VISUAL PERCEPTION SUCCESS OF FAST BALL GAME PLAYERS DURING SACCADE

YILMAZ Alpaslan
Erciyes University, Physical Education and Sport Collage, TURKEY

ABSTRACT
The purpose. Saccadic eye movements are rapidly moving of eye balls to an interesting point within the visual field. Even if the image on the fovea is suppressed by the mechanism of "saccadic suppression", the image can be detected voluntarily during saccade. Visually guided saccades are reported to be faster in fast ball game players. In this study, it is intended to measure the success of catching the perceived image of fast ball game players.
Methods. 15 athletes in our study (mean age. 21.20 ± 1.32) 15 sedentary (mean age. 20.46 ± 0.91) participated voluntarily. Measurements were made using a Biopac MP-30 system. Participants tried to capture the sine wave on a CRT oscilloscope 40cm front of them.
Results. Fast ball game players and sedentaries' sine wave catching average were 10,73±2,86 and 5,60±2,50 respectively.Visual perception success score were found significant between two groups (t=-5,23, P<0,01).
Conclusion. According to results, it was found out that fast ball game players' visual perception abilities are better than sedentaries during saccade.

***Key words**: Saccadic suppression, fast ball games*

Introduction

Saccadic eye movements are rapidly moving of eye balls to an interesting point within the visual field.

The aim of voluntary saccades is to bring the image of a target from the periphery onto the fovea. Saccades can be done voluntarily or reflexive with or without a visual target.

Christenson et al have reported the visual system of athletes to be superior to that of non-athletes, especially with respect to motor reaction time (Christenson GN, Winkelstein AM., 1988).

Some studies have found fast ball game players have faster visually guided saccades and shorter latency of antisaccade task (Lenoir M, Crevits L, Goethals M, et al, 2000, Jafarzadehpur E, Aazami N, Bolouri B., 2007).

Visual perception during saccade is subjected some recent studies. These studies usually focused on shape of perceived objects or perception of time during saccade (Hamker FH, Zirnsak M, Calow D, 2008). We experienced that one cannot perceive visual scene during every saccade. This study prepared to determine perception success during saccades of fast ball game players and sedanteries.

Methods

Participants

15 athletes in our study (mean age. 21.20 ± 1.32) 15 sedentary (mean age. 20.46 ± 0.91) participated voluntarily. All of the athletes were player of any fast ball game. The athlete participants were comprising: 3 tennis players, 5 table tennis players and 7 volleyball players. All participants were male.

Measurement

Eye movements of participants were recorded via Biopac MP-30 system's electrooculography method. Only binocular horizontal eye movements were recorded.

Two disposable electrodes which were placed outer canti of participant's eyes and one reference electrode was placed onto middle of forehead. Visual target generated by a CRT monitor was located 40 centimeter away of volunteers.

Participants were free about timing, direction and amplitude of saccade. Every participant made twenty separate saccades, and each saccade trial they were asked to define waveform of target if they saw. To determine a perception as successful participants had to define accurately waveform of target.

RESULTS

Table 1. Perception success and saccade velocity values of athletes and non-athletes.

	Athletes (mean±SD)	Non-athletes (mean±SD)	n	t	P
Successful perception	10,73±2,86	5,60±2,50	15	-5,227	<0,01
Saccade velocity	265,87±30,89	260,73±28,05	15	-0,48	0,64

Perception success and saccade velocity values illustrated in table 1. As seen in the table, mean perception success of athletes were 10,73±2 86 and mean perception success of sedanteries were 5,60±2,50.

The differences between athletes and sedanteries perception success values were significant statistically.

Saccade velocity mean values of athletes and sedanteries were 265,87±30,89 and 260,73±28,05 respectively.

Saccade velocity values of two groups were not significantly different.

Discussion

We found significant differences in the perception success between athletes and sedanteries. We are not aware of any studies that investigated perception abilities during saccade.

Many of these studies connected with shape of percieved objects or percieved visual scene while saccadic movements (H. Awater, M. Lappe,2004, R J. Babu, L. Lillakas, E. L. Irving, 2005).

Our findings showed that fast ball game players conspicuously superior in perception during saccade. Because of the first finding about perception success during saccade in this study, we could not compare our result with any similar studies.

Our second important finding is about saccadic velocity.

There are a few studies about saccade velocity in which is compared athletes with non-athletes (M. Lenoir , L, Crevits , M. Goethals , 2000, E. Jafarzadehpur, N. Aazami, B. Bolouri, 2007). According to these studies athletes have faster prosaccades and shorter antisaccade latencies (M. Lenoir, L. Crevits M. Goethals 2000).

At first view it seems as our results are not compatible with these studies reported faster prosaccade of the athletes.

We consider about this situation in two reasons; 1- in the case of we did not use any visual stimulation and we cannot be sure these saccades are prosaccades, 2- because of our participants made saccades voluntarily, it was impossible to measure latencies of saccades.

Due to the ballistic nature of saccadic movements it is well known that visual perception during saccade does not affect saccade itself.

Visual perception abilities of fast ball game players may stem from training that they have to follow fast moving object such as ball or opponent players.

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