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Effects Of Plyometric Exercise On Selected Motor Skills; A Case Study Approach

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Abstract

Objective: This study was carried out to examine the effects of Plyometric training in certain aspects of motor skills.

Methods and Materials: Plyometric Training Group (PTG) consisted of 60 male students from various departments at Sarhad University (SUIT), with an average age of 19-25 years. The Control Group consisted of 60 male students with an average age of 19-25 years. The experiment/intervention included of eight weeks plyometric training program. Apart from their daily routine, the control group received no training.

Results: The chosen participants' motor abilities were tested, including speed, endurance, explosive power and agility. The statistical treatment computation ANCOVA was used.

Conclusion: Plyometric exercise helped male university students enhance their muscle endurance, explosive strength, speed, and ability. It is also eminent that the said program had significantly improved male university students' speed, muscle endurance and lumbar strength. It was concluded that plyometric exercise is superior in boosting male university students' speed, lumbar strength, stamina, and muscle endurance.

Keywords: Plyometric, Explosive Strength, Muscle Endurance, Speed, Agility.

Introduction

Plyometric training has an impact on certain physical and motor skills (Kotzamanidis, 2006). Plyometric training is defined as a combination of exercise and speed and strength exercises used to improve strength, increasing explosion-related movements. Plyometric can also be considered a fast, powerful, uplifting exercise in the right muscles in response to muscle contraction. Plyometric movements have a wide range of sports use in the use of force (Ramírez-Campillo et al., 2014). Plyometric training enables muscles to gain maximum strength in a short time. This ability to stabilize speed is known as strength (Wirth, Hartmann, Sander, Mickel, Szilvas, & Keiner, 2016). Athletics aims to work very well and in many physical and mental strengths, men of sport are highly developed (Krishna, 2016). Athletics aims to work hard both mentally and physically, which is not always the case in other human activities. As a result, the playground has valuable information about the limitations of human performance as well as various performance characteristics (Chaouachi, Leiper, Chtourou, Aziz & Chamari, 2012). It moreover resulted in the identification of methods and means to develop various physical and mental abilities (functional aspects) to a high degree. This information can be reliable for use in other sports facilities and human activities.

The aims of plyometric training, defined as strenuous exercise that requires a lot of energy as well performed for physiologic findings the necessary change in the performance of the elite in sports, I accordingly reduce the length of contact time with down while running or jumping. By touching the ground, the quadriceps muscle group stretches again it is solid. Disorders occur in the arteries and thighs. Therefore, the potential expandable potential arises. Likewise, potential expansion potential from cruciate arteries, so. These forces are applied during the eccentric period access and with the help of gravity, much more of the energy produced during the conversion into concentric reach. In plyometric training, reflexive strengthens the muscles and increases in time the muscles access (Davies, Riemann & Manske, 2015).

The most recent sports training science is presented in the discipline of sports science. In the previous few decades, the field of sports science has advanced rapidly (Bourdon, Cardinale, Murray, Gastin, Kellmann, Varley & Cable, 2017). Trainers and trainees should understand the knowledge obtained from these disciplines so that it may be applied successfully in the training

program. However, most coaches lack the necessary scientific and training credentials to fully utilize the knowledge garnered from sports science fields. This training science and its staff with sufficient science and sports background can close this gap and can be a mediator between scientists and coaches. The goal of sports training is to help athletes improve their performance. Plyometric training is a common and successful approach for improving sprinting and jumping sports performance. Depth leaping, hopping, and bounding drills are examples of plyometric training exercises. Plyometric workouts for the legs and medicine ball exercises for the arms are utilized to develop explosive strength, speed, and other motor ability components. Therefore, the researcher work on the effects of plyometric training on specific aspects of motor skills (a case study of Sarhad university male students).

Methods and Materials

Experimental design and outcome variables assessment;

Subjects were chosen at random from SUIT Peshawar and tested before and after an 8-week training session utilizing similar testing methodologies. Individual participant testing sessions took place on SUIT grounds and were finished in under three hours. The test measured muscular endurance, explosive power, speed, endurance, strength, flexibility, and agility. Everyone was urged to give each exam their best, and verbal encouragement was offered throughout the procedure. To standardize the testing method, all subjects were assessed in the following order: agility, speed, endurance, strength, muscular endurance, explosive power, and flexibility. Each test was conducted according to conventional techniques reported in full elsewhere. Data was collected using a 50-yard circuit and finish line, and time was recorded using hand-held clocks and clapper clocks to the nearest 0.01 second. A bent knee was used to test muscle endurance for one minute. The force is measured by a straight leap against a wall and recorded in inches and a long-jump position with tape and a jump hole and a distance of 0.01 meters. For pre-shuttle motion, agility was assessed, and the average was reported to be the closest 0.01 seconds.

Protocol for Training:

The functional training regimens were developed with the assistance of the most recent research as well as national and global wise specialists. A separate training protocol for the whole group:

Week 1 to Week 8- Training Program

B. Group for Plyometric Training

Name of Training	Execution/Time	Repetitions	Recovery	Total Time
1. 18" high box jumping in both legs	20m/30 Seconds	8	Walk back	2min.
2. Hopping over mini hurdles	20m/30 Seconds	8	Walk back	2min.
3. Two legged hops or bunny hops	20m/30 Seconds	8	Walk back	2min.
4. Medicine ball chest pass with partner-4kg.	20m/30 Seconds	8	Walk back	2min.
5. Medicine ball power drop with partner-4kg	20m/30 Seconds	8	Walk back	2min.
6. Medicine ball chest pass incline position with partner	20m/30 Seconds	8	Walk back	2min.

Data Analysis

The effects of plyometric exercise on specific aspects of motor skills were investigated using the statistical methodologies listed below (A Case Study of Sarhad University Male Students). The definitive statistics of the data were processed with SPSS 20.00 software, which was collected before training (pre-test) and at the end of the 8 weeks (final test). Differences reported after the test between the experimental groups were assessed using covariance analysis. Scheffe's post HOC test was performed to assess the significance of the paired mean differences if the adjusted post-test result was significant (Thirumalaisamy, 1997). The 0.05 significance level was used.

Results

Table I shows a statistical comparison of first and final speed methods for plyometric training in university (male) students.

There were considerable improvements, the Scheff Confidence time test was used to perform a post hoc analysis of the results. Table II summarizes findings.

Table I: Calculation of the co-variance in speed (in seconds)

	Plyometric Training	Control	Source of variance	Sum of squares	df	Mean Squares	Obtained F
Pre Test Mean	7.03	7.07	Between	0.03	2	0.01	0.19
			Within	4.24	57	0.07	
Post Test Mean	6.95	7.05	Between	0.54	2	0.27	3.89*
			Within	3.95	57	0.07	
Adjusted Post Test Mean	6.98	7.04	Between	0.37	2	0.18	12.42*
			within	0.83	56	0.01	
Mean Difference	-0.07	-0.01					

*Table F-ratio at 0.05 level of confidence for 2 and 57(df) = 3.15, 2 and 56(df)=3.15. *Significant*

Table II
Scheffe, s Confidence Interval Test Scores on Speed

MEANS			Required C.I
Plyometric Training	Control	Mean Difference	
6.98		-0.19*	0.10
6.98	7.04	-0.07	0.10
	7.04	0.12*	0.10

***Significant**

The Scheff Confidence time test was used to perform a post hoc analysis of the results. Table IV summarizes findings.The statistical study of the initial and final means of muscular endurance during one-minute sit-ups on university male students as a result of plyometric training is shown in Table III.

Since there have been considerable improvements, the results have been tested using Scheff's Confidence Interval test. Table IV summarises the findings.

Statistically, an analysis comparing the first and last methods of explosive force with direct jump due to plyometric training for male university students in Table V.

Table III

Computation of analysis of co-variance on Muscular Endurance

	Plyometric Training	Control	Source of variance	Sum of squares	df	Mean Squares	Obtained F
Pre Test Mean	31.80	33.05	Between	15.83	2	7.92	0.57
			Within	794.35	57	13.94	
Post Test Mean	35.40	32.45	Between	88.03	2	44.02	5.78*
			Within	433.95	57	7.61	
Adjusted Post Test Mean	35.73	32.07	Between	132.65	2	66.32	20.61*
			within	180.21	56	3.22	
Mean Difference	3.60	-0.60					

Table V

Computation of analysis of co-variance on Explosive Power

	Plyometric Training	Control	Source of variance	Sum of squares	df	Mean Squares	Obtained F
Pre Test Mean	47.25	49.85	Between	74.13	2	37.07	0.76
			Within	2770.85	57	48.61	
Post Test Mean	56.05	48.65	Between	579.63	2	289.82	6.62*
			Within	2494.70	57	43.77	
Adjusted Post Test Mean	56.94	47.37	Between	906.81	2	453.40	44.00*
			within	577.06	56	10.30	
Mean Difference	8.80	-1.20					

Table F-ratio at 0.05 level of confidence for 2 and 57(df)=3.15, 2 and 56(df)=3.15. *Significant

Since the significant improvements were seen, the findings were confirmed using Scheff's Confidence Interval test for some time. Table VI summarises the findings.

Table VI

Scheffe,s Confidence Interval Test Scores on Explosive Power/Vertical Jump

MEANS			Required C.I
Plyometric Training	Control	Mean Difference	
56.94		5,75*	2.55
56.94	47.37	9.56*	2.55
	47.37	3.81*	2.55

***Significant**

Table VII shows the results of a comparison of Agility's first and last plyometric training techniques for male university students.

Table VII

Computation of analysis of co-variance on Agility

	Plyometric Training	Control	Source of variance	Sum of squares	df	Mean Squares	Obtained F
Pre Test Mean	10.88	10.67	Between	0.41	2	0.21	0.78
			Within	15.17	57	0.27	
Post Test Mean	10.21	10.69	Between	2.68	2	1.34	5.06*
			Within	15.08	57	0.26	
Adjusted Post Test Mean	10.11	10.78	Between	4.94	2	2.47	299.49*
			within	0.46	56	0.01	
Mean Difference	-0.66	-0.02					

Table VIII

Scheffe, s Confidence Interval Test Scores on Agility

MEANS			Required C.I
Plyometric Training	Control	Mean Difference	
6.98		-0.53*	0.07
6.98	10.78	-0.68*	0.07
	10.78	-0.15*	0.07

***Significant**

Discussion

Tables, I, III, V, and VII, shows the F values obtained in the previous test were less than the required F value of 0.19,0.57, 0.76, and 0.78, indicating that the randomized study assignment was successful and that their points were faster than before of training was equal and that no discernible difference existed.

The adjusted post-test methods were established using pre-test and post-test methods, and the covariance analysis revealed that the F value of 12.42 was more than the required value of 3.15, indicating that plyometric training significantly improved speed. A post-hoc examination of the adjusted findings indicated that the control group and the plyometric training group differed significantly from the control group. This showed that the SUIT plyometric training runners had greatly improved after eight weeks. Table I shows that when the two training methods are compared, plyometric exercise increases the muscular endurance of SUIT male students more.

The F-value of 20.61 was more than the required value of 3.15, indicating that plyometric exercise considerably enhanced the endurance of research subjects. A post-hoc examination of the adjusted findings indicated that the control group and the plyometric training group differed significantly

from the control group. This demonstrates that SUIT athletes improved significantly after eight weeks of plyometric exercise. The average difference of 1.48 was more than the necessary value of 1.42 when comparing plyometric training. Thus, plyometric exercise was shown to be more effective in improving the endurance of male SUIT students.

The F-value of 299.49 was larger than the required value of 3.15, indicating that plyometric exercise enhanced speed considerably. A post-do examination of the adjusted data indicated that the control and plyometric training groups were significantly different. This demonstrates that SUIT athletes improved significantly after eight weeks of plyometric exercise.

Conclusion

In conclusion, current research has shown that plyometric training has significantly improved speed, explosive strength, muscle endurance, and the ability of male university students. The researcher also noted that the program had significantly improved male university students' speed, muscle endurance, and lumbar strength (SUIT). Finally, the researcher concluded that plyometric training is superior in improving lumbar strength, stamina, and muscle endurance of male university students (SUIT).

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