

ASSESSMENT OF STRENGTH CAPACITY IN POWER ATHLETES BEFORE AND AFTER FATIGUING TEST

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INTRODUCTION

This research develops ~~some~~ arguments of two previous works done between 1987 and 1989. These were joint studies in collaboration between the High Institute of Physical Education of the Lombardy and the Science and Biomedical Technology Department of the University of Milan, Physiology Section.

The first research founded that there was a significant difference ($p < 0.01$) of peak Torque (PT), measured by an isokinetic dynamometer (Cybex II, Lumes Inc, NY), of the fatigue index (IF; Thorstensson Test) and of blood lactate concentration (La) between power and endurance athletes after fatiguing tests.

The second research compared the results of two series of tests (isokinetic and Bosco test (BT)) carried out on power athletes before and after their winter training.

At the first observation a PT significantly greater ($p < 0.005$) was recorded in the non dominant limb. To ~~this~~ explosive strength imbalance corresponds an explosive-elastic and reactive strength (BT) asymmetry. At the end of winter training, an improvement of BT and a re-equilibration of strength capacities in the limbs were found.

Training effects were studied starting ~~from~~ these observations. The ~~aim~~ of this work was to analyse the effects of some fatiguing tests on strength capacity.

METHODS

20 power athletes (100,200, 400m; ~~mean~~ age 21.5 +/- 2.4 years DS; weight 69.9 +/- 6.9 kilos; height 179 +/- 4 cm) of high and middle level (mean record = 88.5% of the world record in 1991), were studied in this research.

Their explosive strength (SO), explosive strength with the use of elastic elements (SCm), ~~and~~ reactive strength (flight time Tf and contact ~~time~~ Tc in seven jumps with minimal countermovement), were tested before and after fatiguing trials. Fatiguing tests included: a) isokinetic test: active extension and flexion of both legs simultaneously for 1 minute, at the ~~an~~gular velocity of 180°/s; b) series of repetition with incomplete recovery; c) single trial of 400m and d) mixed work (weight lifting and cross running). To determine the (La), (Lactate Analyser Kontron 640), a micro sample of capillar blood was taken ~~from~~ the ear lobe, at the fifth minute of recovery time.

RESULTS

The results are reported in the table:

Fatiguing tests	SO	SCm	Tv	Tc	La (mM)
series of repetition	--			--	19.3+3.2
400m	=	+			12.7+2.2
weight lifting+cross r.			--	-/+	4.5+3.0
isokinetic	--	--	--	=	12.6+2.7

-- significant reduction ($p < 0.05$)

- non significant reduction ($p > 0.05$)

= no variations

+ non significant improvement

DISCUSSION

This study demonstrates that fatiguing tests affect the strength capacities in different ways.

Explosive strength with the use of elastic elements (SCm), reduces only after isokinetic fatigue.

Reactive strength reduces after lactacid work, weight lifting + cross running and isokinetic fatigue.

Contact time in reactivity test, seems to be more affected by lactacid work, while flight time by weight lifting + cross running.

From these findings it is possible to conclude that:

1 - coordinative capacity is particularly affected by fatiguing tests which cause high concentration of lactate:

2 - the muscle elastic recovery capacity is not altered by fatiguing tests even when they determine a significant loss of performance