

28th ECSS Anniversary Congress, Paris/France, 4-7 July 2023

Application of video analysis to the measurement of reaction time in high-level tennis competition

Annino, G., Bonaiuto, V., Campoli, F., Caprioli, L., Edriss, S., Padua, E., Panichi, E., Romagnoli, C.

Tor Vergata University of Rome

INTRODUCTION:

2D Video analysis is often used in tennis to analyze the technique of players movements or issues related to game tactics. In modern tennis, many physical and mental abilities are involved in the performance of high-level athletes, who are called upon to solve complex motor problems in a short time through sprints and explosive actions often performed in precarious balance[1]. Indeed, by the tennis players performance model, it appears as various coordinative and perceptive kinetic abilities, such as reaction, anticipation, and transformation, play a fundamental role[2][3]. In this paper is applied video analysis to measure and evaluate the reaction time (RT) in tennis matches. The data shows the RT analysis of some professional players made during the ATP Challenger "Castel del Monte" tournament in November 2022.

METHODS:

The analysis was carried out using the software BIOMOVIE ERGO on video 240 Hz, filmed by a WOLFGANG Action Camera placed behind the center court. For the measurement of RT, the time between the impact of the opposing player and the first movement of the examined player was measured (the first movement coincides with the rotation of the shoulder line in the direction of movement or of the foot descending from the split-step or with a countermovement of the contralateral leg). Sixteen subjects were examined (25.88 ± 4.77 years old, weight 79.13 ± 5.67 kg, height 184.40 ± 5.30 cm, BMI 23.26 ± 1.19) all with an ATP ranking between the #130 position and the #1066 position updated on the day of the sampling.

RESULTS:

The average reaction time was 0.249 ± 0.07 s, with a correlation to the level of play as tennis players with an ATP ranking between #130 and #400 had a mean RT of 0.246 ± 0.07 s, and subjects with a ranking between #400 and #1066 a mean RT of 0.251 ± 0.07 s. The longest reaction times were recorded on the first shot after the serve on average 0.282 ± 0.05 s, while the shortest in defensive situations when the opponent was attacking or playing a volley and the player examined anticipated the movement by starting the run even before the opponents shot sometimes. The average RT recorded in this case is 0.083 ± 0.18 s. In the service response phase, on the other hand, it approaches the general average value with 0.245 ± 0.03 s.

CONCLUSION:

The RT of high-level tennis players are very short, sometimes less than 120 ms, especially in defensive actions when the player often starts before the opponents attacking stroke. This prompts us to consider the importance of kinetic perceptual skills such as reaction speed and anticipation in tennis training.

1. L.P. Matveev, Fundamentals of sport training, Fis, Mosca1977;
2. Fox, Edward L., Richard W. Bowers, and Merle L. Foss. The physiological basis for exercise and sport. No. Ed.
5. Brown & Benchmark, 1993,
3. Richard Shonborn, Advanced Techniques for Competitive Tennis, Meyer & Meyer, 1998

Topic: Training and Testing

Presentation Oral

European Database of Sport Science (EDSS)

Supported by SporTools GmbH



35241