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Study of upper body strength, explosive leg strength and cardiorespiratory endurance of korfball and netball players: A comparison

[*1] Anil Kumar Dabral, [2] Khomdram Sheila Devi
[1] HOD, Physical Education, VVDAV Public School, Delhi, India
[2] Physical Education Teacher, Dubai, UAE

Abstract
The study was intended to compare the upper body strength, explosive leg strength and cardio respiratory endurance of Delhi state players of korfball and netball game. For the purpose of the present study 40 Delhi state players, 20 from each game i.e. Korfball and Netball were selected as participants. Purposively sampling technique was employed in order to select the subjects. The age of the subjects were ranged between 17-23 years. To investigate the upper body strength, explosive strength and cardio vascular endurance of the Delhi state korfball and netball players, the following test were applied (push-ups for assessing upper body strength, Vertical jump for explosive leg strength and cooper test for cardio respiratory endurance). T-test was used as statistical technique in order to compare the data of upper body strength, explosive strength and cardio respiratory endurance of Delhi state korfball and netball players. To test the hypothesis, the level of significance was set at 0.05 level. The finding of the study revealed that there is a significant difference in cardiorespiratory endurance but no significant difference was found in upper body strength and explosive leg strength between the netball and korfball players selected Therefore this concludes that Netball players are slightly better in cardio respiratory endurance as compared to korfball players.

Keywords: upper body strength, explosive leg strength, cardio respiratory endurance, korfball, netball players

1. Introduction

Sports can be a great way to get in shape or stay that way. Having a specific goal can be a great motivator. Physically, you need strength and endurance. Your training will vary with your sport. You would not train the same way for pole vaulting as for swimming. You might, however, cross train. Cross training simply means that you include a variety of fitness activities in your program. Research shows that cross training builds stronger bone. Strength training is a type of physical exercise specializing in the use of resistance to induce muscular contraction which builds the strength, anaerobic endurance, and size of skeletal muscles.

When properly performed, strength training can provide significant functional benefits and improvement in overall health and well-being, including increased bone, muscle, tendon, and ligament strength and toughness, improved joint function, reduced potential for injury. Reaching maximum efficiency in any activity is not possible over a day. Efficiency is conditioned by several interrelated areas. Sports training focuses on reaching maximum efficiency in motor abilities connected to a certain sports discipline. Supposed performance depends on motor ability and motor skill which are closely related to the sports discipline.

Motor abilities can be described as relatively stable sets of inner genetic presuppositions needed to carry out locomotive activities. They include force, speed, endurance, coordination and flexibility. Motor abilities are manifested on the outside by sports skills. Sports skills are presuppositions needed for implementing performance in a selected sports discipline which is limited by rules. Such presuppositions are gained through motor learning. The physical demands in sport are related to the activities of the athlete. The performance in selected sports discipline is based on the characteristic of the respiratory and cardiovascular systems as well as muscles, combined with the interplay of the nervous system.

Strength training is typically associated with the production of lactate, which is a limiting factor of exercise performance.

Regular endurance exercise leads to adaptations in skeletal muscle which can prevent lactate levels from rising during strength training. Sports where strength training is central are bodybuilding, weightlifting, powerlifting, strongman, Highland games, shot-put, discus throw, and javelin throw. Many other sports use strength training as part of their training regimen, notably tennis, American football, wrestling, track and field, rowing, lacrosse, basketball, pole dancing, hockey, professional wrestling, rugby union, rugby league, and soccer. Strength training for other sports and physical activities is becoming increasingly popular.

Korfball

Korfball is a Dutch game that is rooted in both netball and basketball. A team game, it is played with eight players on each side, usually all female although it can be played with four females and four males. Scoring points (goals) is done by putting the ball through the opposition's raised basket.

Netball

In 1891 in Springfield, Massachusetts a 30-year-old Canadian immigrant to the USA, James Naismith, was ordered to invent an indoor game for high-spirited young men at the School for

Christian Workers (later the YMCA). In 1995 Netball became a "recognized" sport of the International Olympic Committee (IOC) and one of the Federation's objectives is to ensure this status is retained and to encourage the International Olympic Committee to include Netball in the Olympic Games Programme in the future.

In 1963, the first World Tournament with 11 teams competing, was held in England and Australia were undefeated. World Championships are staged every four years. Netball was a demonstration sport at the Auckland Games in 1990 but was not included in the Commonwealth Games program for the first time until 1998 in Kuala Lumpur.Netball is an exciting, fast and skillful game of fair contest. It is a game in which two teams of seven players each strive to keep or gain possession of the ball.

The team with the ball, through running, jumping, throwing and catching, attempts to move the ball into its goal circle from where a goal may be scored, while the opposing team uses defensive movements and strategies to prevent this and to gain possession. The team with the greater number of goals is the winner of the match.

2. Methods

Sample: 20-20 Korfball and Netball Delhi male state players were taken as subjects for the study. The age group is ranged from 17-25 years.

Variability : Keeping the feasibility of criterion measures in mind, especially in case of availability of instrument, the following physical fitness variables were upper body strength, explosive leg strength and cardio respiratory endurance.

Criterion Measures and Administration of Test.

Push –Ups

Purpose: To measure the upper body strength.

Equipment: Floor mat, Metronome (or audio tape, clapping, drums), stopwatch, wall, chair.

Procedure: A standard push up begins with the hands and toes touching the floor, the body and legs in a straight line, feet slightly apart, the arms at shoulder width apart, extended and at a right angles to the body. Keeping the back and knees straight, the subject lowers the body to a predetermined point, to touch some other object, or until there is a 90-degree angle at the elbows, then returns back to the starting position with the arms extended. This action is repeated, and test continues until exhaustion, or until they can do no more in rhythm or have reached the target number of push-ups.

Scoring: Record the number of correctly completed push-ups. Push-ups successfully performed in the time allowed for the test

Vertical Jump

Purpose: To measure the explosive leg strength.

Equipment required: Measuring tape or marked wall, chalk for marking wall

Procedure: The person stands side on to a wall and reaches up with the hand closest to the wall. Keeping the feet flat on the ground, the point of the fingertips is marked or recorded. This is called the standing reach. The person puts chalk on their fingertips to mark the wall at the height of their jump. The person then stands away from the wall, and jumps vertically as high as possible using both arms and legs to assist in projecting the body upwards. Attempt to touch the wall at the highest point of the jump. The difference in distance between the standing reach height and the jump height is the score. The best of three attempts is recorded.

Scoring: The jump height is usually recorded as a distance score. The table below provides a ranking scale for adult persons based on observations of testing results over time. This will give you a general idea of what is a good score. For more information, see a selection of vertical jump test results.

Cooper 12/9 min run/walk test

Purpose: To measure the development of the athlete's aerobic endurance.

Equipment: 400 meter track, Stopwatch, Whistle, Assistant etc.

Procedure: The athlete warms up for 10 minutes. The assistant gives the command "GO", starts the stopwatch and the athlete commences the test. The assistant keeps the athlete informed of the remaining time at the end of each lap (400m). The assistant blows the whistle when the 12 minutes has elapsed and records the distance the athlete covered to the nearest 10 metres

Scoring: At the end of 12 minutes the test is stopped, and the covered distance is measured. Record the distance travelled in those 12 minutes in miles or kilometers.

Variables	Test	Measures
Upper Body Strength	Push Ups	In Numbers
Explosive leg Strength	Vertical Jumps	Meters
Cardiovascular Endurance	Cooper Test	In Seconds

Statistical Analysis

In this study, to compare the data between the korfball and netball, "t" test was employed and level of significance was set at 0.05 level. On that basis further conclusion was drawn.

3. Result

The mean and standard deviation of obtained data of upper body strength, explosive leg strength and Cardio Respiratory Endurance as measured by pushups, vertical jump and Cooper's 12/9 min Run/Walk Test of korfball and netball players were presented in the following table.

Table 1: Table showing the comparison between the mean of korfball and netball players in Upper Body Strength

Test	Game	Mean	SD	D	SE	Cal t	Tab t
Push-Ups	Netball	11.60	5.25	0.65	1.54	0.23	2.021
	Korfball	11.25	4.60				

*Significant level 0.05% level, tab t.05 (40) =2.021.

Table 1 clearly indicates that there is no significant difference was found between the mean of korfball and netball players in upper body strength as the observed p value is 0.23 (P<0.05) which was lower than (2.021) so found insignificant at 0.05 level of significance.

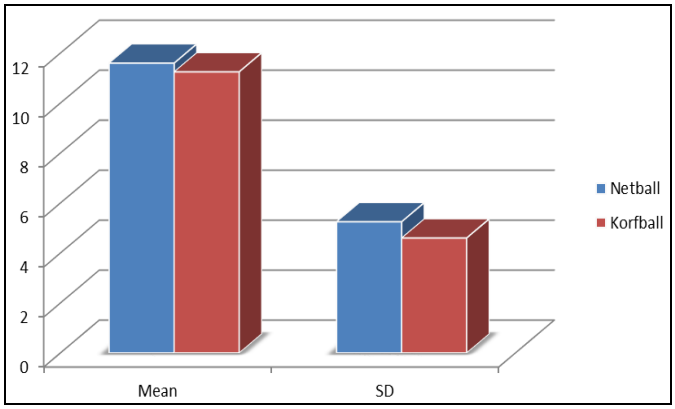

Fig 1: Graphical representation showing the comparison between the mean of korfball and netball players in Upper Body Strength

Table 2: Table showing the comparison between the mean of korfball and netball players in Explosive Leg Strength

Test	Game	Mean	SD	D	SE	Cal t	Tab t
Vertical Jump	Korfball	5.89	1.41	0.28	.40	.82	2.021
	Netball	5.56	1.13				

Significant level 0.05% level, tab t.05 (40)=2.021.

Also, table 2 clearly indicates that there is again no significant difference was found between the mean of korfball and netball players in explosive leg strength as the observed p value is 0.82 (P<0.05) which was lower than (2.021) so found insignificant at 0.05 level of significance.

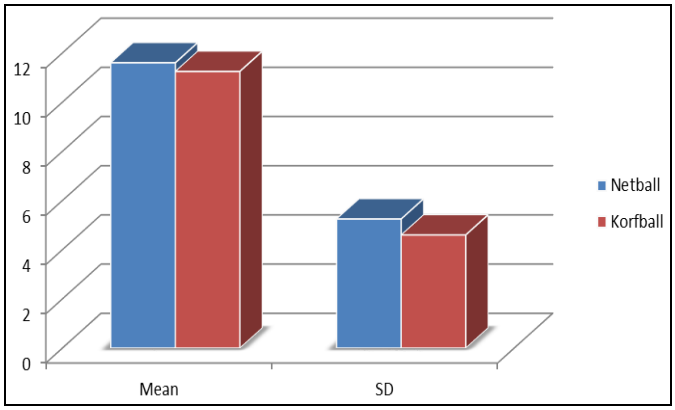

Fig 2: Graphical representation showing the comparison between the mean of korfball and netball players in Explosive Leg Strength

Table 3: Table showing the comparison between the mean of korfball and netball players in cooper 12/9 min run/walk test.

Test	Game	Mean	SD	D	SE	Cal t.	Tab t
Cooper 12 min test	Netball	120.49	14.39	1.55	4.30	3.32	2.021
	Korfball	106.21	12.84				

Table 3 clearly indicates that significant difference was found between the mean of korfball and netball players in aerobic endurance as the observed p value is 3.32 (P>0.05) which was greater than (2.021) so found significant at 0.05 level of significance.

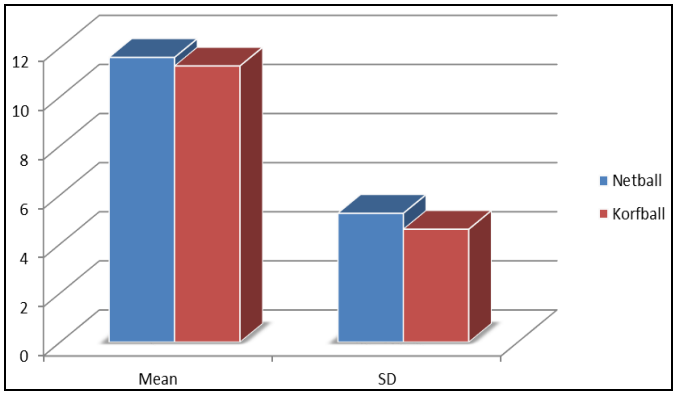

Fig 3: Graphical representation showing the comparison between the mean of korfball and netball players in cooper 12/9 min run/walk test

4. Conclusion

The findings of the study can be concluded as under on the basis of t-test applied. The findings of the study concluded that Netball and Korfball player shows a significant difference in aerobic endurance. No significant difference was found in upper body strength and lower body leg explosive strength in netball and korfball players. As Netball and korfball are somehow similar i. e both are ball games in which there is a target and one has to shoot in the target. For shooting, players require upper body strength (arm Strength) and lower body strength (explosive leg strength). And hence the upper body strength and leg explosive strength are found insignificant Whereas Netball has bigger court area than korfball which shows that there is more up and down movement during play which can be helpful in better aerobic endurance of players than the korfball players and hence found significant.

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