Time Air Changes of DJ 40-60 Plyometric Test for 12 Weeks Training in Young Volleyball Players in Albania

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Doi:10.5901/ajis.2015.v4n3p215

Abstract

The study focuses on young volleyball players in Albania during the 12-week plyometric training in order to compare and evaluate the residence time in the air during the vertical jump performance through DJ40-60 test. Methods. Twenty young (male) volleyball players considered as the experimental group No = 10 and control group No. = 10 (age 17 ± 1) are participating in this study. Both volleyball groups were evaluated before and after 12 weeks. Only the experimental group developed 12 week of plyometric training with 2 sessions per week.The control group developed technical and tactical training with the ball. Besides anthropometric measurements they developed drop jump tests by jumping from the cube in height 40 cm and 60 cm Resulsts.The results showed a high correlation coefficient (r = 0,924) and statistically significant (sig.<0.05). Data obtained from two groups GRFP to show that the relationship between the contact time and the time air have also changes between the two tests DJ 40-60cm.Conclusions. The methodology used helps us to compare the high and poor performances that help coaches to program a more detailed plyometric training for the development of jumping skills in young volleyball players. Vertical jumping may be assessed not only by the height of its development but also by the phase of residence in the air.

Keywords: *younger drop jump, volleyball, plyometric training.*

1. Introduction

A volleyball player during a game or a match alongside the technical elements - should develop tactical and technical elements such as; attack, block, service and/or following by vetrtical jumping. The best Perfection of a vertical jump is achieved through a certain training in order to increase the height of jump. Coaches need exercises less time consuming and help to improve the vertical jumping ability of their players. Plyometric is a form of resistance exercise that refers to the stretch-shortening cycle (SSC) such as jumps or doing vertical or horizontal jumps (Fleck & Kramer, 2004). Several scholars have shown that jumps in height can be greatly improved through plyometric exercises. To assess the vertical jump is needed the application of Bosco tests such as Drop Jump (Gilles & Dominique, 2009) that made possible the definition of the height of the optimum fall from which the volleyball player takes\wins the maximum jumping and the connection between the height of the fall, the time of contact and flight-time. Some authors have reported (Voelzke, et al., 2012) that a commanded plyometric training shows that exercises are effective to increase the jumping, speed and skill of volleyball players. Several studies focused on drop jumps and possible plyometric training effects: (Pacheco, et al., 2011) concluding that static stretching has a significant effects on drop jumps 40 cm; (Tsolakis, et al. 2010) concluding that static stretching does not have a statistically significant effect on the drop jump; (Behm & Kibele, 2007) concluding that static stretching held for 30 s significantly decreases drop jump height; (Fletcher 2013) concluding that the height of the drop jump significantly increases after a warm- up including resistance training and dynamic stretching; have been reviewed. Studding effects of plyometric training on jump performance is quite a novel and promising field for Albanian volleyball players. The purpose of the study was to determine if twelve weeks of plyometric training can improve a volleyball player's jumping skill. We have conducted a study with young volleyball players during the 12 week training in order to assess and compare the ability of jump performance in the phase of the time of contact and the time of flight through Drop Jump.

2. Methods

A quasi-experimental pretest/posttest control and experimental group design was used based on literature review.

Subjects were divided into two groups, a plyometric training (experimental group) and a control group. The plyometric training group performed in a twelve week plyometric training program and the control group did not perform any plyometric training techniques. In total there are twenty (20) young men volleyball players respectively with 10 players each, taken from the two groups of volleyball teams in Tirana. These volleyball players were considered as prospective players in the Albanian volleyball. The average age of players included in this study is 17-18 years old. Players from the volleyball team "TiranaVolley" were regarded as the Experimental group and the players from volleyball team "FarkaVolley" were regarded as the Control group. Besides the anthropometric measurements volleyballplayers have developed Drop Jump test at the system platforms Leonardo® Ground Reaction Force Plate (GRFP-Novotec Medical, Pforzheim, Germany).

Table 1. Descriptive Statistics for Volleyball Player

Nr	Team	Age	Body Height BH cm	Body Weight BW kg	Body Mass kg/m²%
10	Experimental SD	18 1.1	185.3cm 7.3	76.3kg 12.1	22.19% 2.4
10	Control SD	17 0.9	187.9cm 9.47	70.2kg 10.08	20.37% 2.06

3. Intervention

The Plyometric training program is implemented by the experimental group for 12 weeks and is held twice a week with duration of 90 minutes (Monday-Wednesday) and three other sessions of technical-tactical exercise with ball. Control Group has developed only 5 technical-tactical training sessions with the ball. Experimental Group in the implementation of the training program has developed only plyometric exercises and the level of the height of the vertical jump was defined adapted to DJ 40cm and DJ 60cm tests.

4. Protocols of the Test Performed

4.1 Drop Jump Test

The purpose of this test is to assess on volleyball players the Time Air and Time Contact in DJ performance test in two different heights (40cm and 60cm). In the beginning were conducted anthropometric measurements and later on the tests in vertical jump performance of the three protocol tests (Marell M., & Risalti M. 2007) This test is performed on lab equipment platform Leonardo® system Ground Reaction Force Plate (GRFP) in University of Sports, Tirana. Volleyball players are placed in a row on the cube height 40-60, with their hands on their loins. Through a free fall from the height of the cube they leave themselves falling into GRFP platform and rapidly the reaction after contacting with GRFP they should jump in vertical as high as possible. The test has been developed 3 times and we got the best measure of the contact time and the time in the air.

4.2 Statistical analyses

Statistical Analyses was conducted using IBM SPSS Statistics 20. Pre and post values for the dependent variables were analyzed to determine if the distributions were tested for normality using Kolmogorov-Smirnov and Shapiro-Wilk tests. The aim consisted in identifying any possible change as a training effect. ANOVA analysis with 2 repeated measurements for maximum Force as a dependent variable and (Experimental / Control group) as independent resulted in statistically non-significant values (sig. > 0.05) for Drop Jump 40cm and for Drop Jump 60cm. ANOVA analysis with 2 repeated measurements for maximum Power as dependent variable and (experimental / control) group as independent resulted in statistically non-significant values (sig. > 0.05) for DJs 40cm and for DJ 60cm. Pearson Correlation was used to point out significant correlation between DJs 40cm and for DJ 60cm tests.

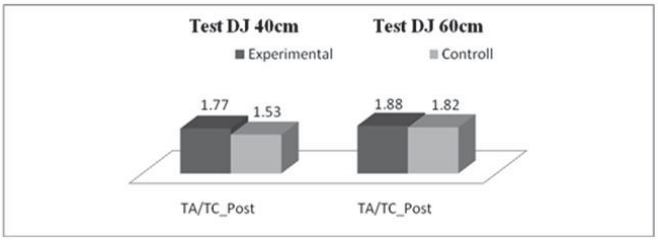
5. Results

The results shown in (tab. 2) of DJ60cm and DJ40cm tests' performance differ from each other. The variables of force and power were tested for statistically significant differences between the experimental and control group. The reliability

of tests is controlled by "test-retest" method, as one of the most used ways in similar tests, as to minimize the effect of other factors that are not taken into account in the study. The main objective consisted in testing the sustainability of the results.

Table 2. Descriptive Statistics for Drop Jump test at Pre and Post measurement

Nr	DJ 40 cm Experimental	Time Contact		Time Air		TA/TC s	
		Pre	Post	Pre	Post	Pre	Post
10	**Average**	0.376	0.397	0.553	0.519	1.52	1.77
	Max.	0.516	0.601	0.62	0.621	2.04	2.1
	Min.	0.257	0.259	0.514	0.45	1.09	0.75
	SD	*±0.07*	*±0.11*	*±0.03*	*±0.04*	*±0.3*	*±0.3*
Nr	**DJ 60 cm Experimental**	**Time Contact**		**Time Air**		**TA/TC s**	
		Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**
10	**Average**	0.348	0.356	0.552	0.514	1.66	1.88
	Max.	0.489	0.515	0.608	0.608	2.21	2.21
	Min.	0.236	0.249	0.504	0.444	1.1	0.86
	SD	*±0.07*	*±0.08*	*±0.03*	*±0.05*	*±0.3*	*±0.3*
Nr	**DJ 40 cm Control**	**Time Contact**		**Time Air**		**TA/TC s**	
		Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**
10	**Average**	0.419	0.337	0.499	0.587	1.24	1.53
	Max.	0.646	0.395	0.58	0.68	1.59	2.33
	Min.	0.273	0.25	0.347	0.461	0.8	1.24
	SD	*±0.12*	*±0.04*	*±0.08*	*±0.06*	*±0.2*	*±0.3*
Nr	**DJ 60 cm Control**	**Time Contact**		**Time Air**		**TA/TC s**	
		Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**
10	**Average**	0.348	0.322	0.552	0.609	1.66	1.82
	Max.	0.489	0.439	0.608	0.655	2.21	2.87
	Min.	0.236	0.214	0.504	0.535	1.1	1.38
	SD	*±0.07*	*±0.06*	*±0.03*	*±0.03*	*±0.3*	*±0.4*



Graphic 1: Drop Jump test at Post measurement.

6. Discussion

The linear correlation between "Drop Jump 40" and "Drop Jump 60" tests as an assessment would be intuitive and the connection that exists between the similarity jump -fall test from a height of 40 cm and one from 60 cm. The correlation between the tests was measured according to the Pearson's moment product. The results showed a high correlation coefficient (r = 0,924) and statistically significant (sig. <0.05). The reliability of tests is controlled by "test-retest" method, as one of the most used ways in similar tests, as to minimize the effect of other factors that are not taken into account in the study. It is held an analysis to determine whether the test and measurement methods used were available to identify whether the volleyball groups did achieve high or poor performance. It was also analyzed whether the testing protocol was able to discern the changes coming from the 12-week plyometric training between the Experimental groups with that of control Group. Results of force and power presented in tab 2 differ from each other. These differences make the interpretation more difficult for us because they do not provide the necessary results to observe the differences occurred

during the plyometric training. Therefore, the maximum rate of force and power development, according to the test is not considered a valid method to discern the changes after the training phase in volleyball groups. In this experiment were observed the differences between the two groups at the time of contact during the fall and the air time during the jump.

7. Conclusion

The findings of this study show that the methodology used herein is accurate and helps to compare the high and poor performances that help coaches to program more detailed plyometric training for the development of jumping skill in young volleyball players. Vertical jump may be assessed not only by the height of its development but also by the phase of residence in air.

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