

## **VALIDITY AND RELIABILITY OF A SPECIFIC REPEATED SPRINT ABILITY TEST FOR YOUNG TENNIS PLAYERS**

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### INTRODUCTION

Several activities, both individuals and team sports are characterized by repeating some specific sports movements as explosive as possible, or repeated efforts during the entire match. This kind of ability has been defined as repeated sprint ability (RSA), and it is defined by efforts lasting less than 10 second, with a maximal or near-maximal intensity, and incomplete rest intervals. In addition, some authors have shown that the RSA can determinate the match result (Girard, Mendez-Villanueva y Bishop, 2011), that is why it is necessary to evaluate this ability.

The main problem posed by several of test used in these studies is the lack of relationship between the chosen RSA test and the specific sport demands. This problem appears in sports like tennis, where decelerations and change of directions are common, but most of the tests used in the literature are lineal. Those tests usually consist of 6-15 repetitions of 30-40m with 25 sec rest (Chaouachi et al, 2010). In this study, a specific test for tennis players has been designed with changes of directions and a work-rest ratio similar to tennis' requirements.

Aiming to give validity to the tests, several studies have used the category/ranking as a construct (Wilkinson, McCord y M. Winter, 2010), but the problem is that in those studies the authors compared between groups of level with high differences (generally sport sciences students and elite players). Regarding the reliability, the most used parameter has been the intraclass coefficient correlation (ICC) or the coefficient of variation (CV) (Glaister, Howatson, R. Pattison y McInnes, 2008).

Therefore, the aim of our study was to provide the validity (a construct that explains the RSA) and reliability of a specific test of RSA.

## METHOD

23 tennis players (15 males and 8 females) took part in this study. The sample was divided into two groups (elite, n=13; amateur, n=10), based on their ranking. The RSA test consists of 20 metres with 3 changes of directions (two of 180° and one of 90°), it had a "V" shape starting from the vertex. The right change of direction was performed with the dominant leg, and the left change of direction was performed with the non-dominant leg. Each participant carried out 6 repetitions of a RSA circuit initiated every 20 seconds. The variables used for the analysis were the total time of RSA ( $\Sigma$  of 6 repetitions), the time required to change of direction, and the fatigue index. In addition, the evolution of lactate in capillary blood was analyzed at the end of the RSA test, an anthropometry was used to determine fat mass, and a 20m test and a maximal oxygen uptake test were performed. The RSA test was repeated 48-72 hours after the first session.

## RESULTS

A paired t-test, a reliability analysis (ICC, CV, standard error of measurement, SEM, and smallest real difference, SRD) and bivariate correlations were made. A high ICC, and a low SEM, SRD and CV in the RSA total time was obtained for whole sample (ICC = 0.942, SEM = 1.13, SRD = 1.695, CV = 10.4%), and in both elite and amateur group (ICC = 0.952, SEM = 1.05, SRD = 1.575, CV = 10.7%; ICC = 0.973, SEM = 0.79, SRD = 1.185, CV = 10.4%, respectively). Nevertheless, a moderate ICC, a low SEM and SRD, and a high CV were found for the fatigue index in the three groups (ICC = 0.670, SEM = 1.41, SRD = 2.115, CV = 54.2%; ICC = 0.560, SEM = 1.67, SRD = 2.505, CV = 54.6%; ICC = 0.810, SEM = 1.06, SRD = 1.59, CV = 56.4% ; for all, elite and amateur group respectively).

Significant differences were found between day 1 and day 2 in the RSA test for amateur group ( $p < 0.001$ ). Significant correlations were found between RSA total time and velocity in 20m ( $r = 0.660$ ,  $p = 0.001$ ), and between RSA total time and changes of direction dominant ( $r = 0.488$ ,  $p = 0.018$ ) and non-dominant ( $r = 0.548$ ,  $p < 0.001$ ). There was no correlation between RSA total time and maximal oxygen consumption ( $VO_2\max$ ), neither with % fat mass, nor ranking. The fatigue index did not show correlations with any variable.

## DISCUSSION

According to the literature (Haj-Sassi et al, 2011; Pyne, Saunders, Montgomery, Hewitt, & Sheehan, 2008), the results have shown total time as a good reliability indicator, but not the fatigue index. Regarding fatigue index, our results are in line with several authors, who found a low rate of reliability in

the performance decrement during RSA test (high CV and SEM) (Haj-Sassi et al, 2011; Glaister et al, 2008).

Pyne et al (2008) showed a high correlation between the total time of RSA test and short speed (20m). The results of this study agree with those of Pyne et al, showing the 20m sprint time is the most important validity variable, followed by change of direction time. Nevertheless, RSA total time and ranking did not show significant correlations, therefore, it seems to be a useless validity criterion. Based on these results, it is necessary to find out about new constructs, such as speed or change of directions ability.

Aiming to give reliability of this test with amateur players, the test should be performed more than twice.

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