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STUDY ON THE MANIFESTATION OF REACTION SPEED AT YOUNG ATHLETES (BASKETBALL VS FOOTBALL PLAYERS)

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Abstract

The present study tries to make a comparison between the specific performances of the reaction speed between 2 groups of subjects, basketball and football athletes - Under 10 category, boys. The reaction speed assessment test was carried out using the Witty System equipment, which gives accuracy to the recording of the results. 2 tests were carried out, one on the upper body (arms) and the second on the lower body (legs) both with the mentioned sample of basketball and soccer players.

As expected, there were notable differences between the 2 groups, with the reaction speed being superior to the basketball players in arms case and better to the soccer players in legs case.

The basic conclusion is that there are prerequisites for the introduction in the sports training process of exercises aimed at improving reaction speed both at the upper body and at the lower body level, regardless of the practiced sport.

Introduction

Since the middle of the last century, reaction speed has been studied by researchers, it being responsible for the appropriate response in human activity according to gender or age [1]. Also, in that period, a correlation between the degree of fatigue and reaction speed is attempted [2], bringing into question the need to accurately measure it, using information technology [3].

Reaction time is defined as the time interval between the presentation of the stimulus and the occurrence of an appropriate voluntary response. The human body responds to the number of external environmental signals of different types, providing a voluntary and intentional response to the signals. There is a certain amount of time between the application of the signals and the appropriate motor response. Visual reaction time is defined as the time required to provide a response to visual signal, and auditory reaction time is the time required to provide a response to auditory signal. Reaction time becomes an important component of information processing, as it indexes the speed of signals processing and response programming [4, 5, 6].

Many studies have confirmed that the reaction to sound signals is faster than the reaction to sight. Perhaps, this is because an auditory signal only takes 8-10ms to reach the brain, but a visual signal takes 20-40ms. Therefore, because the auditory signals reaches the cortex faster than the visual one, the auditory reaction time is faster than the visual reaction time [7, 8, 9].

A lot of studies have shown that reaction time depends on a number of factors, including the nature of the signals, the duration, the intensity of the signals, the rate of afferent and efferent transmission of nerve input, the processing time dependent on the complexity of the task, the size of the muscle group or segment that perform the motor or neuro motor task. Simple motor reaction time is a motor reaction to kinesthetic, visual, auditory or tactil signal. Recognition reaction time is based on the cognitive processes by which the most appropriate responses to complex signal are chosen, and the response depends on the type and nature of the signal. Cognitive reaction time is based on decoding, parsing, associating and applying signal information in relation to situational context and cognitive complexity [10, 11].

Success in basketball relies heavily on the ability to move quickly and change direction quickly. But, without reaction, speed and quickness can be wrong, because the performance of the athlete is directly related to the length of the reaction time. In this context, players and coaches are beginning to understand the importance of reaction time in sports performance achiving. Reaction times to a particular signal

can be made faster with repeated practice with a particular one. A proper change of direction training program should include exercises that require players to make moves based on visual cues, such as pointing to a partner, and audio cues, such as calling directions to a partner, so players can improve their performance by improving the reaction time [12].

Visual motor reaction speed is a measure of the length of time that encompasses the onset of a signal, an individual's recognition of the signals, and the length of time required to complete their response. It is assumed that athletes who are able to recognize and respond in the shortest possible time would have a competitive advantage. In general, team sports value effective ball control, which essentially depends on the speed with which players can integrate and process multiple sources of information in a dynamic environment and react in a timely manner. In basketball, a player can use this ability to simultaneously monitor the movements and positions of multiple players (teammates and / or opponents), all relative to themselves, each other, and the basket. Players who excel in this skill devote more time to making a successful play, avoiding costly mistakes [13].

During a official game, any football player changes direction every 2, 3 or 4 seconds and he has between 1.200 and 1.400 changes of direction. In a game situation, the changes of directions may be initiated to react to a moving ball or to either pursue or get lost an opponent player. Therefore, it has been recognized that the response to a stimulus is a component of agility performance. In competitive sports disciplines, particularly in sports that use a ball (football), the ability to rapidly process various types of changing information and to quickly react to different stimuli is very important for players. [14, 15, 16, 17].

A number of studies have shown that there are notable differences between the performance obtained in reaction speed between arms and legs, some researches even explaining this [18, 19, 20]. In the present study, as we stated previously, we propose to carry out an analysis of the reaction speed values in the Under 10 boys category, the present studies being relatively few quantitatively compared to this age category, others managing to find a correlation between our theme and peripheral vision of athletes [21].

Material-method

The present study tries to make a comparison between the specific performances of the reaction speed between 2 groups of subjects, basketball and football practitioners - Under 10 category, boys.

The reaction speed assessment test was carried out using the Witty System (WS) equipment, which gives accuracy to the recording of the results. 2 tests were carried out, one on the upper body (arms) and the second on the lower body (legs)

both with the sample of basketball and soccer players. The tests were adapted to the age of the subjects and consisted of recording the time needed to stop touching the 4 component sensors of the WS equipment 10 times.

The sensors were placed on the floor at a distance of 98 cm between sensors 1 and 4, between sensors 1 and 2 the distance is 33 cm, between sensors 2 and 3 it is 33 cm, between sensors 3 and 4 it is 33 cm. The subject sits on the floor with his feet between sensors 1-2 and 3-4 respectively. In the case of the upper body speed reaction test, the subject has the sitting position with his palms on his knees, the athlete paying attention to the transmitted indications, and when the green light lights up on one of the sensors, it must be touched (Figure 1). The same configuration of the 4 sensors was also applied in the case of measuring the reaction speed for the legs, this time the subject was in a standing position, stopping the sensor with the sole of the foot. Importing the data of this equipment (WS) is easy, they are exported in an Excel file, the time being presented with 5 decimal places. In this article, we will present reaction time with only 2 decimal places. We mention the fact that the recordings took place in the sport hall of the Faculty of Physical Education and Mountain Sports from Trasilvania University from Brasov.

Figure 1 – Upper body speed reaction Test

Results

After the measurements performed on the sample of young basketball (39) and football (18) players, the results are presented in Table 1.

Table 1. Tests results

Basketball subjects	Arms reaction speed	Legs reaction speed	Football subjects	Arms reaction speed	Legs reaction speed
Subject 1	15,29	14,74	Subject 1	14,81	14,02
Subject 2	13,57	15,13	Subject 2	13,96	13,96
Subject 3	13,75	14,22	Subject 3	14,01	14,11
Subject 4	14,37	13,88	Subject 4	14,12	14,04
Subject 5	14,00	13,30	Subject 5	13,94	14,50
Subject 6	14,55	14,82	Subject 6	14,05	13,88
Subject 7	13,79	14,53	Subject 7	14,08	14,01
Subject 8	13,98	14,38	Subject 8	14,17	13,96
Subject 9	13,00	14,86	Subject 9	13,79	14,34
Subject 10	13,74	15,57	Subject 10	15,05	13,94
Subject 11	14,32	15,35	Subject 11	14,67	13,84
Subject 12	15,13	13,82	Subject 12	14,80	13,90
Subject 13	13,23	14,31	Subject 13	14,36	14,21
Subject 14	14,00	15,28	Subject 14	14,66	14,12
Subject 15	14,52	15,38	Subject 15	15,01	14,06
Subject 16	13,42	15,00	Subject 16	14,72	13,99
Subject 17	13,82	13,64	Subject 17	14,55	13,78
Subject 18	13,41	13,57	Subject 18	14,24	14,05
Subject 19	13,00	14,90			
Subject 20	13,13	13,30			
Subject 21	13,51	14,41			
Subject 22	13,99	15,83			
Subject 23	13,23	14,54			
Subject 24	13,75	13,69			
Subject 25	16,71	15,53			
Subject 26	13,73	13,89			
Subject 27	13,13	13,13			
Subject 28	14,00	13,86			
Subject 29	13,21	13,23			
Subject 30	13,46	14,40			
Subject 31	14,49	13,55			
Subject 32	14,54	15,00			
Subject 33	13,32	13,91			
Subject 34	13,83	13,99			
Subject 35	14,64	14,83			

Subject 36	13,31	14,66		
Subject 37	13,00	13,18		
Subject 38	13,81	15,00		
Subject 39	13,48	13,56		
$\bar{x}$	13,87	14,56	14,38	14,03
σ	0,73	0,75	0,39	0,17
V	5,26	5,15	2,71	1,21

The analysis of the statistical index values shows that in the case of basketball young athletes, the group is not homogeneous, a plausible explanation being the age and level of psychomotor development of the subjects. For this reason, we will choose to further analyze and interpret the obtained datas.

Thus, we find that at the upper body level, the average reaction speed of basketball players is 13.87 seconds, and for football players it is 14.38 seconds, a result half a second weaker. In the case of the reaction speed at the level of the legs, the ratio changes in favor of the group practicing football, the time being 0.53 seconds higher (14.56 vs 14.03) (Diagram 1).

In our opinion, the explanation for these differences is the fact that in this stage of training (initiation in the sports game of basketball and football), the specific technique of the sport demands differently the arms, respectively the legs.

It will be interesting to see if these differences persist over time, or when or if they even out.

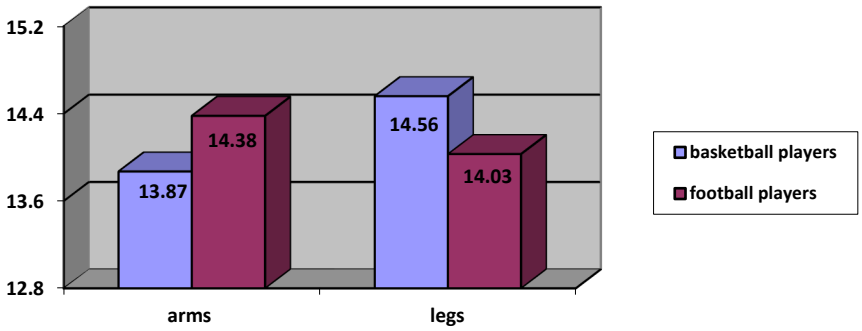

Diagram 1 – Graphic presentation of tests results (reaction speed)

Discussions

Analyzing the results obtained, given that similar studies in which the same equipment was used, are difficult to compare, because there are no exact data on the location of the sensors. Precisely for this reason, we chose to present the location of the sensors with accuracy in this article.

The limits of the study can be represented by the degree of involvement of the subjects, who are 10 years old, but also by the fact that the combination of visual signals (green light) of the 4 sensors was set randomly, having no control over this aspect.

The importance of the study is represented by the fact that there is a precision measurement of reaction speed at these groups and there are strong premises for the developing of sports selection criteria based on the evolution of athletes in correlation with the measured reaction speed.

As future work, we propose to test the reaction speed with the same technical equipment (WS) of rally pilots, practitioners of contact sports (boxing, karate, judo, etc.) and athletes of team games at the senior level.

Conclusions

The basic conclusion is that there are prerequisites for the introduction in the sports training process of exercises aimed at improving reaction speed both at the upper body and at the lower body level, regardless of the sport practiced, especially since the demands of modern sports games involve speed, in all forms them of manifestation.

As expected, there were notable differences between the 2 groups, with the reaction speed being superior to the basketball players for the arms and better to the soccer players for the legs.

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