

Effect of Selected Plyometric Exercises on Explosive Strength, Speed and Agility

Dr. Mantu Baro¹, AINU Sonowal²

Assistant Professor, Centre for Studies in Physical Education & Sports
Dibrugarh University, Assam, India-786004

M.P.Ed, Centre for Studies in Physical Education & Sports, Dibrugarh University, Assam, India-786004

Abstract: The purpose of the present study was to determine the effect of selected plyometric exercise on Explosive strength, Speed and Agility. 20 male students of Bachelor of Physical Education of Dibrugarh University aged 19 to 25 years were selected as subjects. For the study the pre-test post-test single group design was adopted. The experimental treatment was given to the subjects through the plyometric exercises i.e. Squat Jump, Split Jump (lounges), Vertical Depth Jump, Jump up, Box Jump March, Lateral Jump (Single leg), Lateral Jump over the cone (Double leg), four days a week for 6 weeks of one and half hour per session from 6 a.m. to 7:30 a.m. The pre-test and post-test data were collected before and immediately after the completion of the training programme by using Standing Broad Jump, 50 yard dash and Semo Agility test respectively. To analyze the collected data t-test statistical technique was employed and the level of significant was observed at 0.05 level of confidence. On the basis of the statistical technique it was conclude that there was significant improvement of Agility ($t_{0.05 (38)} = 3.074 > 2.0244$) and insignificant improvement of Explosive strength ($t_{0.05 (38)} = 0.778 < 2.0244$) and Speed ($t_{0.05 (38)} = 0.663 < 2.0244$) due to the training of selected plyometric exercises.

Keywords: Plyometric, Exercise, Agility, Explosive strength, Speed

1. Introduction

Plyometric is exercise training whose aim is to be produce fast and powerful movement likewise improve the nervous system involved in these activities. The exercise involve improve on strength, elasticity and innervation of muscles surrounding tissues.

Plyometric training involves practicing plyometric movements to toughen tissue and train nerve cells stimulating a specific pattern of muscle contraction. So the muscle generates as strong a contraction as possible in the shortest amount of time. Plyometric exercise use explosive movement to develop muscular power the ability to generate large amount of force quickly, plyometric training acts on both the musculo - tendinous and neurological levels to increase an athlete's power output without increasing this maximum strength output.

Plyometric exercises are specialized high intensity training techniques used to develop an athletic power (strength and speed). Plyometric involves high intensity, explosive muscular contraction that involves the stretch reflex. Plyometric training is advanced intense and involve high impact exercise. It requires strength and endurance, so make sure build both with a complete program of both cardio and strength training.

2. Methodology

For the present study 19 to 25 years old 20 male student of bachelor of physical education of Dibrugarh University were selected as subjects randomly. For the study the pre-test post-test single group design was adopted. The experimental treatment was given to the subjects through the selected plyometric exercises i.e. Squat Jump, Split Jump (lounges), Vertical Depth Jump, Jump up, Box Jump March, Lateral

Jump (Single leg), Lateral Jump over the cone (Double leg), four days a week for 6 weeks of one and half hour per session from 6 a.m. to 7:30 a.m. The pre-test and post-test data were collected before administering the training and immediately after the completion of the training programme by using Standing Broad Jump, 50 yard dash and Semo Agility test to measure the Explosive leg strength, Speed and Agility respectively. The tests were conducted in the morning between 6.00 am to 7.30 am. To analyze the collected data t-test statistical technique was employed and the level of significant was observed at 0.05 level of confidence.

3. Result and Discussion

Table 1: Comparison of Pre Test and Post Test Mean of Agility, Explosive Strength and Speed

Components	Test	Mean	SD	MD	SE	t-value
Agility	Pre test	45.65	9.635	8.64	2.81	3.074*
	Post test	54.29	8.063			
Explosive Strength	Pre test	48.60	9.994	2.42	3.108	0.778
	Post test	51.02	9.664			
Speed	Pre test	48.90	10.428	2.06	3.105	0.663
	Post test	50.96	9.175			

*Significant at t 0.05 level of confidence Tabulated $t_{0.05 (38)} = 2.0244$

From the table it was revealed that there was significant improvement of agility after six weeks training on selected plyometric exercises as the $t_{0.05 (38)} = 3.074 > 2.0244$ at 0.05 level confidences. The insignificant improvement was also observed in the explosive strength and speed, $t_{0.05 (38)} = 0.778$ and $0.663 < 2.0244$ respectively.

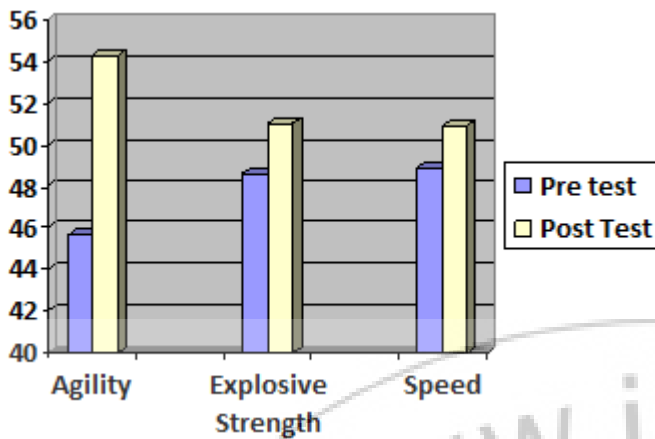


Figure 1

Graphical depiction of Pre Test and Post Test Mean of Agility, Explosive Strength and Speed

The finding of table 1 revealed the significant improvement of agility after six weeks training of selected plyometric exercises and insignificant improvement was occurred in explosive strength and speed. The result of the study is attributed the training might affect positively on neuromuscular coordination, reflective electrical activity, increased muscular contraction and the musculoskeletal systems might get hypertrophy. As the agility is the outcome of strength and speed, the significant improvement of agility was occurred along with the improvement of explosive strength and speed.

4. Conclusion

On the basis of statistical findings of the study it was conclude that there was significant improvement of Agility and insignificant improvement of Explosive strength and Speed due to six weeks training of selected plyometric exercises.

References

- [1] Avery D., James E. Faigenbaum, Fred B. McFarland et al. "Effects of a short-term plyometric and resistance training program on fitness performance in boys age 12 to 15 years" *Journal of Sports Science and Medicine* (2007) 6,
- [2] Brown, Andrea C, Wells, Tobin J, Schade, Margaret L, Smith, Denise L, Fehling, Patricia C, "Effects of Plyometric Training Versus Traditional Weight Training on Strength, Power, and Aesthetic Jumping Ability in Female Collegiate Dancers" *Journal of Dance Medicine & Science*, June 2007, Vol. 11,
- [3] Clutch David, Wilton Mike, Carl McGown, G. Rex Bryce "The Effect of Depth Jumps and Weight Training on Leg Strength and Vertical Jump" Published online 08 Feb 2013
- [4] Hebert Devries (1996): *PHYSIOLOGY OF EXERCISE*; Dubuque, Iowa
- [5] Kansal, Divender K. "Text book of Applied Measurement Evaluation and Sports Selection", SSS Publication(2008),

- [6] Makaruk Hubert, Tomasz Sacewicz, "Effects of Plyometric Training on Maximal Power Output and Jumping Ability", University of Physical Education, Biala Podlaska, Warsaw, Poland. Vol. 11, Issue 1
- [7] Mark Vaczi, Jozsef Tollar, Balazs Meszler, Ivett Juhasz, & Istvan Karsai, "The Effects Of A Six-Week-Long Periodized PT Program On Agility and Power among Male Adult Soccer Players", *Journal of Human Kinetics*. 2013 March, vol. 36,
- [8] Michael G. Miller, Jeremy J. Herniman, Mark D. Ricard, Christopher C. Cheatham and Timothy J. Michael, "The Effects Of A 6-Week Plyometric Training Program On Agility" *Journal of Sports Science and Medicine* (2006) 5
- [9] Shaji John and Saluja Isha, "Comparative analysis of plyometric training program and dynamic stretching on vertical jump and agility in male collegiate basketball players", *Al Amen J. Med Science* (2009) 2(1):36
- [10] Barrow H.M. and Mc Gee R., *A Practical Approach to Measurement in Physical Education*, (Lea & Febiger, USA).
- [11] Stojanovic Nikola, Jovanovic Nikodije, Stojanovic Toplica, "The Effects of Plyometric Training on the Development of the Jumping Agility in Volleyball Players", *FACTA UNIVERSITATIS Series: Physical Education and Sport* Vol. 10, N1, 2012
- [12] Verkoshansky Yuri (1966). "Perspectives in the Improvement of Speed Strength Preparation of Jumpers". *Legkaya Atletika (track and Field)* 9
- [13] www.power-system.com/n-243-plyometric-exercise.
- [14] Yessis Michael (2009). *Explosive Plyometrics. Ultimate Athlete Concepts*
- [15] Zeareia Hoda, Ramezanpourb Mohammad Reza, Pakdelan Saeid, "Comparison of the Effect of Plyometric and Resistance Training on Explosive Power and Speed in Female Taekwondo Players", *Journal of Basic and Applied Science Research*, 3(1s) 2013