

Validity of Myotest® during a vertical jump test: Preliminary study

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Introduction

The vertical jump is a fundamental quality for athletes. The evaluation of this quality is thus essential when monitoring a person's physical training. Several tests and evaluation systems can be deployed to assess this quality. The aim of this experiment was to check the validity of the Myotest® for measuring vertical jump tests. The experiment involves comparing two measuring systems to measure vertical movement during squat jumps (SJ) and a reactivity test.

Experimental procedure

Subjects. 30 subjects (6 girls and 24 boys), all of whom study physical education, took part in the study.

Each subject was evaluated randomly by means of the two vertical displacement tests:

The squat jump (SJ) and reactivity test.

Tests. The SJ allows measurement of “non-pliedometric” displacement and the ability to develop a great deal of strength within a very short space of time (explosiveness).

This test consisted of the person jumping as high as possible with their hands on their hips from a half-squat position (i.e. 90° bending of the knees).

This position was maintained for about 1s. The subjects were then instructed to extend the lower limbs as explosively as possible with the aim of performing a squat jump.

Three attempts were made at this exercise. The best result was retained for analysis.

The reactivity test allows us to measure the calf muscle power. The subjects performed 6 vertical jumps (with as little bending of the knees as possible) with their arms as support.

The idea was to achieve the least possible contact time for a maximum jump height.

The test was only performed once.

The average height of the 6 jumps was calculated and then compared.

Equipment used. The jump heights were simultaneously recorded using two evaluation systems.

The Myotest® (Myotest, Sion, Switzerland) system allows you to calculate the jump height using an accelerometer placed on the pelvis with integration calculations, allowing you to determine the sensor's vertical displacement (i.e. jump height).

The jump height can also be determined by measuring the airborne time with an Ergojump (Globus Italia, Codogno, Italy) contact mat.

Statistical analysis. The values obtained from the two measurement systems are compared per test student.

The correlations are then researched to establish the degree of association between the performances recorded by the two systems.

A significance threshold of 0.05 was adopted for all of the statistical analyses.

Results

The jump height comparison gained from the Myotest® and the Ergojump did not show any significant differences (see table 1). Nevertheless, the jump heights are slightly higher with the Myotest® when compared to those of the Ergojump. This difference was approx. 3 cm, meaning a relative average difference of 9.5%.

	Ergojump (cm)	Myotest® (cm)	Difference (cm)	Difference (%)
Squat Jump (n = 30)				
Average	32.1	34.8	2.7	8.7
Standard deviation	6.3	7.0	2.8	9.1
Reactivity (n = 20)				
Average	31.	34.6	3.0	10.7
<u>standard deviation</u>	<u>5</u>	<u>7.2</u>	<u>3.3</u>	<u>12.5</u>

Table 1 Heights of the squat jump tests and reactivity measured with the Myotest® and Ergojump.

Relations between the jump heights measured with the Myotest® and Ergojump are shown in figure 1. Significant correlations were achieved for the SJ and reactivity test ($P < 0.001$).

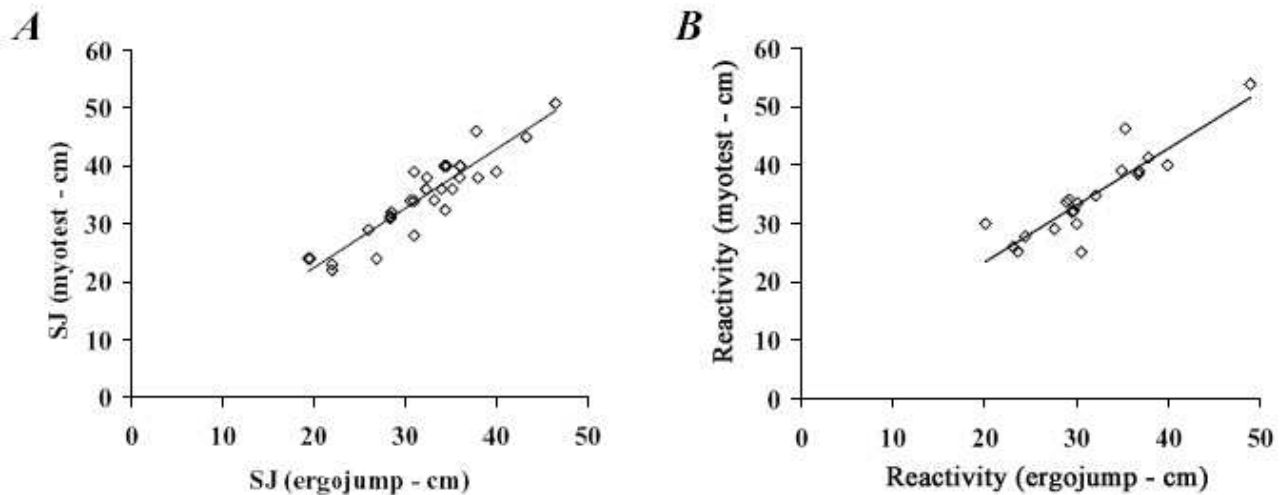


Figure 1 – Correlations between the jump heights of the Ergojump and Myotest® during the SJ (A, $r^2 = 0.84$, $P < 0.001$) and reactivity test (B, $r^2 = 0.87$, $P < 0.001$).

Conclusion

The aim of this experiment was to check the validity of the Myotest® during vertical jump tests. The preliminary results show a significant correlation between this system and the Ergojump for both the SJ and the reactivity test. A difference of about 9% was recorded in favor of the Myotest®. This difference can be explained due to the measurement method and the calculation method used. The contact mat takes the airborne time into account whereas the Myotest® only measures the acceleration of the center of gravity during the ground contact phase. The Myotest® therefore appears to be an efficient tool for evaluating performance during the vertical jump test. However, complementary studies need to be carried out to round out this study. Such studies could include (i) a comparison of the Myotest® with other systems (e.g. force platform) using parameters such as take-off speed or power or (ii) a test involving the reproducibility of the measurements.