

Comparison of Simple Reaction Time between Volleyball and Football Playing Collegiate Athletes

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ABSTRACT

Context: The importance of reaction time in sports is to develop fine motor skills for athletes in specific movements; this improves as a result of extensive practice of those concerned movements in athletic events. Reaction time is crucial as per the demand of the sports and for the prevention of sports related injuries. Thus, evaluation of reaction time and emphasizing the importance of its evaluation is required as it guides to train them accordingly.

Aim: To determine the differences in the reaction time of Volleyball playing and Football playing collegiate athletes

Settings and design: Study setting was Pravara institute of medical sciences (DU) & Study design was cross-sectional comparative study.

Materials and Methods: The study involved 60 collegiate athletes between the age group of 18-25 years from PIMS (DU). The participants were assessed for the Simple reaction time. By using Ruler drop method. Material used was Wooden Ruler.

Statistical analysis used: Mean & SD were used for descriptive statistics and unpaired t test was used for comparison of data between both the groups. Data analysis were done on SPSS v. 20.00

Result: The mean and standard deviation of group A (Volleyball playing collegiate athletes) and Group B (Football Playing collegiate athletes) was 0.22 ± 0.02 and 0.18 ± 0.02 respectively. The t value between both the groups was 7.75.

Conclusion: After comparing two groups (A&B) it was concluded that Group B has reduced reaction time than Group A. Football

playing collegiate athletes has faster reaction time than volleyball playing collegiate athletes.

Keywords: reaction time, ruler drop method, volleyball players, football players, collegiate athletes

INTRODUCTION

Reaction time is the time phase between the applications of a stimulus and the appearance of appropriate voluntary response by a subject as quickly as possible. It is a measure of function of sensorimotor association and performance of an individual. It involves stimulus processing, decision making and response programming.^[1]

Reaction time involves the central nervous system recognizing a stimulus and then directing the muscles to take some kind of action. Sensory neurons detect a stimulus. Additional neurons transmit the message about the stimulus to the brain or spinal cord, which interprets the information and decides on some type of action. A message is then carried back to motor neuron cells. Motor neuron cells direct the muscles to carry out the response. All of this activity within nervous system happens in a fraction of a second. That fraction of a second is measured as reaction time.^[2]

Time require to respond visual stimuli is known as 'Visual Reaction Time (VRT)'. Reaction time becomes an important of information processing as it indexes speed

of stimulus processing and response programming. [3]

Luce and Welford [4-5] described three types of reaction time.

1) Simple reaction time: there is one stimulus and one response.

2) Recognition reaction time: stimulus that should be responded to and other that should not get a response.

3) Choice reaction time: there are multiple stimulus and multiple responses.

By the practice of motor movements, muscular coordination and speed of movement can be improved which would improve movement time. Long lasting improvement in performing skilled motor movements can be achieved by training and retraining and repeated practicing. [6-8]

It is a measure how quickly an organism can respond to a particular stimulus. Lesser the reaction time it multiplies one's achievements in many areas such as, sports, academics, music, dance, driving, defense etc. By identifying the person's reaction time, we can predict reacting abilities in the above-mentioned situation.

The importance of reaction time in sports is to develop fine motor skills for athletes in specific movements; this improves as a result of extensive practice of those concerned movements in athletic events. Rapid reaction time in athletes could be due to improved concentration and alertness, better muscular coordination, and improved performance in speed and precise tasks. [6]

Quick reaction is helpful in sports such as football, basketball, and tennis. [4] Several studies have found that adherence to a regular exercise program can improve muscle strength and this helps to a significant improvement in reaction time. Impairment in muscle strength, stability, and balance alters the reaction [7]

MATERIALS AND METHODS

Ethical clearance was obtained from Institutional Ethical Committee of Dr. A.P.J. Abdul Kalam College of

Physiotherapy, PIMS-DU. A total 100 participant based on inclusion criteria and exclusion criteria was selected. The collegiate athletes of age group from 18 to 25 years old, collegiate athletes who have played volleyball and football at university or higher level and subjects willing to submit written informed consent form were included in this study. Any type of acute injury or trauma like open wounds, fractures, nerve injury related to upper limb causing physical changes and pain which can affect reaction time, and athlete who are on irregular practice of sports more than 2-3 months were excluded for this study. The participants were selected randomly from Pravara Institute of Medical Sciences voluntarily.

After taking written informed consent form all the 100 participants, only 60 participants were randomly selected for further participation in this study. All these 60 participants were divided randomly in to two equal groups of 30 each. Group A consists of 30 participants of Volleyball players and group B consists of 30 participants of Football players.

The simple reaction time of each participant was assessed by using ruler drop method. The test was done in a cool and calm laboratory setup during morning session with room temperature maintaining at 25°C. All participants were instructed not to involve in any physical exertion activity at least 2 hours prior to the test.

To measure reaction time by ruler drop test, the subject is made to sit with their dominant side elbow flexed at 90 degrees with mid-pronated forearm resting on a flat horizontal table surface, with the open hand at the edge of the table; Then ruler is suspended vertically by the examiner, such that 5 cm graduations of the ruler were aligned between the web space (the space between thumb and index finger) of the subject's hand. Then the subject is asked to catch the ruler once it was released from the examiner's hand.

Then distance is converted into time by using following formula:

$$t = (2d/g)^{1/2}$$

Here t = reaction time; d = distance travelled by the ruler and g = 9.81m/s² (gravitational constant). Three trials will be taken and their mean is taken into analysis. [9]

RESULTS

The mean and standard deviation of group A (Volleyball playing collegiate athletes) and Group B (Football Playing collegiate athletes) was 0.22±0.02 and 0.18±0.02 respectively as shown in table 1.

Table 1: Demographic table

Mean& Standard deviation	GROUP A		GROUP B	
	Male	Female	Male	Female
No. of participants	06	24	20	10
Age	20.83±1.94	21.13±1.42	19.80±1.54	19.90±1.29
Height	174.17±9.99	165.96±7.24	173.80±7.51	163.70±3.37
Weight	67.33±10.31	58.50±9.07	69.85±11.66	53.40±10.63
BMI	22.45±1.92	20.90±2.77	22.86±3.63	19.93±4.00

Students Unpaired‘t’ test was applied for simple reaction time between both groups. The t value was 7.75 as shown in table 2.

Table 2: Mean reaction time of Group A and Group B and value of t test

GROUPS	A	B	p value	t value	Result
MEAN ± STANDARD DEVIATION	0.22±0.02	0.18±0.02	< 0.001	7.75	Highly Significant

DISCUSSION

Reaction time is important in sports to develop fine motor skills for athletes in specific movements; this improves as a result of extensive practice of those coordinated movements in athletic events. Speedy reaction is helpful in sports such as football, basketball, volleyball, tennis etc. several studies have found that adherence to a regular exercise program can improve muscle strength and this helps to a significant improvement in reaction time. In previous studies Aranha et al. has performed ruler drop method in typically developed children’s [10] and Anitha et al [11] has performed ruler drop method to estimate reaction time in sitting and standing posture among typical young adults. But not many studies were conducted in athletes with the use of assessment tool such as Ruler Drop Method.

In this study ruler drop method was used to find out reaction time in athletes (In two different sports playing collegiate athletes) to find which sports gives reduced reaction time i.e. good reaction time than other. The aim of the study was to determine the differences and correlation of reaction time in athletes. Analysis of the

results shows that those practice football had shorter reaction time when compared with volley ball players. The difference between reaction time values was statistically significant. (The mean and standard deviation of group A: Volleyball players were 0.22±0.02, and in Group B: Football Players were 0.18±0.02. There is significant difference between mean reaction time.

In relation to gender observation in this study, Group B Where in respect to sex ratio, male ratio is more than female ratio (There were 6 Males in Group A (Volleyball playing collegiate athletes) and 20 Males in Group B (Football playing collegiate athletes), whereas 24 Females in Group A and 10 Females in Group B. due to unequal sex ratio, as Group B has more males these can lead to reduced reaction time in Group B Than A. These observations also support the study done by Balasubramanian et al., where males showed faster RTs than Females [12] Some of the reasons stated by previous authors were the varying level of sex steroids modifying the axonal conduction affecting the sensory

motor association with processing speed at the central nervous system. [13]

Clinical implication through this study suggests that Ruler drop method is Reliable clinical measure use for assessment of reaction time in collegiate athletes. Further research with respect to different sports and on patients with specific condition should be conducted. RDM can be used as Clinical evaluation tool.

CONCLUSION

After comparing two groups (A&B) it was concluded that group B (Football playing collegiate athletes) has reduced reaction time than group A (Volleyball playing collegiate athletes)

Football playing collegiate athletes has faster reaction time than volleyball playing collegiate athletes

Conflict of Interest: No conflict of Interest.

REFERENCES

1. Pritesh Gandhi, Pradnya A. Gokhale, and C.J Shah. A Comparative study of simple Auditory Reaction Time in Blind (Congenitally) and Sighted subjects. Indian Journal of Psychological Medicine.
2. <http://www.nsta.org>
3. Rao SL, Gangadhar BN, Keshavan MS, Hegde AS, Naradev G, Reaction time deficits in posttraumatic syndrome. Indian journal of Psychiatry 1985; 27:63-5
4. Luce RD. Response Times: Their Role in inferring Elementary Mental Organization. New York: Oxford University Press;1986
5. Welford AT. Choice reaction time: Basic concepts. In: Welford AT, editor. Reaction Time. New York: Academic Press;1980 p.73-128
6. Proctor RW, Dutta A. Skill acquisition and human performance. AJ Psycho 1996;109: 645-9
7. Guadagnoli MA, Lee TD. Challenge point: A framework for conceptualizing the effect of various practice conditions in motor learning. J Mot Behav 2004;36: 212-24
8. Agostino R, Curra A, Soldati G, Dinapoli L, Chiacchiari L, Modugno N, et al. Prolonged practice is of scarce benefit in improving motor performance in Parkinson disease. Mov Disord 2004; 19:1285-93
9. Maciel RN, Morales AP, Barcelos JL, Nunes WJ, Azevedo MMA, Silva VF. Relation between reaction time and specific function in volleyball players Fit Perf J.2009 Nov-Dec;(6):395-9.
10. Vencita Priyanka Aranha, Ruchi Joshi, AsirJohn Samuel, Kavita Sharma Catch the Moving Ruler and Estimate Reaction Time in Children
11. M. N. Anitha, Vijay Samuel Raj VReaction time in sitting and standing postures among typical young adult.
12. Balasubramanian M, Sivapalan K, Nishanthi V, Kintusa S, Dilani M. Effect of dual-tasking on visual and auditory simple reaction times. Indian J Physio Pharmacol 2015; 59:194-8.
13. Karia RM, Ghuntla TP, Mehta HB, Gokhale PA, Shah CJ. Effect of Gender Difference on Visual Reaction Time: A Study on Medical Students of Bhavnagar Region. IOSR Journal of Pharmacy (IOSRPHR) 2012; 2:452-54.

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