

Original article:

Comparative study of auditory reaction time, visual reaction time and agility in basketball players and healthy controls

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Date of submission: 05 June 2014; Date of Publication: 15 September 2014

Abstract:

Background: Reaction time is the interval of the time between presentation of the stimulus and initiation of response. Successful game of basketball needs ability of the players to generate good speed, agility and tremendous power during the play of game. Our aim was to assess and to compare auditory reaction time, visual reaction time and agility in basketball players and healthy controls.

Material and Methods: The present study was carried out in 30 male basketball players in the age group of 16-25years playing at state and university level and 30 age matched healthy controls. Auditory and visual reaction time was recorded by reaction time apparatus. Agility was determined by Burpee (squat thrust) test.

Results and conclusion: Reaction time was significantly less in basketball players as compared to healthy controls. Thus the reaction time is a good indicator of performance in sports like basketball. Therefore training programmes which improve the reaction time should be included.

Agility was significantly more in basketball players as compared to healthy controls. Hence agility should be tested before selecting the player. In the training programme different means to improve agility should be included.

Key words: Basketball, auditory reaction time, visual reaction time, agility.

Introduction:

Reaction time is the interval of the time between presentation of the stimulus and initiation of response¹. Successful game of basketball needs ability of the players to generate good speed, agility and tremendous power during the play of game. Skills like dribbling, shooting and passing are of utmost importance for a player at any level of play. Not merely skills but also physical and physiological characteristic of a player will contribute to the success of the player as well as of the team². Agility may be defined as the physical ability which enables an individual to rapidly change body position and direction in precise manner¹ Our aim was to assess

auditory reaction time, visual reaction time and agility in basketball players and healthy controls and to compare auditory reaction time, visual reaction time and agility in basketball players and healthy controls.

Material and Methods:

The present study was carried out in Exercise and Sport physiology laboratory, Department of Physiology, Dr. V.M.G.M.C. Solapur. 30 male basketball players in the age group of 16-25 yrs, and 30 age matched controls were selected for the study.

Inclusion criteria for players

- Those doing regular practice minimum for 2 yrs.
- Those participated at state and university level.

Exclusion criteria for players

- Those not practicing regularly.
- Those having any sport injury during practice or matches .
- Those having diminished hearing or vision .
- History of smoking and alcohol.

Inclusion criteria for control group

- Healthy control group was undergraduate medical students and interns.

Exclusion criteria for control group

- History of smoking and alcohol
- Those having diminished hearing or vision, injured limb.

Auditory and visual reaction time was recorded by Audiovisual reaction time apparatus.

Recording of visual reaction time- (msec).

Stimuli used- Red light.

Recording of Auditory reaction time(msec).

Stimuli used-High frequency sound(Tone).

Agility was determined by Burpee(Squat Thrust) Test.

a) Burpee Test (or Squat Thrust) : The objective was to measure the rapidity by which body position can be changed. Equipment needed for this test was stop watch. From a standing position, the subject was asked to bend at the knees and waist and place the hands on the floor in front of the feet. Then, he was asked to thrust his legs backwards to a front leaning rest position and then to return to the squat position and finally to rise to a standing position. From the signal "GO" the subject was asked to repeat this movement as rapidly as possible until the command "STOP" was given. The test was scored in terms of number of parts executed.

in 10 seconds. Squatting and placing the hands on the floor was one part, thrusting the legs to the rear was two, returning to the squat rest position was three and returning to the standing position was fourth. The correct number of repetitions executed by the subject in 10 seconds were recorded¹.

b) Auditory Reaction Time : Auditory reaction time is the time taken by an individual to react to an auditory stimulus. It was measured by 'Audio-Visual Reaction Time Apparatus' designed by Anand Agencies, Pune. The instrument is specially designed to measure reaction time in milliseconds. The auditory stimulus was provided in the form of high (Tone) frequency sound. After connecting the instrument to the mains, the subject was asked to sit on a chair in front of the instrument. He was asked to press the response switch using the thumb as soon as he hears the tone. Thus, after familiarizing the subject with the instrument and after repeated practice, three readings were noted. The least reading of the three appeared on the display was taken as subject's best auditory reaction time³.
Visual Reaction Time : Visual reaction time is the time taken by an individual to react to a visual stimulus. The visual stimulus is provided in the form of a red light. The subject was asked to press the response switch with the thumb as soon as the red light blinks. The least of three readings on the display was taken as the visual reaction time of that subject. Visual reaction time was noted both for dominant as well as non dominant hand³.

Observations & results:

Data was analyzed by unpaired t test.

Reaction Time(msec)		Basketball players	Controls	p values
		Mean±SD	Mean ±SD	
Visual	Right	117.34±14.58	137.00±19.26	<0.001*
	Left	120.66±13.84	145.45±18.81	<0.001*
Auditory	Right	114.90±14.11	135.10±15.99	<0.001*
	Left	119.79±11.86	143.03±18.32	<0.001*
Agility(no.of parts executed in 10sec)		19.24±1.96	16.00±1.13	<0.001*

Discussion:

In our study we observed that auditory reaction time was significantly less in both hands of basketball players than controls. Also the visual reaction time of basketball players was significantly less in both hands than the control group. Results supporting our study were also observed by other workers such as Prabhjot Kour et al(2006)⁴ observed that athlete performed better than control for visual as well auditory reaction time task. Also Ghuntala et al(2012)⁵ found that visual reaction time was significantly less in basketball players as compared to controls in simple reaction time task. And Prafull Kamble et al(2012)⁶ found that reaction time for auditory and visual stimuli was less in both hands of basketball players as compared to controls. They also found that Burpee’s squat thrust test score was significantly more in basketball players as compared to controls. The quicker reaction time in athletes as compared to controls is due to improved concentration, alertness, better muscular coordination and improved performance in the speed and accuracy task^{7,4}. Top class sportmen and athletes normally had shorter reaction time than nonathletes and continuous participation in sports at higher level did reduce reaction time. Also team game players had quicker

reaction time than others.⁸ Basketball demands and develop a high degree of muscular coordination and skill, speed of foot, good vision, and great agility are also necessary². In our study we found that the Burpee (Squat Thrust) Test score of basketball players was significantly more as compared to controls, The subject were in ‘Intermediate’ category according to the ‘Raw Score Norms’ for Burpee (Squat Thrust) Test¹. In the past it was generally believed that agility was almost entirely dependant upon one’s heritage.

Conclusion:

Thus it can be concluded that reaction time is a good indicator of performance in sport like basketball. Thus the training programmes with different means to improve the reaction time should be included. Agility should be tested, before selecting the player. In the training programme different means to improve agility should be included.

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