

REVIEW OF LITERATURE

PERFORMANCE TESTS: DESIGN AND APPLICATION

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SUMMARY PLUS

INTRODUCTION

Sport performance is assessed and evaluated by well-designed performance tests which are supposed to simulate race or game conditions in the laboratory and permit the generalization of research results to actual sports. These tests are assumed to depict the current physiological conditioning of the athlete in a sport specific situation. In particular, they are grouped into the following general categories: a) constant work or time trials tests; b) constant duration tests; c) constant power or constant load tests; and d) critical power tests.

AIM

The aim of this review was to present the basic methodological criteria of selecting, designing and applying performance tests.

VALIDATION and RELIABILITY

The most important criterion for the appropriate test is the strong association between actual and laboratory-based performance. In general, it has been suggested that the most preferable tests for the assessment of explosion, speed and endurance are the iso-inertial tests, the constant work or duration tests and the constant power test, respectively.

Table 1: Performance tests with coefficient of variation (CV) lower than 5%.

Performance Test	Study	Subjects	Distance	Duration	C.V.
Constant Work Tests	Laursen et al., (2003)	43 cyclists	40 km	58 min	1-3.0%
	Smith et al., (2001)	8 cyclists	40 km	~55 min	1.00%
	Jeukendrup et al., (1996)	10 cyclists	40 km	60 min	3.35%
	Palmer et al., (1996)	6 cyclists	20 km	30 min	1.10%
	Schabort et al., (1999)	8 cyclists	2 km	~7 min	2.00%
Lindsay et al., (1996)	8 cyclists	40 km	~55 min	0.97%	
Constant Duration Tests	Bishop (1997)	20 cyclists	-	60 min	2.70%
	Weinstein et al., (1998)	29 cyclists	-	30 sec	2.20%
	Busso (2003)	6 untrained	-	5 min	1.58%
Constant Power Tests	Lindsay et al., (1996)	8 cyclists	-	60-80 sec	1.70%

An important parameter, which strengthens the test's reliability, is the coefficient of variation that should always be lower than the improvement expected as a result of an intervention (Table 1). Validity and reliability are influenced by several methodological factors such as the size and the nature of the sample, the measurements conditions, the biomechanical parameters, the subjects' dietary status and the specific team sports' parameters. These factors should be taken into consideration in test designing and test selection.

CONCLUSIONS

There are numerous tests in the literature, but few of them are well-designed, with high validity and reliability and thus allowing a relatively safe interpretation and generalization. Sport scientists should be very careful in choosing the right test taking into account the fundamental methodological principles presented in this review.

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