Introduction

- At present there are few testing methods that reliably evaluate performance of the work demands of team sports (3,7).
- The purpose of this study was to report on the reliability of a new test and method for measuring team sport running performance on a non-motorised treadmill (NMT) in a laboratory.

Methods

- Subjects
  - 11 moderately-trained (VO2max = 52.6±4.5 ml·kg⁻¹·min⁻¹; age = 23.6±4.5 yrs; body mass = 77.5±6.2 kg) male team sport athletes participated in this study.
  - Following a familiarisation session, each subject completed three 30 min team sport-specific running protocols on a NMT, separated by 6 days.

- 30 min Team Sport-Specific Running Protocol
  - The activity profile of the 30 min team sport-specific running protocol was based on previous time and motion studies of various team sports including soccer, rugby league and Australian rules football (2,6).
  - Two 15 min activity profiles were performed succinctly (separated by a 2 min rest) on a NMT (Force Tread Dynameter, Woodway, USA) to form a total duration of 30 min.
  - Included in these activity profiles were six running speeds: standing (0% of maximal sprint speed (MSS)), walking (20% MSS), jogging (35% MSS), running (45% MSS), fast running (65% MSS) and sprinting (100% MSS) (see figure 1).
  - The six movement categories were designated a particular duration based on time and motion data from team sports (2,6). Walking, standing and jogging were all assigned 8 s time durations. Running, fast running and sprinting were assigned 6 s, 4 s, and 3 s time durations, respectively.
  - A specialised software package (Force Software, Innovations Joondalup, Australia) then randomised the movement duration data into a 15 min set protocol such that the total amount of running at any given speed would approximate that which occurred during a competitive match (1).
  - The result was a 30 min team sport-specific running protocol, which comprised of 181 changes in speed (first 15 min period = 91 changes, second 15 min period = 90 changes).

- Statistics
  - One-way ANOVA was used to determine any significant differences in physiological and performance variables between the three trials (SPSS Inc., Version 12.0.1 for Windows, Chicago, USA).
  - Typical error (TE), typical error expressed as a coefficient of variation (CV), and Intraclass correlation coefficient (ICC) were used to determine the reliability of each physiological and performance variable between the three trials (see table 1 and 2). TE and CV were calculated according to the methods of Hopkins (4).

Results

- No significant differences were shown in any of the physiological or performance variables between trial 1-2, trial 2-3 and trial 1-3 (P>0.05).
- The mean (±SD) total distance covered, 3 s and 6 s sprint distance was 3430.7 ± 122.2 m, 17.3 ± 1.5 m, and 36.6 ± 2.3 m, respectively. The mean (±SD) peak running speed was 25.5 ± 1.4 km·h⁻¹. The mean (±SD) total 5 x 6 s repeated sprint ability (RSA) test distance (sprinting and jogging) was 661.5 ± 37.7 m.
- The mean (±SD) heart rate (HR) and blood lactate concentration ([BLa⁻]) for the entire 30 min team sport-specific running protocol was 158.3 ± 9.9 bpm and 9.9 ± 3.3 mmol·L⁻¹, respectively.

Discussion & Conclusions

- The activity profile used to simulate team sport match running demands in this study elicited physiological responses that were similar to those reported from match play in a variety of team sports (2,6).
- The 30 min team sport-specific running protocol has a high reproducibility and can be considered more reliable than common field tests used to assess the physical capacity and performance of team sport athletes (5).
- A 6 s sprint is more reliable than a 3 s sprint on a NMT. Furthermore a 5 x 6 s RSA test can be used reliably on a NMT under pre-fatigued conditions.
- These results demonstrate that the NMT system and 30 min team sport-specific running protocol used provide a reliable tool for assessing both key performance variables and physiological measures in team sport athletes. Furthermore, these results indicate that two familiarisation sessions should be completed prior to testing on a NMT.
- The present results can be used to interpret meaningful changes in performance and also to determine the appropriate sample size needed for future studies using this protocol.

References