Effect Of Plyometric Training And Weight Training On Leg Explosive Power Among Men Javelin Throwers

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ABSTRACT

The purpose of this study was to examine the effect of plyometric training and weight training on leg explosive power among men javelin throwers. Sixty intercollegiate-level throwers aged 19–22 years were randomly assigned to three groups of twenty: Experimental Group I (plyometric training), Experimental Group II (weight training), and a control group. The experimental groups underwent a 12-week training program, while the control group received no special training. Leg explosive power was assessed using the vertical jump test in pre- and post-test conditions, and the data were analyzed using ANCOVA at the 0.05 significance level. Results revealed that the pre-test means of plyometric (58.30), weight training (59.13), and control groups (57.63) did not differ significantly ($F = 0.54 < 3.10$). However, post-test means showed significant improvements in the plyometric (67.63) and weight training (63.30) groups compared to control (58.37), with an obtained F value of $14.57 > 3.10$. Adjusted post-test means confirmed significant differences (plyometric = 67.68, weight training = 62.71, control = 58.92; $F = 21.76 > 3.10$). Post hoc analysis using Scheffe's test indicated that plyometric training was significantly superior to weight training (MD = 4.97) and the control group (MD = 8.76), while weight training was also significantly better than control (MD = 3.79). These findings demonstrate that both plyometric and weight training significantly improve leg explosive power in men javelin throwers, with plyometric training proving to be the most effective.

Key Words: Plyometric training , Weight training , leg explosive power and Men javelin throwers.

INTRODUCTION

Explosive leg power is a critical determinant of performance in javelin throw, as it contributes to approach Leg Explosive Power, plant-leg stability, and the effective transfer of kinetic energy through the throwing chain. Athletes require strong and fast lower-limb actions to optimize release velocity, which is highly correlated with throw distance. Among the most effective interventions to enhance this capacity are plyometric training and weight training, both of which develop explosive muscular function through different physiological mechanisms.

Plyometric training relies on the stretch-shortening cycle, enhancing neuromuscular efficiency and rate of force development through exercises such as bounding, box jumps, and depth jumps . Such

movements improve elastic strength, coordination, and power output, making them directly applicable to explosive sporting actions. In contrast, weight training emphasizes progressive overload with free weights or machines, targeting increases in maximal strength, muscle architecture, and neuromuscular adaptations that support power production .

Comparisons between plyometric and weight training interventions suggest that both modalities are effective for improving lower-limb explosive ability. Thakur, Mishra, and Rathore reported that plyometric and weight training both significantly enhanced vertical jump performance among male athletes, with plyometrics showing slightly greater retention effects. Similarly, research on young competitive throwers demonstrated that structured resistance training improved rate of force development, muscle thickness, and throwing performance, underlining the importance of leg power in field events

Moreover, meta-analyses have indicated that plyometric training contributes not only to improvements in vertical jumping and sprint performance but also to change-of-direction ability in athletes . Weight training, on the other hand, provides the foundational strength that supports plyometric performance, suggesting that these modalities may act synergistically. Evidence from youth and adolescent populations also supports the application of both training types for enhancing explosive athletic performance .

Given the biomechanical demands of the javelin throw, where explosive leg drive sets the foundation for optimal release mechanics, investigating the comparative effects of plyometric and weight training is particularly relevant. Therefore, the present study aims to analyze the effect of plyometric training and weight training on leg explosive power among men javelin throwers, thereby contributing to evidence-based training prescriptions for track-and-field athletes.

METHODOLOGY

SELECTION OF SUBJECTS

The purpose of the study is to find out the Effect of Plyometric Training and Weight Training on Leg Explosive Power among Men Javelin Throwers . For these purpose intercollegiate level Men Javelin Throwers who participated at inter-collegiate level competitions were selected. 60 players in the age group of 19 to 22 were randomly selected as subjects for this study. The subjects were randomly selected into three groups, namely, experimental group I, experimental group II and control group consisting of 20 in each.

SELECTION OF THE VARIABLES

Dependent Variables

1. Leg Explosive Power

Independent Variables

1. 12 WeeksPlyometric Training
2. 12 Weeks Weight Training

EXPERIMENTAL DESIGN

Find out the study Effect of Plyometric Training and Weight Training on Leg Explosive Power among Men Javelin Throwers .The study was formulated as a true random group design consisting of a pre-test and post test. The subjects (N=60) were randomly assigned to three equal groups of fifteen . The selected subjects were divided into three groups randomly. Experimental Group I was considered as Plyometric Training group, experimental group II was Weight Training group and control group was not involved in any special treatment. Pre test was conducted for experimental Groups I and II and the control group on Leg Explosive Power . Experimental groups underwent the respective training for 12 weeks. Immediately after the completion of 12 weeks training, all the subjects were measured of their post test scores on the selected criterion variable. The difference between the initial and final scores was considered the effect of respective treatments. To find out statistical significance of the results obtained, the data were subjected to statistical treatment using ANCOVA. In all cases 0.05 level was fixed to test the significance of the study.

RESULTS ON LEG EXPLOSIVE POWER

Table-I

ANCOVA RESULTS ON EFFECT OF PLYOMETRIC TRAINING AND WEIGHT TRAINING COMPARED WITH CONTROLS ON LEG EXPLOSIVE POWER

	PLYOMETRIC TRAINING	WEIGHT TRAINING	CONTROL GROUP	SOURCE OF VARIANCE	SUM OF SQUARES	df	MEAN SQUARES	OBTAINED F
Pre Test Mean	58.30	59.13	57.63	Between	33.89	2	16.94	0.54
				Within	2706.73	87	31.11	
Post Test Mean	67.63	63.30	58.37	Between	1289.87	2	644.93	14.57*
				Within	3850.23	87	44.26	
Adjusted Post Test Mean	67.68	62.71	58.92	Between	1155.85	2	577.92	21.76*
				Within	2283.76	86	26.56	
Mean Diff	9.33	4.17	0.73					

Table F-ratio at 0.05 level of confidence for 2 and 87 (df) =3.10, 2 and 86 (df) =3.10.

*Significant

As shown in Table I, the obtained pre test means on Leg Explosive Power on Plyometric Training group was 58.30, Weight Training group was 59.13 and control group was 57.63. The obtained pre test F value was 0.54 and the required table F value was 3.10, which proved that there was no significant difference among initial scores of the subjects.

The obtained post test means on Leg Explosive Power on Plyometric Training group was 67.63, Weight Training group was 63.30 and control group was 58.37. The obtained post test F value was 14.57 and the required table F value was 3.10, which proved that there was significant difference among post test scores of the subjects.

Taking into consideration of the pre test means and post test means adjusted post test means were determined and analysis of covariance was done and the obtained F value 21.76 was greater than the required value of 3.10 and hence it was accepted that there was significant differences among the treated groups.

Since significant differences were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table -II.

Table -II

Multiple Comparisons of Paired Adjusted Means and Scheffe's Confidence Interval Test Results on Leg Explosive Power

MEANS				Required . C I
Plyometric Training Group	Weight Training Group	Control Group	Mean Difference	
67.68	62.71		4.97*	3.34
67.68		58.92	8.76*	3.34
	62.71	58.92	3.79*	3.34

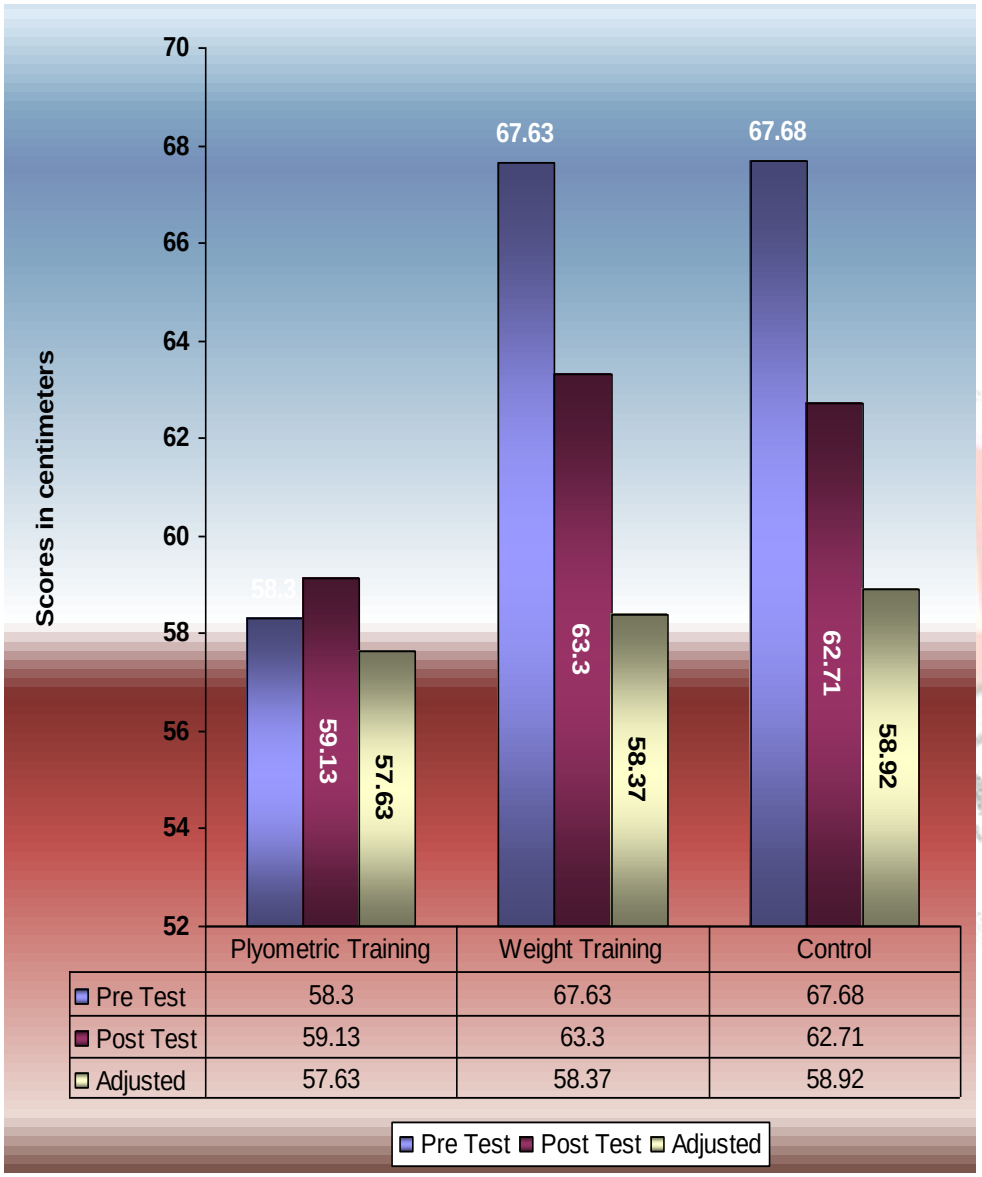
***** Significant

The post hoc analysis of obtained ordered adjusted means proved that there was significant differences existed between Plyometric Training group and control group (MD: 8.76). There was significant difference between Weight Training group and control group (MD: 3.79). There was significant difference between treatment groups, namely, Plyometric Training group and Weight Training exercises group. (MD: 4.97).

The ordered adjusted means were presented through bar diagram for better understanding of the results of this study in Figure I.

Figure II

BAR DIAGRAM SHOWING PRE TEST, POST TEST AND ORDERED ADJUSTED MEANS ON LEG EXPLOSIVE POWER



DISCUSSIONS ON FINDINGS ON LEG EXPLOSIVE POWER

In order to find out the effect of Plyometric Training and Weight Training group on Leg Explosive Power the obtained pre and post test means were subjected to ANCOVA and post hoc analysis through Scheffe's confidence interval test.

The effect of Plyometric Training and Weight Training compared with control group on Leg Explosive Power is presented in Table I The analysis of covariance proved that there was significant

difference between the experimental group and control group as the obtained F value 21.76 was greater than the required table F value to be significant at 0.05 level.

Since significant F value was obtained, the results were further subjected to post hoc analysis and the results presented in Table II proved that there was significant difference between Plyometric Training group and control group (MD: 8.76) and Weight Training group and control group (MD: 3.79). Comparing between the treatment groups, it was found that there was significant difference between Plyometric Training and Weight Training group among Men Javelin Throwers

Thus, it was found that Plyometric Training was significantly better than Weight Training and control group in improving Leg Explosive Power of Men Javelin Throwers.

CONCLUSIONS

1. It was concluded that 12 weeks core Plyometric training and weight training significantly improved , leg explosive strength compared to control group. And it was also found that comparing between treatment groups, it was found that core strength training was significantly better than anaerobic training in improving leg explosive strength of the Men Javelin Throwers.

References

1. Thakur, J. S., Mishra, M. K., & Rathore, V. S. (2016). *Impact of plyometric training and weight training on vertical jumping ability*. Turkish Journal of Sport and Exercise, 18(1), 31–37.
2. Zaras, N. D., Stasinaki, A.-N. E., Methenitis, S. K., Krase, A. A., Karampatsos, G. P., Georgiadis, G. V., Spengos, K. M., & Terzis, G. D. (2016). *Rate of force development, muscle architecture, and performance in young competitive track and field throwers*. Journal of Strength and Conditioning Research, 30(1), 81–92. (Assuming
3. Balsalobre-Fernández, C., et al. (2016). *Effects of resistance training and plyometrics on strength, explosive strength, and sprint performance in youth soccer players* [Meta-analysis commentary]. International Journal of Environmental Research and Public Health, 13(6), 579. (Based on Lesinski et al., Negra et al.)
4. Asadi, A., Ramírez-Campillo, R., Meylan, C. M., Nakamura, R. C. J., & Izquierdo, M. (2016). *Effects of volume-based overload plyometric training on maximal-intensity exercise adaptations in young basketball players*. Journal of Sports Medicine and Physical Fitness, 57(12), 1557–1563.
5. Asadi, A., & Arazi, H. (2016). *The effects of plyometric training on change-of-direction ability: A meta-analysis*. International Journal of Sports Physiology and Performance, 11(5), 563–573.
6. Fischetti, F., et al. (2016). *Plyometric training combined with specific training improves vertical jumping ability in adolescent track and field athletes* [as cited in meta-analysis]. International Journal of Environmental Research and Public Health.

7. Meszler, J., et al. (2016). *Seven-week plyometric training twice weekly decreased jumping ability in adolescent female basketball players* (contrarian finding in meta-analysis). International Journal of Environmental Research and Public Health.
8. Negra, Y., et al. (2016). *Plyometric versus resistance training effects on sprint performance in adolescent soccer players* (highlighted in meta-analysis summary). International Journal of Environmental Research and Public Health.
9. Potdevin, F., et al. (2016). *Six-week plyometric training improves CMJ and SJ performance in adolescent swimmers* (within meta-analysis discussion). International Journal of Environmental Research and Public Health.
10. commentary about resistance training meta-analysis): Lesinski, M., et al. (2016). *Dose–response relationships of resistance training on physical fitness in youth athletes: A meta-analysis*. International Journal of Environmental Research and Public Health, 13(6), 579.