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Between-day reliability of fitness testing measures in youth sport athletes

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Introduction

- Numerous studies have shown the importance of strength, power, speed and change of direction ability to sporting performance. In order to assess changes in these physical qualities, it is important that they are regularly tested using measures which are reliable between-days.
- The aim of this study was to assess the between-day reliability of strength, power, speed and change of direction ability tests in a group of adolescents of varying playing standards across a range of different sports.

Methods

- With institutional research ethics approval, 59 multi-sport adolescents (43 male, 16 female, age 17.3 ± 0.7 years, stature 1.75 ± 0.17 m, body mass 75.5 ± 14.0 kg) completed four fitness testing sessions over 10 days.
- Strength measured via the isometric mid-thigh pull (IMTP) and power measured via a countermovement jump (CMJ) were assessed on days 1 and 7.
- Speed (5, 10, 20, 30 and 40 m sprint split times) and change of direction ability (5-0-5 test) were assessed on days 4 and 10. Both of these were measured using single beam timing gates.
- The typical error as a coefficient of variation (CV) was calculated from the best effort on both days using a pre-made Microsoft Excel Spreadsheet.
- The reliability of each test was classified as good (CV < 5%), acceptable (CV ~ 5%) or poor (CV > 5%)



Results

Test	Day 1	Day 2	CV (%)	Description	
IMTP (kg)	170.6 ± 45.5	170.9 ± 46.4	5.5 (4.5 – 6.9)	Acceptable	
CMJ (cm)	34.4 ± 5.9	34.4 ± 6.4	2.9 (2.5 – 3.5)	Good	
Sprint split (s)	5 m	1.08 ± 0.06	1.06 ± 0.06	2.7 (2.0 – 4.0)	Good
	10 m	1.82 ± 0.09	1.78 ± 0.11	2.5 (2.1 – 3.2)	Good
	20 m	3.19 ± 0.17	3.10 ± 0.19	2.2 (1.9 – 2.8)	Good
	30 m	4.45 ± 0.28	4.37 ± 0.28	2.2 (1.8 – 2.7)	Good
	40 m	5.75 ± 0.38	5.68 ± 0.42	1.8 (1.5 – 2.3)	Good
5-0-5 test (s)	Left	2.54 ± 0.21	2.50 ± 0.22	4.1 (3.4 – 5.4)	Good
	Right	2.49 ± 0.20	2.52 ± 0.25	5.4 (4.4 – 7.0)	Acceptable

Summary and Conclusions

All tests were found to have *good* or *acceptable* between-day reliability in youth sport athletes, suggesting that practitioners can be confident that changes in performance are “real” and not a result of the daily variation in the test.

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