



**Research Article**

**COMPARISON OF AGILITY IN RECREATIONAL BASKETBALL AND VOLLEYBALL MALE PLAYERS USING ILLINOIS AGILITY RUN TEST: AN OBSERVATIONAL STUDY**

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**ABSTRACT**

Many young adults are involved in playing different types of outdoor sports recreationally, namely being cricket, football, basketball, volleyball, badminton, tennis and many more. As we know that playing any kind of sport needs speed, strength, accuracy and skill, which are all the components of agility. Agility is nothing but the ability to do movements quickly or change directions fast and complete the task with skill and perfection. This study focused on evaluating and comparing agility of two outdoor sports which are basketball and volleyball. Both these sports are proved to have a need of more agility in trained players but do the recreational players have similar agility are not known, this study intended to evaluate and compare the agility of recreational volleyball and basketball players who had no professional training of the specific sport. This comparative study was conducted on recreational volleyball and basketball male players, Belagavi, Karnataka. Data analysis was done using SPSS version 16.0. Descriptive statistics including mean and standard deviation were used to analyse the data. T-test was used to compare the mean of both the groups. The study concluded that the volleyball players in higher age group had more agility than the lesser aged volleyball players, the basketball players had uniformity throughout the age group in all the players included in the study. There was slightly significant difference between the agility of volleyball and basketball players where the basketball players had more agility than the volleyball players. Authors in the future can consider this study for reference and can make a specific agility training protocol for the recreational volleyball and basketball players.

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**INTRODUCTION**

Agility is most often defined as ability to change direction rapidly<sup>1</sup>. It has many forms such as simple footwork while walking or jogging to moving the entire body into a different position or direction while high speed running. The basic definition of agility is too simplistic which now is thought to be much more complex which involves not only speed, but also balance, co-ordination and the ability to react to a sudden change of environment<sup>2</sup>. Speed is classically defined as the shortest time required for an object to move along a fixed distance, which is the same as velocity, but without specifying the direction<sup>3</sup>. Practically, referring to the ability of moving the body as quickly as possible over a set distance. However it is a more slightly complex issue in reality as, the speed cannot constant over the entire distance and is therefore divided into different phases: acceleration, maintenance of maximum speed and deceleration<sup>1</sup>. Accordingly, agility is a physical capability, which by its essence belongs among “mixed” physical capabilities.

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It is determined by the quality of regulation (CNS) and analysers, as well as the type of muscle fibers<sup>4</sup>. Therefore, agility should be superior to speed, quickness and co-ordination abilities. The term agility used to be understood in the past as the ability to change direction, or to start and stop the movement quickly<sup>5</sup>. Speed and agility in team sports represent complex psychomotor skills<sup>6</sup>. They involve moving the body as rapidly as possible, but agility has the added dimension of change of direction. In team sport agility does not only involve the ability of changing the direction of movement, but also the capability to anticipate the movement of the opponent, read and react to specific game situations<sup>7</sup>. Sheppard and Young presented a categorical definition of agility: “rapid whole body movement with the change of velocity or direction in response to a stimulus”<sup>8</sup>. In the perspective of team sports, agility therefore involves not only change of direction abilities but also perception and decision making. Which in a way is as same as speed expression, agility in the context of team sports is multifactorial. Various sports games have variable nature, where the situation changes every second, high frequency and speedy movements are executed and can start from a variety of starting conditions. Which means, perception-action coupling and decision making are

critical elements in terms of developing the ability to express speed and agility capabilities<sup>9</sup>. The Illinois agility run test is a commonly used test of agility in sports. The objective of the Illinois agility run test is to monitor the athlete's agility. This is a simple test to administer. Also the turning ability of players in different direction and different angles is tested. An excellent score is under 15.2 seconds for a male and under 17 seconds for a female. The reliability of this test would depend upon how strict the test is conducted and the individual's level of motivation to perform the test. There are no published tables to relate to potential performance in competition<sup>10</sup>. Basketball is a limited contact sport played on a rectangular court. It is a fast game played as a team sport with 5 players on each side. Objective of this game is to shoot the ball through a hoop (basket).

The game was invented in 1891 by Dr. James Naismith<sup>11</sup>. Agility is defined as an ability to accelerate, decelerate and stop quickly while maintaining good body control<sup>10</sup>. Basketball is not played in a straight line but instead requires constant changes of direction. In this game, one needs to be able to explode when penetrating to the basket, get into position to take a charge or to catch up to an opponent after a turnover in a foot break situation. Basketball is an extremely fast game that requires continual agility. The sport of volleyball originated in the United States, and is now just beginning to achieve the type of popularity in the U.S. that it has received on a global basis, where it ranks behind only soccer among participation sports. In 1895, William G. Morgan, an instructor at the Young Men's Christian Association (YMCA) in Holyoke, Mass., decided to blend elements of basketball, baseball, tennis, and handball to create a game for his classes of businessmen which would demand less physical contact than basketball. He created the game of Volleyball (at that time called mintonette). Volleyball is a teamsport in which 2 teams of 6 players are separated by a net. Each team tries to score points by grounding ball on the other team's court under organized rules<sup>12</sup>.

**MATERIALS AND METHOD**

An observational study design was conducted on 62 subjects through non-probability sampling design for a period of 6 months. Male recreational volleyball and basketball players were included in the study in Belagavi city, Karnataka, India. Subjects with any recent injuries or recently undergone surgeries were excluded from the study.

**Outcome Measures**

Illinois agility run test- The length of the course is 10 meters and the width (distance between the start and finish points) is 5 meters. Four cones are used to mark the start, finish and the two turning points. Another four cones are placed down the centre an equal distance apart. Each cone in the centre is spaced 3.3 meters apart. Subjects should lie on their front (head to the start line) and hands by their shoulders. On the 'Go' command the stopwatch is started, and the athlete gets up as quickly as possible and runs around the course in the direction indicated, without knocking the cones over, to the finish<sup>10</sup>. The scores of the subjects were recorded.

**Procedure**

An approval for the study was obtained from the Institutional Ethical Committee. Subjects were taken in the study based on

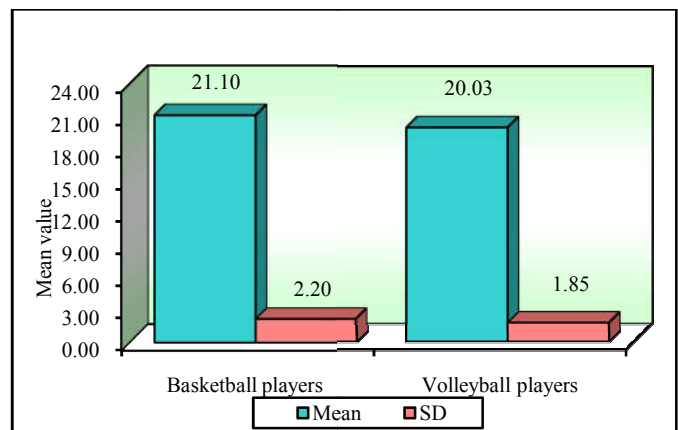
the inclusion and exclusion criteria prior to their enrolment to the study. Demographic details of each subject were recorded. The study protocol was explained to the participants. Participants were distributed into Two groups:- Both the groups were tested for agility using Illinois Agility Run Test. Group A (n= 31):-10 minutes of warm-up session was given to the subjects. The subjects were then taken for trials. Subjects were told to lie on their front (head to the start line) and hands by their shoulders. On the 'Go' command the stopwatch was started, and the athlete got up as quickly as possible and ran around the course in the direction indicated, without knocking the cones over, to the finish<sup>10</sup>. The subjects were then given a cool-down session. Group B (n=31):-10 minutes of warm-up session was given to the subjects. The subjects were then taken for trials. Subjects were told to lie on their front (head to the start line) and hands by their shoulders. On the 'Go' command the stopwatch was started, and the athlete got up as quickly as possible and ran around the course in the direction indicated, without knocking the cones over, to the finish<sup>10</sup>. The subjects were then given a cool-down session.

**RESULTS**

**Table 1** Comparison of basketball and volleyball players with respect to mean age by t test

Players	Mean	SD	SE	t-value	p-value
Basketball players	21.10	2.20	0.39	2.0628	0.0435*
Volleyball players	20.03	1.85	0.33		

\*p<0.05



**Figure 1** Comparison of basketball and volleyball players with respect to mean age

**Table 2** Comparison of basketball and volleyball players with respect to mean BMI by t test

Variable	Players	Mean	SD	SE	t-value	P-value
Height in cms	Basketball players	171.87	4.63	0.83	-0.0247	0.9804
	Volleyball players	171.90	5.62	1.01		
Weight in kgs	Basketball players	70.61	9.71	1.74	2.4294	0.0181
	Volleyball players	64.06	11.44	2.05		
BMI	Basketball players	23.93	3.37	0.61	2.3157	0.0240*
	Volleyball players	21.78	3.92	0.70		

\*p<0.05

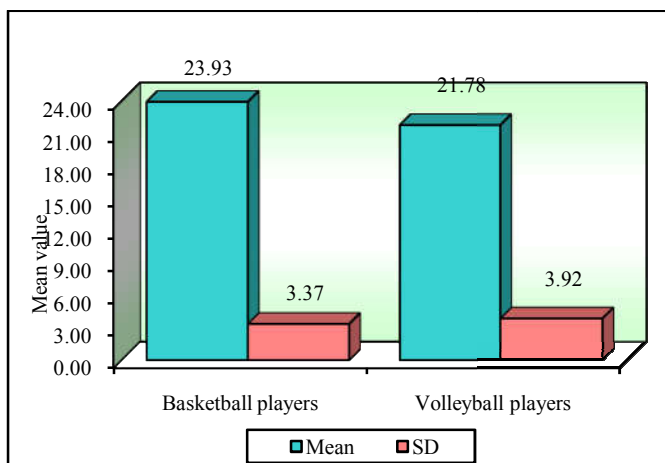


Figure 2 Comparison of basketball and volleyball players with respect to mean BMI

Table 3 Normality of agility scores of basket and volleyball players by Kolmogorov Smirnov test

Summary	Basketball players	Volleyball players
Z-value	0.9710	0.8100
P-value	0.3020	0.5280

Note: Agility scores of basket and volleyball players follow a normal distribution; therefore, the parametric independent t test was applied.

Table 4 Comparison of basketball and volleyball players with respect to mean agility by t test

Players	Mean	SD	SE	t-value	p-value
Basketball players	16.63	0.66	0.12	-5.7627	0.0001*
Volleyball players	17.95	1.09	0.20		

\*p<0.05

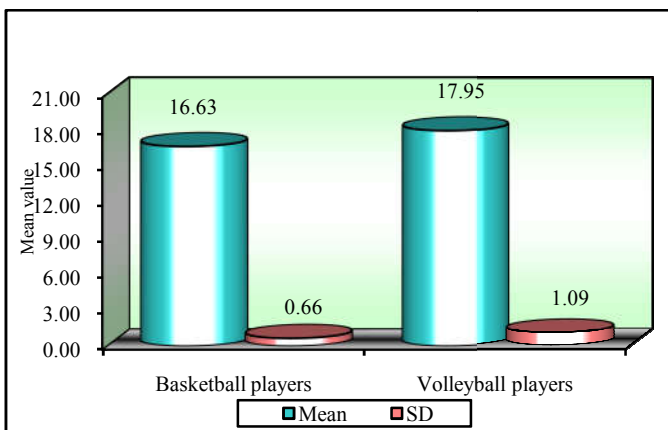


Figure 3 Comparison of basketball and volleyball players with respect to mean agility

Table 5 Correlation between age and agility scores of basketball and volleyball players by Karl Pearson's correlation coefficient method

Samples	Variables	Correlation between agility scores with		
		r-value	t-value	p-value
Basketball players	Age in yrs	0.3981	2.3368	0.0266*
	BMI	0.5348	3.4082	0.0019*
Volleyball players	Age in yrs	-0.2720	-1.5224	0.1388
	BMI	0.1149	0.6228	0.5383
Total players	Age in yrs	-0.1470	-1.1508	0.2544
	BMI	0.0257	0.1993	0.8427

\*p<0.05

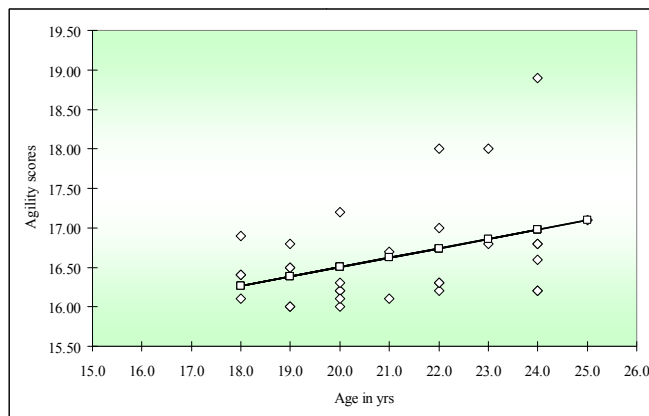


Figure 4 Correlation between age and agility scores of basketball players

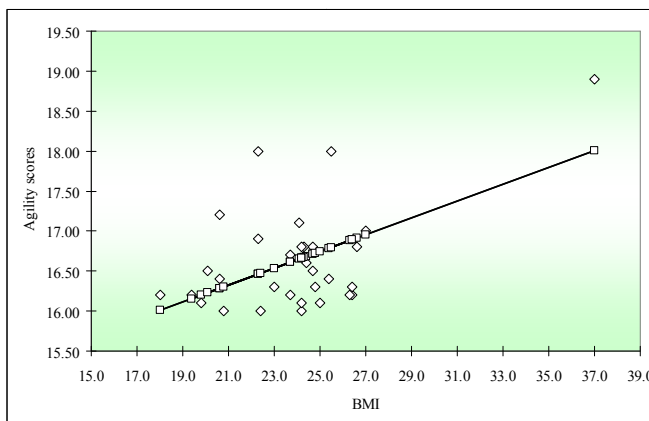


Figure 5 Correlation between BMI and agility scores of volleyball players

Table 6 Comparison of basketball and volleyball players with respect to levels of agility

Levels of agility	Basketball players	%	Volleyball players	%	Total	%
Excellent	0	0.00	0	0.00	0	0.00
Above average	6	19.35	0	0.00	6	9.68
Average	24	77.42	18	58.06	42	67.74
Below average	0	0.00	4	12.90	4	6.45
Poor	1	3.23	9	29.03	10	16.13
Total	31	100.00	31	100.00	62	100.00

Chi-square=17.2571 P = 0.0012\*

\*p<0.05

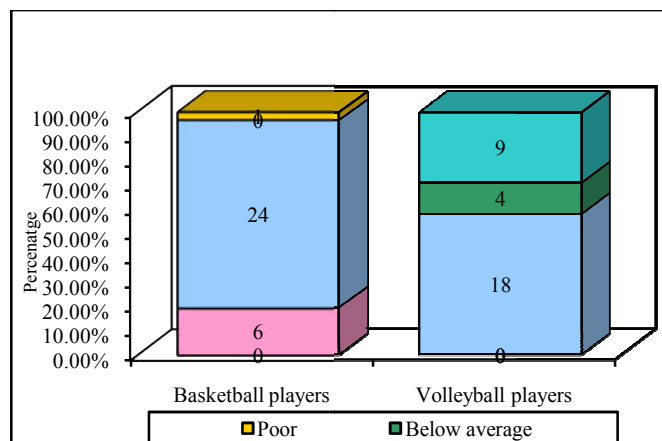


Figure 7 Comparison of basketball and volleyball players with respect to levels of agility

## DISCUSSION

The present study was intended to evaluate and compare the agility of recreational male volleyball and basketball players, where it was observed that volleyball players of more age had more agility than those with less age, similarly, the basketball players didn't have any difference of agility in respect to age within themselves. The BMI scores of the basketball players were lesser than those of volleyball players which again was a good observation. Mainly, the basketball players had more agility compared to the volleyball players. A comparative study conducted to measure speed, agility, anaerobic strength and anthropometric characteristics in male basketball and handball players using 30 Meter Speed Test for determining speed abilities, Illinois Agility Test for determining agility, Sergeant Jump Test for determining anaerobic strength and height-weight and body mass index for anthropometric characteristics of players. As a result there was significant difference among speed, anaerobic and anthropometric characteristic values of male basketball and handball players, while there was not a significant difference in agility values<sup>13</sup>. Another comparative study done to measure agility between volleyball and basketball players using SEMO Agility Test on 20 subjects from age group of 14-17 years and they concluded that there was no significant difference found on agility between volleyball and basketball players<sup>14</sup>. Similarly, a study compared the agility, reaction time, strength and flexibility of basketball and volleyball players to fulfil the objective of study on 150 basketball and 150 volleyball players was done, using SEMO Agility Test, Nelson Foot Reaction time test, Vertical Jump Test for strength and flexibility.

It is concluded that reaction time of volleyball and basketball players contains slight difference and agility of basketball players is better than the volleyball players<sup>15</sup>. Likewise, a similar study conducted to find out differences in the performances of basketball, volleyball and soccer players from the point of view of sports specialization and also to assess the relationship between Illinois Agility Test and Fitro Agility Check on 55 subjects in each group from the age group of 14-17 years. They concluded that greatest differences were found between the performances of players in Illinois Agility Test, on the contrary in the Fitro Agility Check found agreement in performances of players of different specializations<sup>16</sup>. Comparative study was done on agility and strength between basketball and netball male players was conducted on 60 male player's age ranging from 12-15 years in each group. 4×10 Meters Shuttle Run for agility and Standing Broad Jump for strength were used. The study concluded that basketball players had higher agility and strength in comparison with netball players<sup>17</sup>. By the same token, a comparative study on selected motor fitness parameters between 24 basketball and volleyball players age ranging from 18-25 years using 10×4 Shuttle Run Test for agility and 50 Meter Dash Run Test for speed ability. The study concluded that the basketball players had more fitness ability in agility and speed than volleyball players<sup>18</sup>. A study on comparison of different fitness attributes of adolescent badminton and volleyball players was conducted in which 15 subjects in each group were included from a district level competition with age ranging from 15-18 years. Pull-ups, Push-ups, 4×10 Shuttle Run Test, 50 Meter Run and 600 Meter Run were used to measure muscle strength, muscular endurance, speed cardio-vascular endurance and significant difference of agility. Except muscular strength

component, badminton players were slightly better than volleyball players in all the other components such as muscular endurance, agility, speed and cardio-vascular endurance<sup>19</sup>. All of these above studies mentioned were conducted on trained players in the respective sports. The current study intended to focus the recreational players who do not have a specific training and specific protocol of exercises of the respective game. As a result the recreational players had low agility scores compared to the normative values of Illinois agility test. Most of the players had their scores above average category but were not in excellent category.

## CONCLUSION

This study concluded that male recreational basketball players had more agility compared to the male recreational volleyball players in the 18-25 years of age group. Lack of training protocol specifically for agility and even lack of sport specific exercise protocol may lead to low agility. Including such protocols or exercises may increase the agility of recreational volleyball as well as basketball male players.

### Future Scope

A similar study in female recreational players of volleyball and basketball and also of other sports can be done. Exercise and agility training protocols for recreational players with less difficulty can be made by taking the results of this study in consideration. Authors in the future can consider this study for reference of years of work as here the same is less as compared to other studies.

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