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DETERMINING THE SPEED REACTION TIME TO THE LOWER LIMBS IN A WOMEN' S VOLLEYBALL TEAM (CSU MEDICINA TG. MURES)

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ABSTRACT. Speed reaction is an important concept in various fields like physiology, psychology and sports science. It refers to the time it takes to respond to a specific stimulus visual, auditory, tactile. Reaction speed is an important and fundamental measure in the study of human performance and cognitive processes. **Methods.** The testing was conducted on the female volleyball players, members of the CSU Medicine Târgu Mureş team. This testing took place at the beginning of the 2023-2024 competitive season. **Objective.** The objectives of this study are to identify the reaction time values obtained during the testing of the CSU Medicine Târgu Mureş team. **Results.** The analysis of the results was conducted after downloading the data from the Optojump software as follows: Test 1 Range: 0.532 - 0.393 = 0.139 seconds, test 2. Range: 0.531 - 0.425 = 0.106 seconds Test 3 Range: 0.750 - 0.597 = 0.153 seconds **Conclusion.** This statement suggests that, based on the data collected from the three tests, there is consistency in the performance of individual subjects. Some subjects consistently have low reaction speed values across all three tests, while others consistently have high reaction speed values.

Keywords: *Volleyball, Optojump, Speed Reaction*

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REZUMAT. ***Determinarea timpului de reacţie ale membrelor inferioare la echipa de volei feminin CSU medicina Târgu Mureş.*** Reacţia rapidă este un concept important în diverse domenii precum fiziologie, psihologie şi ştiinţa sportului. Se referă la timpul necesar pentru a răspunde la un anumit stimul: vizual, auditiv, tactil. Viteza de reacţie este o măsură importantă şi fundamentală în studiul performanţei umane şi al proceselor cognitive. **Metode.** Testarea a fost efectuată pe jucătoarele de volei ale echipei CSU Medicina Târgu Mureş la începutul sezonului competiţional 2023-2024. **Obiective.** Obiectivele acestui studiu sunt identificarea valorilor timpului de reacţie obţinut in timpul testării. **Rezultate.** Analiza rezultatelor a fost efectuată după descărcarea datelor din software-ul Optojump, astfel: Testul 1 interval 0,532-0,393=0,139 secunde, Testul 2. Interval: 0,531-0,425=0,106 secunde, Testul 3. Interval: 0,750-0,597=0,153 secunde. **Concluzie**. Această afirmaţie sugerează că pe baza datelor colectate din cele 3 teste există o consistenţă in performanţa individuală a subiecţilor. Unii subiecţi au în mod constant valori scăzute ale vitezei de reacţie în toate cele 3 teste, în timp ce alţii au în mod constant valori mari ale vitezei de reacţie.

Cuvinte-cheie: *volei Optojump, viteză de reacţie*

INTRODUCTION

Speed reaction it is an important concept in various fields like physiology, psychology and also sports science. It refers to the time it takes to respond to a specific stimulus visual, auditory, tactile. One of the physical abilities is reaction, which is the ability of a person to act quickly in response to a stimulus that comes from outside either through the senses of nerves or feelings (Lima,2021). Reaction speed is an important and fundamental measuring in the study of human performance and cognitive process. In several studies, reaction speed has been assessed with computerized tests, such as the motor reaction test, simple reaction time test, and choice reaction time test to understand the facts that affect speed reaction it is important to optimizing the human performance (Piras, 2014). First of all, neurological processes are involved in the speed reaction. The brain must generate a motor response after sensory input wich involves a series of complex neural pathways. Also factors like neural transmission speed, synaptic efficiency, and brain health can influence this process. Volleyball visual reaction speed training belongs to non-periodic sports. The model has no specific exercise intensity and quantitative power metrics (Estrada, 2021). Volleyball requires agility, coordination and reaction ability for playing and a good suspicion to lift and hit the ball. In volleyball, changes in the speed of game and scoring system the set finishes quickly, so players need a high level of

agility, coordination and reaction ability (Freire, 2018). Agility is an important component needed by almost all sports, which is the ability to change the direction or position of the body quickly which is done together with other movements (Mawarti et al., 2021). The most commonly studied in reaction time research is to visual stimuli. Auditory stimuli like a start pistol in a sprint race play a significant role in reaction time. This cand be influenced by factors like: sound and frequency of the sound, volume, individual s hearing ability also multisensory integration, when both visual and auditory cues are involved. Athletes have higher requirements and higher standards based on completion targets. Basic skills require a variety of performances of the ball. The testing was conducted on the female volleyball players, members of the CSU Medicine Târgu Mureş team. This testing took place at the beginning of the 2023-2024 competitive season. The order of the tests was arranged as it will be presented in the paper below. The testing was conducted after a 10-minute warm-up consisting of light jogging, 10 minutes of stretching, and 10 minutes of running drills. Each subject followed the specified protocol both in the warm-up phase and during the testing phase. In volleyball, according to (Mroczek, 2007) reaction speed is ranked in the first place among all coordination abilities. Skilled players are better in information extraction that is globally distributed across the body, rather than relying on a single isolated or local information cue or source (Williams et al., 2018).

OBJECTIVE

The objectives of this study are to identify the reaction time values obtained during the testing of the CSU Medicine Târgu Mureş team. The three tests used to assess the lower body reaction speed levels and conducted with the assistance of the Optojump device were applied with the purpose of analyzing each individually tested player and, at the same time, the entire team. Collecting this data helps us analyze the results and, consequently, the successful development of post-testing training programs.

METHODS

Optojump is an optical measurement system consisting of a transmitting and receiving bar. Each of these contains 96 leds (1.0416 cm resolution). The leds on the transmitting bar communicate continuously with those on the receiving bar (web source). Testing reaction speed in volleyball with an Optojump

system is a valuable tool for coaches and athletes to assess and improve their performance. The testing was performed using the Optojump device. This device is designed to test and analyze the physical qualities of each individual being tested. The tests conducted with the help of this device in this article were used to identify reaction time values in the lower limbs of the CSU Medicina Târgu Mureş women's volleyball team. He three tests used were as follows: reaction speed with the left foot, reaction speed with the right foot. In these two tests, the reaction speed of the tested foot is located within the two beams of the Optojump device. At the sound or auditory signal, the foot must be lifted from the ground. The reaction time will be measured from the moment the alert started until the foot was raised, indicating the reaction speed. The three tests used were as follows: reaction speed with the left foot, reaction speed with the right foot. In these two tests, the reaction speed of the tested foot is located within the two beams of the Optojump device. At the sound or auditory signal, the foot must be lifted from the ground. The reaction time will be measured from the moment the alert started until the foot was raised, indicating the reaction speed.

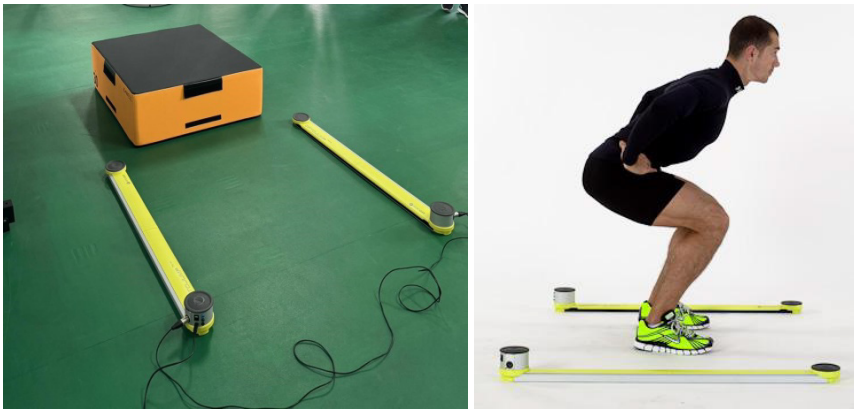

Figure 1. Optojump device – speed reaction test

In the table presented above, the consolidated data obtained by the volleyball team during the three tests to determine the reaction speed of the lower limbs is shown. The first test was performed by jumping with both feet at the moment a stimulus appeared. The next two tests were carried out with the left foot and the right foot, which were placed inside the two rails and lifted when the stimulus appeared.

With the help of Optojump software, the average values of reaction speed were determined, and the values obtained by each tested subject were also determined.

RESULTS

Table 1. Average reaction time results for each tested subject (Avg)

Subject	Left leg reaction time (sec.) avg	Right leg reaction test (sec.) avg	Visual reaction test (sec.) avg
A. C.	0.532	0.531	0.643
A.B.	0.501	0.496	0.652
B.D.	0.453	0.484	0.717
M.F.	0.454	0.469	0.726
D.M.	0.419	0.489	0.670
N.E.	0.476	0.492	0.641
C.A.	0.438	0.456	0.632
D.A	0.422	0.425	0.603
P.E.	0.474	0.429	0.597
G.D.	0.393	0.425	0.621
C.M.	0.441	0.445	0.615
P.D.	0.420	0.441	0.649
M.M.	0.459	0.470	0.631
S.L.	0.502	0.531	0.750
S.A	0.427	0.439	0.638

Table 2. Average reaction time results for the entire tested team (Avg)

	Left leg reaction time (sec.) avg	Right leg reaction test (sec.) avg	Visual reaction test (sec.) avg
AVG	0.454	0.468	0.652
MIN	0.393	0.425	0.597
MAX	0.532	0.531	0.750

The analysis of the results was conducted after downloading the data from the Optojump software as follows: left leg speed reaction reaction test shows us that the best value was obtained by the subject G.D. with a result of 0.393 sec. The lowest reaction time was obtained by the subject A.C. with a result of 0.532 sec. The left leg reaction time vary between 0.393 and 0.532 seconds. Range: 0.532 - 0.393 = 0.139 seconds.

The right leg speed reaction reaction test shows us that the best value was obtained by the subject D.A. and G.D. with a result of 0.425 sec. The lowest reaction time was obtained by subjects A.C. and S.L. with a result of 0.531sec. The left leg reaction time varies between 0.425 and 0.5312 seconds. Range: 0.531 - 0.425 = 0.106 seconds.

Figure 2. Reaction test with left leg

Figure 3. Reaction test with right leg

On the 3th test, *Visual reaction time,* the following results was obtained. The best reaction time value: 0.597 (P.E.). Lowes reaction time value: 0.750 (S.L.). Range: 0.750 - 0.597 = 0.153 seconds. The visual reaction test times vary between 0.597 and 0.750 seconds. Based on this analysis, we can make several

observations: A.C. has the lowest average reaction time for both the left and right leg reaction tests G.D. has the highest average reaction time for the left leg reaction test. S.L. has the lowest average reaction time for the visual reaction test. P.E. has the highest average reaction time for the visual reaction test.

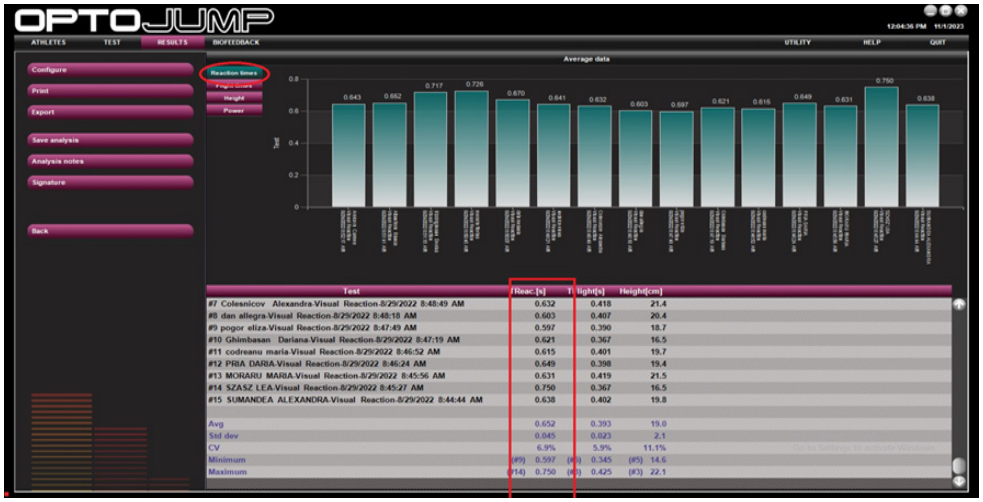

Figure 4. Visual. reaction time results for each player tested

CONCLUSION

There is a range in reaction times for all three tests, indicating individual variability in performance. The data collected and analyzed in the three tests used to identify reaction speed in the lower extremities show that the same subjects with low values are also the same subjects with high values. motor fitness components such as agility, speed, reaction and others will support skills in volleyball games. It can be seen from the results showing the magnitude of the correlation between the value of motor fitness with volleyball skills (Trecroci et al., 2017; Wilkerson et al. 2021).

This statement suggests that, based on the data collected from the three tests, there is a consistency in the performance of individual subjects. Some subjects consistently have low reaction speed values across all three tests, while others consistently have high reaction speed values. This may indicate that the reaction speed of these subjects is relatively stable and not significantly affected by the specific test or conditions. However, the context and details of the tests and the data should be considered to draw meaningful conclusions from this observation.

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