



RELATIONSHIP BETWEEN VERTICAL JUMP, BALANCE CONTROL AND SPRINT WITH CHANGE OF DIRECTION

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Introduction

Often it is necessary for football players to demonstrate strength in situations where their bodies experience disbalance, such as during a sprint, after a change of direction, tackling an opponent or when the pitch is in bad condition.

Previous studies showed that unstable surface training improves performance in the agility T test (1) and in the expression of strength during vertical jumps (2).

The aim of this study is to establish the relationship between the capability arrived at during a one leg vertical jump, a one leg balance control and during the changing of direction.

Methods

Twenty-five young amateur football players were tested. The single leg vertical jump ability was tested with a free arm counter movement jump (CMJ). The measurement in these tests was done by use of an Optojump (Microgate, Bolzano, Italia). The subject was tested after doing 3 jumps on each leg.

The ability of change of direction (CoD) was tested with the 505 agility test(2). During this test the subject does a sprint with CoD of 15+15 meters and the time was estimated in 4 split: 10 meters, 5+5 meters (CoD), 15+5 meters, 15+15 meters (total time test). This was done using a timer connected to two Polifemo photocells (Microgate, Bolzano, Italia), one on the starting line and the other on the 10 m line. The subjects then did 3 CoDs with right leg and 3 CoDs with left one.

The balance control ability was tested with Libra board (Easytech, Prato, Italia). The subjects tested had to maintain their balance on a tilting balance-board for 30 seconds for each trial, for a total of 6 valid trials per leg. The correlation was studied using the Pearson correlation coefficient using the SPSS v.15 software. (SPSS INC, Chicago, IL).

Results and Discussion

The result are reported in table 1.

SPLIT 505 AGILITY TEST				
	Split 10 m	Split 15+5 m	Split 5+5 m	Split 15+15 m
CMJ right	-0.45 *	-0.52 **	-0.42 *	-0.57 **
CMJ left	-0.65 **	-0.40 *	n.c.	-0.63 **
Balance right	-0.41 *	n.c.	n.c.	n.c.
Balance left	n.c.	n.c.	n.c.	n.c.

Table 1. Pearson correlation coefficient between vertical jump, balance control and e 505 agility test.
* P<0.05; ** P<0.01.

From the analysis of the results there is no correlation between single leg vertical jump and single leg balance control.

Negative correlation was found between monopodalic vertical jump and various split of 505 agility test. No correlation was found among CMJ ability with left leg and the 5+5m split during CoD with left leg; probably because a CoD involves both technical and coordinative aspects. Moderate negative correlation was found between balance control with right leg and 10 m split during 505 test.

Conclusion

The vertical jump ability, therefore the power of lower-limb, is correlated with performance during sprint with CoD in 505 agility test. This would confirm the hypothesis that training power and strength would cause better performances in both the sprint and Cod. The absence of a correlation with balance ability could probably be explained by the lack in balance abilities of the studied subjects. Meyer et al., (3) have shown that by improving balance there will be a better postural control and better power and strength performances during sports activities.

References

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- 3.Myer GD, Ford KR, Brent JL, Hewett TE. The effects of plyometric vs. dynamic stabilization and balance training on power, balance, and landing force in female athletes. J Strength Cond Res. 2006 May;20(2):345-53.1

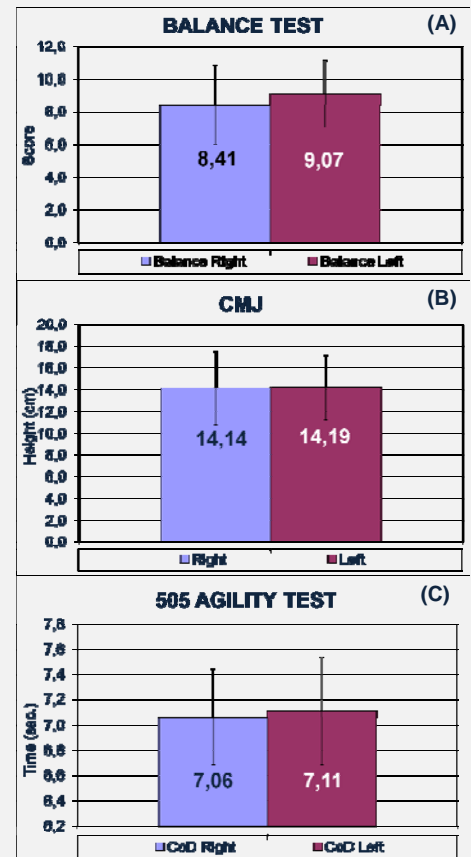


Figure 1. Graphs show the averages of Balance Test (A), CMJ Test (B) and 505 Agility Test (C).

CMJ (cm.)				
	CMJ (CM)		CMJ SX	
	MEDIA	BEST	MEDIA	BEST
MEAN	14.1	14.9	14.2	15.1
DV.ST	3.39	4.48	2.93	3.11

BALANCE TEST				
	EQDX		EQSX	
	MEDIA	BEST	MEDIA	BEST
MEAN	8.41	5.78	9.07	6.39
DV.ST	2.42	2.1	2.07	1.68

RIGHT CHANGE DIRECTION (sec.)				
	MEAN	MEAN	MEAN	MEAN
	SPLIT 1	SPLIT 2	5+5	TOTAL
MEAN	2.2	5.23	3.03	7.06
DV.ST	0.13	0.27	0.21	0.38

LEFT CHANGE DIRECTION (sec.)				
	MEAN	MEAN	MEAN	MEAN
	SPLIT 1	SPLIT 2	5+5	TOTAL
MEAN	2.21	5.2	2.99	7.11
DV.ST	0.16	0.29	0.22	0.43

RIGHT CHANGE DIRECTION (sec.)				
	BEST	BEST	BEST	BEST
	SPLIT 1	SPLIT 2	5+5	TOTALE
MEAN	2.19	5.18	2.97	6.99
DV.ST	0.14	0.27	0.18	0.37

LEFT CHANGE DIRECTION (sec.)				
	BEST	BEST	BEST	BEST
	SPLIT 1	SPLIT 2	5+5	TOTALE
MEAN	2.2	5.16	2.94	7.02
DV.ST	0.16	0.32	0.2	0.42

Figure 2. Tables show best and mean results of all tests.