to be able to overcome inertia during the start. Overcoming inertia is also a goal of weightlifters; in fact, the strength training weightlifters do often enables them to have sprint starts that match up with sprinters. Brian Oldfield, who put the shot 75 feet as a professional, would often race against the best female sprinters in exhibitions and often beat them! He reportedly ran the 100 meters in 10.5 and the 40-yard dash in 4.3 seconds.

Endurance
Endurance is the ability to do sports movement with desired quality and speed under the condition of fatigue. Most sports require athletes to develop muscular endurance to a certain degree, along with the other components of fitness, but because muscular endurance is muscle-specific, certain sports require athletes to hone different muscles for endurance. In sprint and throw events there is not much use of endurance. These events are mostly anaerobic. These types of events are

very short time, so there is no use of endurance training.

Flexibility

Flexibility is defined as the ability to move joints or muscles through their full-range of motion. All sports require flexibility. Throwers need to be able to stop after throwing the object, walking and sprints also requires flexibility. Stretching is of huge benefit as it can with proper stretching can bring increased muscle control, flexibility and range of motion. All three of these are important for sprinters to have. Stretching and gaining flexibility can also be a preventative measure against becoming injured. The benefits for sprinters are tremendous. Hurdlers also could fall under this category. As a hurdler you obviously need a certain extent of flexibility to be able to run fast and still drive your lead leg and whip your trail leg over a forty-two inch tall hurdle at very high speeds. When stretching, it is obviously important to remember to not overstretch so as to hurt or pull a muscle.

Coordination

Coordination is the ability to repeatedly execute a sequence of movements smoothly and accurately. This may involve the senses, muscular contractions and joint movements. All sports require the coordination of eyes, hands and/or feet and maybe an implement and a ball. Sprinting is an activity that depends on the coordination of both nerves and muscles, and on the ability of the central nervous system to eliminate as many breaking and friction movements as possible. Mechanically, sprinting is not a complex skill. Neurologically speaking, sprinting is complex sequence of firing by motor neurons to activate the muscles to move the human lever system in order to effectively apply force. A sprinter's performance is mainly determined by the force and speed with which muscles can contract and relax and, because of the cyclic motion, the correct timing of the change from contraction to relaxation. The throwing events don't show cyclic movements as we see in running, so coordination is a must. Body types required in the throws are quite different than those seen in the other speed and power events.

The main purpose of the study of to find out whether the participation in Sprinters and Throwers will develop the motor ability of every individual. The vigorous participation in Sprinters and Throwers will develop (physical fitness) motor ability. A person can improve the physical fitness through related test batteries for development better performance in sports activities, but also meaning of healthful living. A good physique depends upon certain amount of Physical strength along with the Mental Strength while Physical Strength determines one's abilities and capacities potentialities, Agility of an individual on the other hand, the mental strength determines the Neuro Muscular co-ordination of the individual. Motor abilities represent an integrated outcome of most bodily functions involved in physical activity and can be used to assess the effectiveness of physical education as well as measure by standardize test J.C.R test batteries. Motor fitness refers to the ability of an athlete to perform successfully at their sport. The components of motor fitness are – agility, balance, coordination, power and reaction time.

Material and Methods

Sample

To obtain data for this study, the investigators had selected forty (N=40) male inter- university level athletes of 19 to 28 years of age group to act as subjects. They were further divided into two groups which includes twenty (n_1= 20) Sprinters and twenty (n_2= 20) Throwers. The purposive sampling technique was used to obtain the required data. All the subjects, after having been informed about the objective and protocol of the study, gave their consent and volunteered to participate in this study.

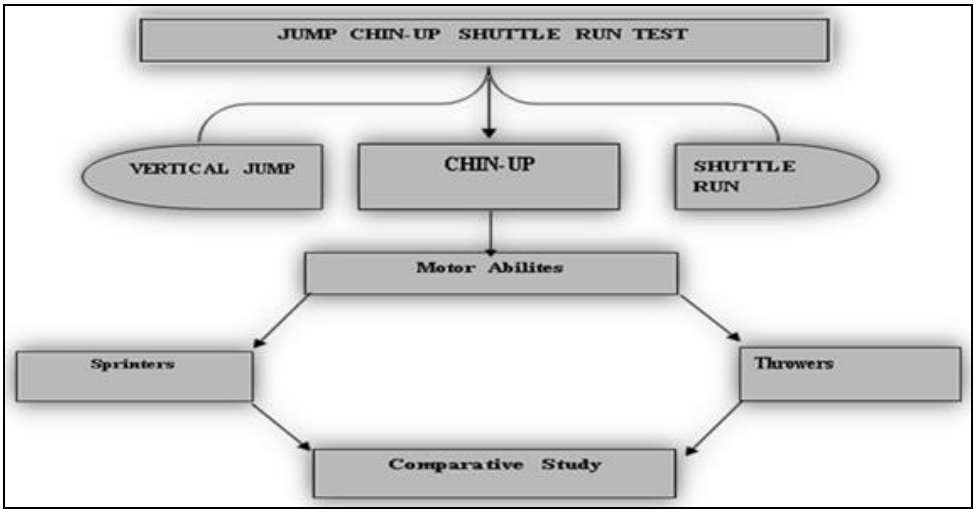

Fig 1

Table 1: Selection of variables

J.C.R. test items	Criterion Measure
Vertical-jump	Recorded in nearest cm/inches
Chin-ups	The total number of correctly completed Chin-ups is recorded
Shuttle-Run	Recorded to the nearest 1/100th Second

Data Analysis

Student's t-test for independent data was used to assess the between-group differences. The level of significance was set on 0.05.

Results

The results pertaining to significant difference, if any, between male Sprinters and Throwers were assessed using the Student's t test and the results are presented in tables-2:

Table 2: Mean, Standard Deviation and t-value of male Sprinters and Throwers

Variables	Mean		SD		t-value
	Sprinters	Throwers	Sprinters	Throwers	
Vertical-jump	17.10	15.35	2.14	1.51	2.98*
Chin-ups	18.04	19.70	2.79	3.98	1.52
Shuttle-Run	8.91	9.49	0.62	0.59	3.03*

*Significant at 0.05 level Degree of freedom=38

Table-2 presents the results of male Sprinters and throwers with regard to the Cooper's JCR motor fitness test. The descriptive statistics shows the Mean and SD values of sprinters on the sub-variable of Vertical-jump as 17.10 and 2.14 respectively. However, throwers had Mean and SD values as 15.35 and 1.51 respectively. The The 't'-value 2.98 as shown in the table above was found statistically significant (P<.05). It has been observed that sprinters have better on Vertical-jump than the throwers. The descriptive statistics shows the Mean and SD values of sprinters on the sub-variable Chin-ups as 18.04 and 2.79 respectively. However, throwers had Mean and SD values as 19.70 and 3.98 respectively. The 't'-value 1.52 as shown in the table above was found statistically insignificant (P>05). It has been observed that Throwers have better on Chin-ups than the Sprinters. The descriptive statistics shows the Mean and SD values of Sprinters on the sub-variable Shuttle-Run as 8.91 and 0.62 respectively. However, Throwers had Mean and SD values as 9.49 and 0.59 respectively. The 't'-value 3.03 as shown in the table above was found statistically significant (P<.05). It has been observed that Sprinters have better on Shuttle-Run than the Throwers. The comparison of mean scores of both the groups has been presented graphically in figure below.

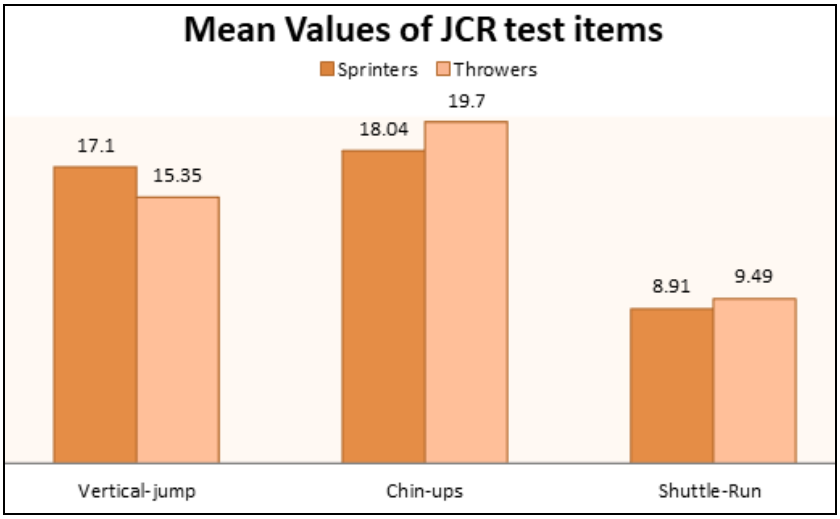

Fig 1: Graphical representation of mean scores of male Sprinters and Throwers with regard to the Cooper's JCR motor fitness test.

Conclusion

The physical demands vary greatly among the track and field disciplines. The sprint events are the 100m, 200m, 400m, hurdles (110/100m, 400m) and relays (4x100m, 4x400m). Obviously top running speed is very important for sprinters; the throwing events are Discus, Shot Put, Javelin and Hammer Throw. The primary fitness component for throwers is power. JCR Test represents an important consideration in an individual's performance in Physical activity. While JCR test is one of the numbers of determinants of the capability of performance in Physical activity in many classes it may spell the difference between success and failure or even between life and death in emergencies. The present study under report studied the physical fitness components such as vertical jump, chin-up, shuttle run, of the male Sprinters and Throwers. From the obtained results it is very clear that the individuals who participate in Sprinting and Throwing events will develop better Vertical Jump, Chin-Up, and Shuttle Run. Hence it is finally concluded that The result reveals that the Vertical-jump performance of Sprinters is high as compared to Throwers. The result indicates that there are insignificant differences between Sprinters and Throwers in Chin-ups, throwers performed better than sprinters. Result found that Sprinters have shown their dominance and their superiority on Shuttle-Run compare to Throwers.

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