

# 13) A COMPARATIVE STUDY OF VISUAL REACTION TIME IN BADMINTON PLAYERS AND HEALTHY CONTROLS

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## ABSTRACT:

**Introduction:** Reaction time is duration between application of a stimulus to onset of response. Visual reaction time is time required to response to visual stimuli. The present study was conducted to measure visual reaction time in 100 subjects (50 Badminton players and 50 healthy controls). **Material & Method:** The visual reaction time was measured by the direct RT computerized software in healthy controls and Badminton players. Simple visual reaction time is measured. During the reaction time testing, visual stimuli were given for eighteen times and average reaction time was taken as the final reaction time. **Result:** The study shows that Badminton players had faster reaction time than healthy controls. **Conclusion:** Our study concluded that persons involved in sports are having good reaction time as compared to controls. These results support the view that playing of Badminton is beneficial to eye-hand reaction time, improve the concentration and alertness.

**Key Words:** Reaction Time, Badminton players, Visual Reaction Time, Alertness

## INTRODUCTION:-

At the present time children are more involved in videogames, watching TV, movies and exploring internet. Sports like badminton, table tennis, volleyball, , cricket, football, etc. are preferred less with modernization. These sports not only make them physically healthy but would also improve their alertness, concentration.

Reaction time is duration between application of a stimulus to onset of response. Visual reaction time is time required to response to visual stimuli. Reaction time acts as a reliable indicator of rate of processing of sensory stimuli by central nervous system and its execution in the form of motor response.<sup>1</sup> Reaction time can be divided into three parts. The first is perception time, which is time for the application and perception of the stimulus and giving the necessary reaction to it. The second is decision time, which signifies the time for giving an appropriate response to the stimulus. The third is motor time, which is the time for compliance to the order received<sup>2,3</sup>. Reaction time can be described into three types, (1) Simple reaction time:- here there is one stimulus and one response. (2) Recognition reaction time: - here there are some stimulus that should be responded to and other that should not get response. (3) Choice reaction time:- here there are multiple stimulus and multiple responses<sup>4,5</sup>. Sports such as badminton ,table tennis, , tennis and squash have been classified as reaction sports<sup>6</sup>. In badminton specifically, the incredible speed of the shuttle which allows a very minimal amount of time to react and execute shots , so badminton player has to give proper and quick response during the game. A study done by Hascelik et al.<sup>7</sup> found decrease in the visual reaction time of male volleyball players. Another study done by Nougier et al.<sup>8</sup> suggest that athletes has better reaction time as compared to control subjects.

Thus we devised the present study to see the effect of badminton playing, which involves decision making during game, on speed of cognitive processes (reaction time) and to compare with control group which is not involved in regular sports activity.

## **MATERIAL AND METHOD:-**

The present study was conducted in 50 healthy controls and 50 Badminton players of age group of 14 to 40 years of male in Jamnagar district. The research protocol was approved by Institutional ethical committee and informed consent obtained from each subject prior to inclusion in the study. Personal history and medical history of both groups was collected in pre-designed proforma. Medical history was taken to rule out any medical or surgical disease which would affect reaction time of individual. After taking consent, Reaction time was measured with Direct RT computerized software.<sup>9</sup> It was carried out with adequate light and in silent atmosphere. Visual reaction time was measured where subject has to respond to different colour stimulus appearing on computer screen by pressing spacebar key on keyboard. In present study only simple visual reaction time was measured. Subjects were given practice session before measuring the actual reaction time. Data was collected and was statistically analyzed. Reaction time was reported as mean  $\pm$  Standard Deviation (SD). The level of significance between Badminton players and controls was tested by T-test (Unpaired) by SPSS version 20 software. The difference was taken as significant if p value was less than 0.05.

## **RESULTS:-**

**Table 1 show General characteristics of healthy controls and Badminton players. (value are Mean  $\pm$  SD)**

	<b>Number</b>	<b>Age (Year)</b>	<b>Height(cm)</b>	<b>Weight(kg)</b>	<b>BMI</b>
<b>Healthy control</b>	<b>50</b>	20.14 $\pm$ 4.015	167.18 $\pm$ 6.252	54.72 $\pm$ 9.996	19.5 $\pm$ 3.264
<b>Badminton players</b>	<b>50</b>	23.50 $\pm$ 8.767*	166.62 $\pm$ 7.478	61.52 $\pm$ 12.339*	22.11 $\pm$ 3.808

**\*P<0.05**

Table 1 shows the mean age of healthy controls was 20.14 years and of Badminton players was 23.50 years. Mean height of healthy controls 167.18 cm and Badminton players 166.62 cm.

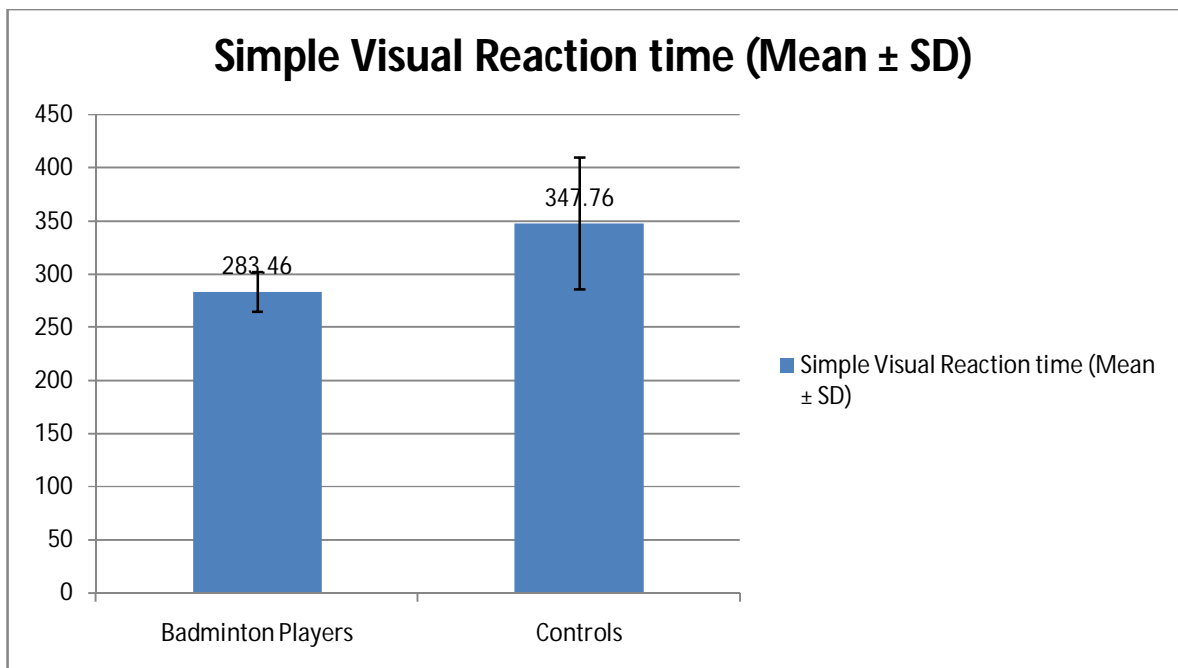
Mean weight of healthy controls 54.72 Kg and Badminton players 61.52 Kg. Mean BMI of healthy controls 19.58 Kg/m<sup>2</sup> and Badminton players 22.11 Kg/m<sup>2</sup>. Among these age and weight are statistically significant.

**Table 2 shows Comparison of simple visual reaction time in healthy controls and Badminton players**

	Number	Simple Visual Reaction time (Mean $\pm$ SD) in ms	P value
Badminton Players	50	283.46 $\pm$ 18.867	<0.05
Healthy Controls	50	347.76 $\pm$ 61.827	

Table 2 shows simple visual reaction time in healthy controls (347.76  $\pm$  61.827 ms) and Badminton players (283.46  $\pm$  18.867 ms). Visual reaction time was significant faster in Badminton players.

**Graph 1 showing simple visual reaction time (mean  $\pm$  SD) in ms in Badminton players and healthy controls.**



## **DISCUSSION:**

In present study there are difference of visual reaction time between Badminton players and healthy controls. Visual reaction time is shorter in Badminton players than healthy controls, which is statistically highly significant. Reaction time is an important component of motor movements. It is one of the important methods to study a person's central information processing speed and fast coordinated peripheral movement response. Reaction time is an accurate indicator of speed and effectiveness of decision making. Reaction times vary depending on what portion of the eye picks up the stimulus. Reaction times are shortest if the stimulus is picked up by the cones of the eye directly in front of the line of vision<sup>10</sup>. This is called central vision. As the stimulus moves more peripherally reaction times increase with the angle of the stimulus from central vision. Visual reaction time is the time taken by an individual to react to an visual stimulus. It can be of crucial value in activities like driving and is an important quality of a sports persons. It has been well documented that exercise and sports beneficial to mental health<sup>11-12</sup>. Patrick J. Smith, et al.<sup>16</sup> found in his study that participants who completed a six month aerobic exercise program exhibited improvements in reaction time. Researchers have also established that exercise and sports results in a mild enhancement of cognitive function<sup>13-17</sup>. Result from present study are tune with finding of study by Hascelik et al<sup>7</sup> who found decreases in the visual reaction time of male volleyball players from 214.55 ms to 200 ms. Ghuntla T et al<sup>18</sup> found the visual reaction time of basket ball players is faster than controls, which was significant. Some study like Mamog̃lu et al<sup>19</sup> found the visual reaction times of professional soccer players to be  $175.0 \pm 14.0$  ms and of part-time soccer players to be  $177.0 \pm 18.0$  ms. Nougier et al.<sup>8</sup> suggest that athletes has better reaction time as compared to control subjects. Badminton is a sport that depends on finely crafted movements that occur very quickly and a precise execution of shots. Badminton players have to give a good attention to the stimuli and have to be alert to give a proper motor response. Motor response execution is a physical task, so it is logical that people trained in physically reactive sports like Badminton may have superior ability to select a correct motor response. Although the mechanism behind exercise and human information processing have not been exactly identified. There are several possible mechanism which provide primary support for different hypothesis. Different direct and indirect mechanisms could explain relationship between exercise and mental processing. Perhaps the most popular mechanism is the idea that those individuals who exercise at moderate to intense levels have higher rates of cerebral blood flow. This increased amount of blood flow in the brain results in improvements in cognitive functioning due to increased supply of necessary nutrients, such as oxygen and glucose<sup>14,15</sup>. The quicker reaction time in Badminton players compared to controls is due to improved concentration, alertness, better muscular co-ordination and improved performance in speed and accuracy task.

## **CONCLUSION:**

To conclude persons involved in sports like Badminton are having good visual reaction time as compared to controls. These results support the view that playing of Badminton is beneficial to eye-hand reaction time and coordination. It can be stated that Badminton is beneficial for the enhancement of cognitive function, concentration and alertness.

## **ACKNOWLEDGEMENTS:**

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**CONFLICT OF INTEREST:-** None declared.

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