

A NEW METHOD OF DEFINING THE SOCCER PLAYERS' SPRINTS

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INTRODUCTION

Several studies have presented different methods able to register players displacement during a soccer match [1, 2, 3] allowing analysis of players physical requirements, such as high-intensity running (sprints). In the literature [2, 3], the beginning of the sprints is determined only when the player exceeds a certain velocity. However, results from these methods can be misinterpreted, once they do not consider the velocity increase since the local minimum of the velocity curves. Therefore, the aim of this work was to propose a new method to define the sprints of soccer players in an official competition and to compare with a method of the literature.

METHODS

Aiming to propose a new method of determining the sprints of soccer players, a first division Brazilian championship game was recorded by six stationary digital video cameras (30 Hz) positioned in the highest points of the stadium. Players' trajectories during the whole game were obtained through an automatic tracking method with Dvideo system [1]. These data were reconstructed in 2D and smoothed using a third order Butterworth low-pass filter (cutoff frequency of 0.375 Hz). In this study 14 players that played the entire game were analyzed, excluding goalkeepers. The curves of velocity were obtained by numerical derivation from the data of the smoothed trajectories and then, curves of acceleration were obtained by numerical derivation from these velocity data. It was considered a sprint when the player exceeded 6.38m/s. In the present study, the beginning of the sprint was determined in the first local minimum before the peak velocity, and the end was the instant when the player velocity was lower than 6.38m/s (Figure 1). However, a previous study [2] reported the beginning of the sprint was the moment that player exceeds 6.38m/s and the finish was the instant when the player velocity was lower than 6.38m/s (Figure 1). For compare the main differences between these two methods, the following variables of 425 sprints performed by the players were calculated through both definitions during the entire game: total sprints performed by each player during each half time, sprint covered distance, sprints' duration, peak acceleration during sprint, peak and initial velocity.

RESULTS AND DISCUSSION

In the present method the mean of sprints distance covered, sprints duration and peak acceleration were, respectively, 22.6m, 4.3s and 2.9 m/s^2 , while through literature method, results were 13.4m, 1.8s and 1.7 m/s^2 . Once the literature method determines the beginning of the sprint only when the player is above 6.38m/s, these results are always lower than the present study method. Therefore, the literature method underestimates the real physical requirements that a player

needs during sprinting. For that reason, the present method intends to demonstrate the sprint features since the moment that the player effort begins. Another advantage of the present method is the possibility of to analyze the initial velocity, while the literature method is always 6.38m/s. Thus, the mean of the initial velocity was 2.1m/s, showing that the players almost do not start the sprint stopped. On the other hand, the mean of total sprints performed by each the player during each half time (16.2 sprints) and peak velocity (7.2 m/s) were the same in both methods, because these variables are independent of the way the beginning of the sprint was determined.

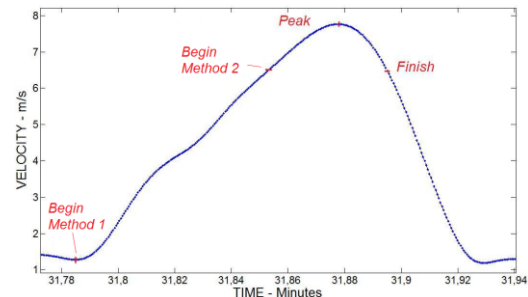


Figure 1: The determination of the beginning and the finish of the sprint. The Method 1 is the begin by the new propose, and the Method 2 is the begin by the method in the literature.

CONCLUSIONS

The present study presented a new proposal of determining soccer players' sprints in an official competition. The proposed method, compared with the literature method, shows that the sprint distance covered, sprint duration and peak acceleration presented greater values, however the total sprints performed by each the player and peak velocity does not change. Furthermore, new data about sprint initial velocity were offered. The method proposed provided important information about the sprints of soccer players that others methods do not provide, yielding coaches better conditions to plan physical programs and to create specific tests during players' evaluation.

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