DETERMINING A RECOMMENDED AGE OF USING REPEATED SPRINTS TESTS ON CANADIAN YOUTH SOCCER PLAYERS

Rob Rupf[1], Richard Bucciarelli[2], B. Naim[3], Scott G Thomas[1],

Graduate Department of Exercise Sciences, University of Toronto, Canada[1], York University, Canada[2], ANB Futbol Academy, Canada[3]

Introduction and Objectives

In the game of soccer, the ability to perform several consecutive sprints at high intensities (RSA) has been partially associated with increased distances covered during games. Therefore, RSA testing procedures have been developed for soccer players, and have been used at all ages levels in Canadian soccer, specifically in youth training academies. However, RSA testing protocol guidelines have not been well developed for youth players, where differences in energy system recruitment exist. Therefore, the purpose of this study was to determine if RSA testing is suitable for all ages of youth soccer.

Methods

Participants (N=64) were recruited from an elite level Canadian academy, and were selected from U12, U14, U16 and U18 teams. Players from this academy train four days per week throughout eleven months of the year, and participate in inter-academy competitions in an outdoor (six month) and indoor (four month) format.

Each player performed a battery of fitness tests upon entering the academy, including, the Australian Institute of Sport (AIS) Multistage Fitness Test, 10m sprint test, a standing long jump test, and a Repeated Sprint Ability (RSA) test. All tests took place on an indoor turf field.

The RSA test consisted of 5 sprints over a distance of 10m. Sprint times were recorded using a Brower system. A 10s passive recovery period was timed using a stop watch and was instituted between each successive sprint (Figure 1). Distances were selected based on previous studies of sprint distances during games.

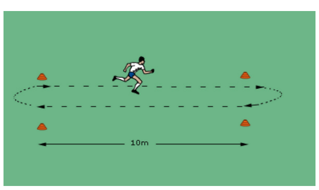

Figure 1. RSA 10m test. Players sprinted from one set of cones to another 10m apart. 10s of passive recovery occurred between sprints, allowing the player to turn around and head back in the other direction.

Predicted VO2 max values were determined using AIS regression equations based on level achieved. Standing long jump values were determined using a standard tape measure. All values were compared amongst age groups using one way ANOVA analysis.

Mean sprint times and the % decrement between the 1st and 5th sprint were used to determine RSA performance indexes. Two way ANOVA was used to compare differences amongst age groups. The Turkey post hoc test was used to identify significances between groups. Significance levels were set to $p<0.05$. Pearson's correlation coefficient was used to determine relationships between aerobic and anaerobic physical characteristics and RSA performance indexes.

Results

Age Group	Predicted VO2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	10m Sprint Time (s)	Standing Long Jump (m)
U-12	42 ± 6	2.1 ± 0.2	1.63 ± 0.20
U-14	48 ± 6	2.0 ± 0.2	1.91 ± 0.20
U-16	54 ± 3	1.9 ± 0.1	2.23 ± 0.10
U-18	54 ± 3	1.8 ± 0.1	2.33 ± 0.15

Table 1. Aerobic and anaerobic physiological characteristics of different age groups tested.

Results

64 Subjects (N=16 for each age group) were recruited for this study,The average age of the participant was 14.7 ± 2.3.

A demarcation of physical characteristics appeared around the U-14 age group as both the U-16 and U-18 players demonstrated a 25% increased aerobic power, 19% increase in standing long jump power and 16% increase in 10m sprint time compared to U-12 and U-14 players (Table 1).

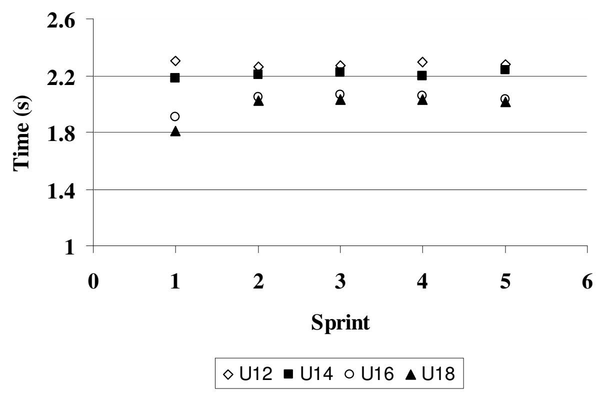

Figure 2. Sprint times for U-12, U-14, U-16, and U-18 age groups over 5 successive 10m sprints.

Significant changes ($p<0.05$) were observed in sprint times over successive sprints for U-16 and U-18 players, however this was not observed for U-14 athletes (Figure 2). Further, an 11% increase in the sprint duration ($p<0.05$) was observed between the first sprint and the second sprint for the U-16 and U-18 age groups. No significant changes were observed between the 2nd and 5th sprint ($p=0.41$).

The relation between aerobic and anaerobic physiological characteristics and performance in RSA testing for U-16 and U-18 players determined that aerobic power contributed to slower sprint times, and less decrement, and faster initial sprint times led to greater sprint times (Table 2). However, the data demonstrates a strong inverse relationship between maximal standing long jump power and the % Decrement in RSA.

	Predicted VO2 Max	Standing Long Jump	10m Sprint Time
Mean Sprint RSA Time	0.67	-0.54	0.78
% Decrement	-0.53	-0.56	-0.43

Table 2. Pearson correlation coefficients determined between RSA performance indexes and aerobic and anaerobic physical characteristics. All values have a p-value < 0.05.

Discussion and Conclusions

Similar to other sprint studies, this study confirmed that RSA testing for age groups less than the age of U-14 does not provide valuable information on the physiological characteristics of soccer players. This study also determined that there is no increase in sprint times after the 2nd sprint. This finding might be related to the fact that only 10m was covered, which leads to a minimal number of steps required to cover the distance. It is recommended that RSA testing be completed on soccer players over the age of 14.