Influence Of Weight Training And Resistance Training On Leg Strength Among Triple Jumpers

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ABSTRACT

The purpose of this study was to investigate the influence of weight training and resistance training on leg strength among triple jumpers. A total of forty-five inter-collegiate triple jumpers (N = 45), aged 18–22 years, were randomly assigned into three groups of fifteen each: Weight Training Group (Experimental Group I), Resistance Training Group (Experimental Group II), and Control Group. The experimental groups underwent their respective training programs for 12 weeks, while the control group did not receive any special treatment. Leg strength was assessed before and after the training period, and the data were analyzed using Analysis of Covariance (ANCOVA) at the 0.05 level of significance.

The results revealed that the Weight Training Group showed the highest improvement in leg strength, with a mean difference of **8.95** (Pre-test Mean = 57.70; Post-test Mean = 66.65). The Resistance Training Group showed a moderate improvement with a mean difference of **3.55** (Pre-test Mean = 58.65; Post-test Mean = 62.20), while the Control Group recorded a minimal change of **1.00** (Pre-test Mean = 56.80; Post-test Mean = 57.80). The obtained **F-value (12.62)** was greater than the table value (3.16) at 0.05 significance level, confirming significant differences among the groups. Post hoc analysis further indicated that weight training was significantly more effective than resistance training and the control condition in enhancing leg strength.

The findings conclude that structured weight training using free-weight, multi-joint exercises is superior in developing leg strength essential for the hop, step, and jump phases of triple jumpers. Resistance training, though beneficial, did not produce significant gains compared to weight training. Coaches and physical educators are encouraged to incorporate weight training protocols with progressive overload and sport-specific exercise selection to maximize performance benefits in triple jumpers.

Keywords: Triple jump, weight training, resistance training and leg strength.

INTRODUCTION

The triple jump is a highly technical, power-dependent event in which performance emerges from the interaction of approach speed, inter-phase force production, and effective distribution of hop–step–jump distances. Biomechanical work shows that both the *phase ratio* and the athlete's ability to generate and tolerate high forces across extremely short ground-contact times are decisive, placing exceptional demands on lower-limb strength and power. Event-specific analyses and computer-simulation studies from this period highlight how increments in an athlete's strength capacity can translate into longer total distance when coupled with optimal technique and approach velocity.

Within this context, weight training and broader resistance training (RT)—including free-weight, machine-based, and mixed-method schemes—remain the most reliable routes to increase maximal force, rate of force development, and stiffness qualities that underpin jump performance. Systematic reviews and meta-analyses (2015–2018) consistently report meaningful gains in muscular strength and jump outcomes following RT, with dose–response evidence suggesting that longer interventions (≥8 weeks) and adequate intensity are particularly effective for lower-limb power proxies.

For jumpers, transfer matters as much as absolute strength. Studies comparing exercise selections (e.g., squats vs. leg press) and contraction strategies (e.g., eccentric emphasis) indicate that free-weight, multi-joint lifts may confer superior speed-strength adaptations and more specific neuromuscular benefits for jumping tasks than machine-dominant work, while manipulating eccentric duration can further influence power and vertical-jump outcomes. These findings support programming that prioritizes task-relevant lifts and tempos to target triple-jump ground-contact demands.

Because triple jump relies on rapid force application through the stretch–shortening cycle, carefully integrating RT with power-focused methods (e.g., complex/contrast training) can potentiate acute and chronic improvements in jump performance. Evidence from 2016–2018 shows that coupling heavy squats with explosive jumps within a session (complex/contrast approaches) enhances countermovement-jump performance and supports the rationale for embedding such pairings in a triple-jump macrocycle.

Despite these advances, event-specific empirical trials on *triple jumpers* were limited in this window, with much of the evidence extrapolated from vertical/horizontal jump tests, team-sport athletes, or simulation and championship biomechanical reports. Therefore, investigating how structured weight and resistance training—alone and in combination with power methods—affects leg strength metrics that are *specific* to the hop, step, and jump (e.g., unilateral peak force, reactive strength, and phase-specific kinetics) remains a warranted line of inquiry for optimizing triple-jump performance.

EXPERMENTAL DESIGN

Find out the study influence of weight training and resistance training on leg strength among triple jumpers.The study was formulated as a true random group design consisting of a pre-test and post test. The subjects who are participated inter collegiate tournaments in kadapa district and their age ranged between 18-22 years (N=45) were randomly assigned to three equal groups of fifteen . The selected subjects were divided into three groups randomly. Experimental Group I weight training group, experimental group II was resistance 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 strength . 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 STRENGTH

The statistical analysis comparing the initial and final means of Leg strength due to Weight training and Resistance training among triple jumpers is presented in Table I

Table I

ANCOVA RESULTS ON EFFECT OF WEIGHT TRAINING AND RESISTANCE TRAINING COMPARED WITH CONTROLS ON LEG STRENGTH

	WEIGHT TRAINING	RESISTANCE TRAINING	CONTROL GROUP	SOURCE OF VARIANCE	SUM OF SQUARES	df	MEAN SQUARES	OBTAINED F
Pre Test Mean	57.70	58.65	56.80	Between	34.23	2	17.117	0.550
				Within	1773.950	57	31.122	
Post Test Mean	66.65	62.20	57.80	Between	783.233	2	391.62	8.589*
				Within	2598.950	57	45.596	
Adjusted Post Test Mean	66.66	61.47	58.52	Between	678.501	2	339.250	12.62*
				Within	1505.877	56	26.89	
Mean Diff	8.95	3.55	1.00					

Table F-ratio at 0.05 level of confidence for 2 and 57 (df) =3.16, 2 and 56 (df) =3.16.

*Significant

As shown in Table I, the obtained pre test means on Leg strength on Weight training group was 57.70, Resistance training group was 58.65 was and control group was 56.80. The obtained pre test F value was 0.550 and the required table F value was 3.16, which proved that there was no significant difference among initial scores of the subjects.

The obtained post test means on Leg strength on Weight training group was 66.65, Resistance training group was 62.20 was and control group was 57.80. The obtained post test F value was 8.589 and the required table F value was 3.16, 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 12.62 was greater than the required value of 3.16 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 strength

MEANS				Required . C I
Weight training Group	Resistance training Group	Control Group	Mean Difference	
66.66	61.47		5.20*	4.12
66.66		58.52	8.14*	4.12
	61.47	58.52	2.95	4.12

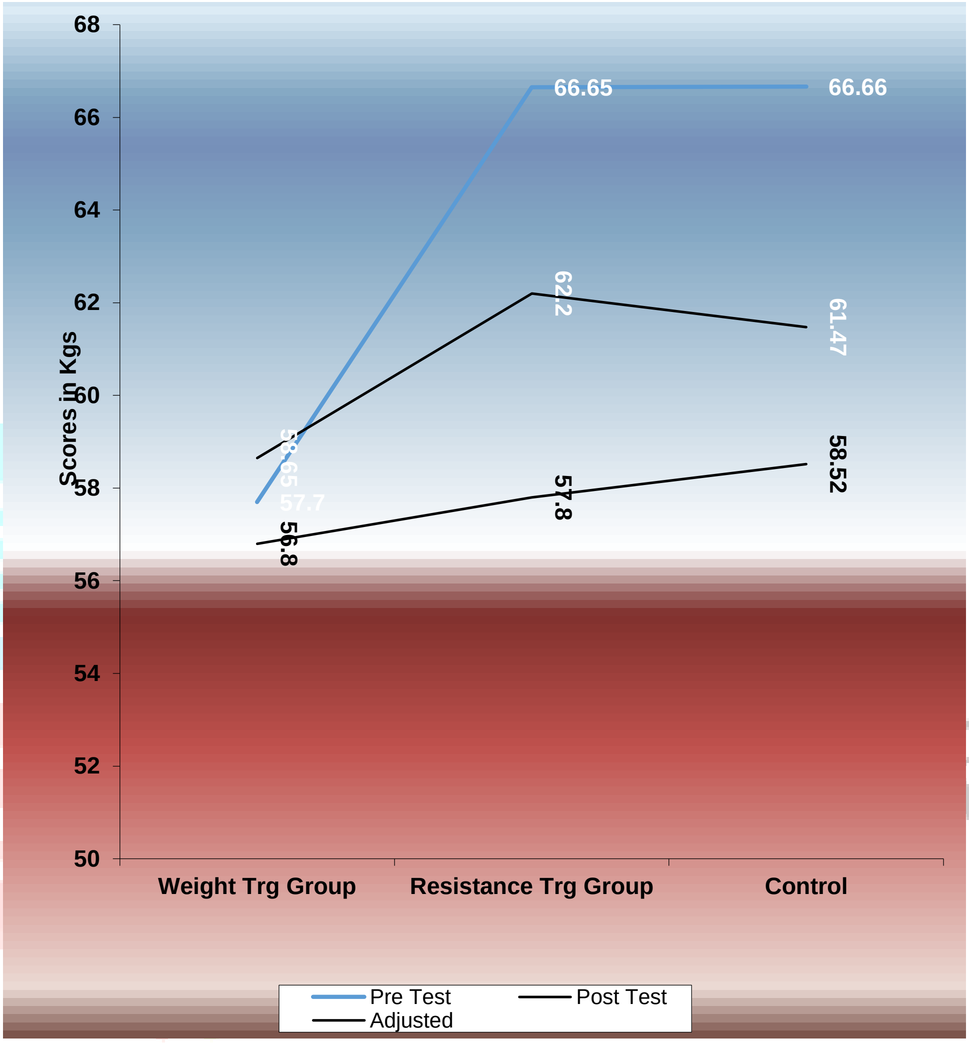
* Significant

The post hoc analysis of obtained ordered adjusted means proved that there was significant differences existed between Weight training group and control group (MD: 8.14). There was insignificant difference between Resistance training group and control group (MD: 2.95). There was significant difference between treatment groups, namely, Weight training group and Resistance training group. (MD: 5.20).

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

Figure I

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



DISCUSSIONS ON FINDINGS ON LEG STRENGTH

In order to find out the effect of Weight training and Resistance training on Leg strength the obtained pre and post test means were subjected to ANCOVA and post hoc analysis through Scheffe's confidence interval test.

The effect of Weight training and Resistance training on Leg strength 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 12.62 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 Weight training group and control group (MD: 8.14). There was no significant difference between Resistance training group and control group (MD: 2.95). Comparing between the treatment groups, it was found that there was significant difference between Weight training and Resistance training group among triple jumpers.

Thus, it was found that Weight training was significantly better than and control group in improving Leg strength of the triple jumpers, while Resistance training failed to significantly alter Leg strength.

CONCLUSION

The present study was undertaken to examine the influence of weight training and resistance training on leg strength among triple jumpers. The results clearly demonstrated that weight training produced significant improvements in leg strength compared to both resistance training and the control group. Resistance training, although effective in developing general muscular endurance, did not bring about statistically significant gains in leg strength within the 12-week intervention. Post hoc analysis further confirmed that weight training was superior in enhancing the specific lower-limb force production capacities required for the hop, step, and jump phases of the triple jump.

These findings support the premise that structured weight training, particularly using free-weight multi-joint exercises, provides a more direct transfer of strength adaptations to the explosive demands of triple jumping. In contrast, resistance training alone may not offer sufficient overload or neuromuscular specificity to yield meaningful improvements in leg strength for advanced jumpers.

From a practical standpoint, coaches and physical educators should prioritize weight training protocols in the conditioning programs of triple jumpers, ensuring appropriate intensity, progressive overload, and exercise selection that mimic the biomechanical demands of the event. Integrating such training into the athlete’s macrocycle can lead to measurable performance advantages in competition.

In conclusion, weight training is a more effective modality than resistance training in improving leg strength among collegiate triple jumpers, thereby highlighting its importance in jump-specific preparation. Future research may extend this work by exploring the combined effect of weight, resistance, and plyometric training on triple jump performance variables such as take-off velocity, reactive strength, and total jump distance.

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