



Article

Contribution of Lateral Bound and Triceps Dips Exercises to the Repulsion Results of Men in North Padang Lawas Regency

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History Article

Received:
August 2023

Accepted:
July 2024

Published:
July 2024

Keywords:
lateral bound, tricep dips,
shot put, youth athletes.

Abstract

The proficiency in the sport of shot put is contingent upon the harmonious integration of strength, power, and technique. Notwithstanding its significance, athletes at Pembina Prestasi club in North Padang Lawas have demonstrated suboptimal outcomes, necessitating a targeted intervention to enhance their performance. The objective of study was to investigate the impact of lateral bound and tricep dip exercises on the performance of male athletes at Pembina Prestasi Club in the discipline of shot put. A pre-test and post-test experimental study was conducted on six male shot put athletes. The intervention comprised lateral bound and triceps dip exercises, conducted thrice weekly for 18 sessions over a six-week period. The efficacy of intervention was evaluated by measuring the participants' shot put performance before and after the intervention. The data were analyzed using descriptive statistics, normality tests, and paired sample t-tests. The results demonstrated a statistically significant enhancement in shot put performance subsequent to the intervention. The mean throwing distance increased from 6.40 meters to 7.74 meters, accompanied by a reduction in performance variability. The frequency distribution of performance categories exhibited a positive shift, with 66.33% of participants transitioning to the "Good" category following the intervention. A statistically significant difference was observed between the pre-test and post-test scores ($p = 0.025$). The implementation of lateral bound and tricep dip exercises effectively enhanced shot put performance among the studied athletes. The intervention not only improved throwing distances but also led to more consistent performances. Further research should explore these exercises with larger sample sizes and over extended periods. The integration of advanced technologies for more precise measurements and investigation of personalized training approaches based on individual athlete characteristics are recommended. Additionally, studies examining the long-term effects of these interventions and their

applicability across different athlete demographics could further contribute to optimizing shot put.

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INTRODUCTION

People are driven to attain success in life by their active engagement in sports, which is a deliberate endeavour. The expanding significance of sports in today's culture is evident as it extends beyond the notion of simply physical well-being (Sitepu, 2018). Sport is a form of productive labour that is expressed through games, tournaments, and purposeful proactive activities (Giulianotti, 2015). Its aim is to achieve optimal recreation and performance. Sport is a productive type of employment. The fundamental movements that are crucial for sports have existed alongside the development of human civilization on Earth throughout history.

The Greek term for "athletics" is "athlon", which translates to "competition" or "struggle" (Kyle, 2014). Athletics is a composite of various sports that can be generically categorized under the disciplines of running, throwing, and leaping. Shot put is a component of the throwing events in athletics. The rule stipulates that the bullet must be propelled or repulsed with a single hand from the shoulder, as implied by its name. Shot put is the act of propelling a spherical metal object (bullet) with a specific weight by forcefully pushing it from the shoulder with one hand, aiming to achieve the maximum distance (Schofield, Cronin, Macadam, & Hébert-Losier, 2022). Velocity, aversion, and intentionality are the core components of repulsion. Engaging in exercise that enhances overall physical condition is crucial for enhancing sports performance, particularly in shot put, since the amount of success is determined by both skill and physical fitness. Physical condition is a crucial requirement for improving an athlete's performance and can be seen as the foundation for achieving success in sports.

According to the author's field observations on April 20, 2022, the shot put results from the Pembina Prestasi club's athletes of North Padang Lawas Regency were still not in line with expectations. This has a negligible effect on the accomplishments of male athletes in this club, which are still quite low compared to other sports competitions. Athletes who are assigned a certain court number for throwing and pushing off do not

receive adequate physical conditioning, and training plans that incorporate equipment or media during practice are seldom provided. The coaches were observed use many physical training tactics to enhance the athletes' sprinting, jumping, and throwing/pushing abilities throughout that period. Coaches specifically tailor their training methods for shot put athletes, contrasting them with athletes who primarily focus on speed, agility, and endurance in running and jumping events. Consequently, there is no notable distinction in the physical training regimen of track and field athletes compared to athletes in other sports. Furthermore, the athletes' arm and leg muscle power results are still considered deficient. The preliminary testing revealed that the shot put athletes experienced a notable impact on their repulsion outcomes when they did not engage in activities targeting waist flexibility, arm muscle power, and stiff muscle power.

The aforementioned data leads the author to conclude that scientific investigation is necessary. This is based on the preliminary conclusion that the shot put athletes of the Pembina Prestasi club are not meeting the required performance standards. In order to enhance repulsion results, it is imperative to offer training that specifically targets the improvement of arm and leg muscle power. The authors intend to conduct a research study entitled "Contribution of Lateral Bound and Tricep Dip Exercises on Repulsion Performance in Male Shot Put Athletes of Pembina Prestasi Club at North Padang Lawas".

METHODS

The investigation was carried out at the North Padang Lawas stadium, located in the village of Huta Lombang, in the Padang Bolak district of the North Padang Lawas Regency. The exercises are conducted thrice weekly for a total of 18 sessions, scheduled from December 10th, 2022 to January 20th, 2023. Prior to commencing the exercise, data on the initial proficiency (pre-test) is initially gathered, followed by the administration of the training, and subsequently the final proficiency data is acquired (post-test).

The population of this study consisted of 20 Pembina Prestasi athletes in 2022. The researchers used a study sample size of 6 individuals. The sampling approach employed in this study is purposive sampling. The criteria for being eligible as a sample are as follows: (i) practicing shot put, (ii) being of the male gender, (iii) actively participating in training, and (iv) expressing willingness to be sampled. The research aims

to determine whether the lateral bound and tricep dips exercises have an impact on the shot put performance of male athletes from Pembina Prestasi of North Padang Lawas.

The research employed an experimental methodology, utilising tests and measurements. The research design was established with the pre-test and post-test one group design. Prior to administering the treatment, the initial test was conducted, followed by the final test which included the medicine ball arm muscular power test, vertical jump leg muscle power test, and shot put test. The results of these tests were obtained. The data underwent several analytical processes, including normality testing (Liliefors test) and hypothesis testing (paired sample t-test). The significance value was set at 0.05.

RESULTS & DISCUSSION

Description of Research Data

The following table presents the descriptive statistics for the results of the shot put test, with a comparison of the pre-test and post-test performance. The data set comprises six participants (N=6) and provides measures of central tendency and variability. In the pre-test, the mean distance thrown was 6.40 meters, with a standard deviation of 0.83 meters and a variance of 0.697. The highest score attained in the pre-test was 7.54 meters, while the lowest score was 5.50 meters. The results of the post-test indicate a notable improvement, with the average distance increased to 7.74 meters.

Table 1. Descriptive Data of Shot Put Results

Description	Avg.	SD	Variance	Max. Score	Min. Score	N
Pre-Test	6.40	0.83	0.697	7,54	5,50	6
Post Test	7.74	0.47	0.223	8,50	7,20	

The post-test data also demonstrates a reduction in variability, as indicated by a smaller standard deviation of 0.47 meters and a reduced variance of 0.223. The maximum score in the post-test reached 8.50 meters, and the minimum score improved to 7.20 meters. These statistics suggest that the participants' shot put performance improved overall and became more consistent after the intervention or training period between the pre-test and post-test.

Table 2. Frequency of Pre-Test Data for Shot Put Results

No.	Interval Class	Frequency		Classification
		N	Percentage	
1	> 8,51 m	0	0	Very Good
2	7,51 m – 8,50 m	0	0	Good
3	6,51 m – 7,50 m	1	16,66	Medium
4	6,01 m – 6,50 m	3	50	Less
5	< 6 m	2	33,33	Very Less
	Total	6	100	

This table shows the frequency distribution of pre-test shot put scores, categorized into interval classes with corresponding classifications. The data are based on a sample of 6 participants (N=6). The results are divided into five interval classes, ranging from less than 6 meters to greater than 8.51 meters. No participant achieved results in the "very good" (>8.51 m) or "good" (7.51 m - 8.50 m) categories. One participant (16.66%) fell into the "Medium" category with a throw between 6.51 m and 7.50 m. The majority of participants, 3 out of 6 (50%), fell into the "Less" category with throws between 6.01 m and 6.50 m. The remaining 2 participants (33.33%) fell into the "Very Less" category with throws under 6 meters. This frequency distribution provides insight into the initial performance levels of the participants and shows that most of them (83.33%) were performing at the lower end of the scale prior to any intervention or training, with throws primarily below 6.50 m. The remaining 2 participants (33.33%) were categorized as "Very Less" with throws between 6.01 m and 6.50 m.

Table 3. Frequency of Post Test Data for Shot Put Results

No.	Interval Class	Frequency		Classification
		N	Percentage	
1	> 8,51 m	0	0	Very Good
2	7,51 m – 8,50 m	4	66,33	Good
3	6,51 m – 7,50 m	2	33,33	Medium
4	6,01 m – 6,50 m	0	0	Less
5	< 6 m	0	0	Very Less
	Total	6	100	

This table shows the results, which are divided into five interval classes, each of which is associated with a performance classification. In the post-test, none of the participants achieved throws in the "very good" category (>8.51 m). However, a significant improvement is evident as 4 out of 6 participants (66.33%) now fall into the "Good" category, with throws between 7.51 m and 8.50 m. The remaining 2 participants (33.33%)

fall into the "Medium" category, with throws between 6.51 m and 7.50 m. Notably, there are no participants in the "Less" or "Very Less" categories, which is in contrast to the pre-test results. This distribution indicates a significant overall improvement in performance compared to the pre-test, with all participants now achieving throws over 6.51 meters. The shift towards higher performance categories suggests that the intervention or training between the pre-test and post-test was effective in improving the shot put performance of the participants.

Normality Test

Table 4. Normality Test of Shot Put Results

Category	Statistic	df	Sig.
Pre-Test	0.194	6	0.200
Post Test	0.283	6	0.144

The test compares both pre-test and post-test scores for a sample of 6 participants ($df = 6$). For the pre-test, the test statistic is 0.194 with a significance (p-value) of 0.200. The post-test shows a higher test statistic of 0.283 and a significance of 0.144. In both cases, the p-values exceed the conventional alpha level of 0.05, indicating that we fail to reject the null hypothesis of normality. This suggests that both the pre-test and post-test data can be considered normally distributed. The higher p-value in the pre-test (0.200) compared to the post-test (0.144) implies that the pre-test data might align more closely with a normal distribution, although both datasets satisfy the normality assumption required for further parametric statistical analyses. These results provide a foundation for applying parametric tests in subsequent analyses of the shot put performance data.

Hypothesis Test

Table 5. Hypothesis Test of Shot Put Results

Data Description	Results
Mean	-1.333
SD	1.033
t	-3.162
df	5
Sig. (2 tailed)	0.025

This table presents the results of a hypothesis test for shot put performance, comparing pre-test and post-test scores using a paired samples t-test. The mean difference between the two tests is -1.333, indicating an average improvement of 1.333

meters in the post-test compared to the pre-test. The standard deviation (SD) of the differences is 1.033 meters, indicating a certain degree of variability in the observed improvement across participants. The test statistic (t) is reported as -3.162, with 5 degrees of freedom (df), corresponding to a sample size of 6 participants. The negative t-value corroborates the hypothesis that performance has increased from the pre-test to the post-test. The p-value for a two-tailed test is 0.025, which is less than the conventional alpha level of 0.05. This indicates a statistically significant discrepancy between the pre-test and post-test scores. These findings provide compelling evidence to reject the null hypothesis of no difference between the tests, suggesting that the intervention or training period between the pre-test and post-test had a notable positive impact on the participants' shot put performance. The magnitude of improvement (1.333 meters on average) appears substantial, particularly in light of the relatively limited sample size.

The observed enhancement in throwing distance lends support to the effectiveness of structured training programs, which is in alignment with the findings of several pivotal studies in the domains of shot put biomechanics and athletic performance. For example, Zaras et al. (2016) demonstrated significant improvements in shot put performance following a periodized strength and power training program, emphasizing the importance of combining heavy resistance exercises with explosive movements. This approach was further supported by recent work from Michał et al. (2021), who found that integrating velocity-based training methods into traditional strength programs led to enhanced throwing performance in elite track and field athletes.

The observed reduction in performance variability among participants post-intervention is consistent with the findings of Steele et al. (2017), who demonstrated that well-designed resistance training programs not only enhance overall performance but also lead to more consistent results among athletes across various sports, including throwing events. This consistency is of particular importance in the context of shot put, where technical precision and repeatability are of paramount importance for competitive success. The findings of the current study are also consistent with those of Soares et al. (2023), who observed improvements in power output and throwing distance following the implementation of a comprehensive strength and conditioning program tailored for

rotational shot putters. Their work emphasized the significance of implementing sport-specific training regimens while adhering to the fundamental biomechanical principles of shot putting. The observed variability in individual responses to training in the present study aligns with broader findings in athletic performance research, such as those reported by Beattie et al. (2014). These findings suggest that factors such as genetic predisposition, previous training history, and psychological variables may influence the magnitude of improvement.

Although the present study offers significant insights, it also suggests avenues for future research on the enhancement of shot put performance. The recent work of Al Ardha et al. (2024) on the integration of technology in tracking and analyzing throwing mechanics provides a foundation for more in-depth investigations into the optimal balance of strength, power, and technique training. The utilisation of inertial measurement units (IMUs) to evaluate rotational velocity and power output in shot put has the potential to facilitate the development of more targeted and efficient training protocols. Furthermore, longitudinal research monitoring athletes over extended periods, as exemplified by Haugen et al. (2019) in their study of long-term athlete development in track and field, could elucidate the sustained effects of diverse training approaches and how they might be periodized for optimal performance during pivotal competitions. Moreover, examining the influence of variables such as athlete experience level, age, and gender in response to training interventions could facilitate a more comprehensive understanding of how to customize programs for optimal effectiveness across diverse athlete populations. Such research could build upon the recent work of Miranda-Oliveira et al. (2021), who examined the biomechanical differences in shot put technique between elite male and female athletes, potentially leading to more gender-specific training optimizations and injury prevention strategies.

CONCLUSION

The study on the effects of lateral bound and tricep dip exercises on shot put performance among male athletes of the Pembina Prestasi Club in North Padang Lawas has yielded significant insights into the efficacy of targeted training interventions in enhancing athletic performance. The considerable enhancements in throwing distances and the diminution in performance variability provide compelling evidence in favor of the

efficacy of integrating targeted strength and power exercises in shot put training. These findings reinforce the importance of integrating both heavy resistance and explosive movements in training protocols for athletes engaged in the sport of shot put. The results of the study highlight the value of training regimens that are specific to the demands of the sport in question, with a focus on developing the key muscle groups and movement patterns that are essential for success in shot put. The observed enhancements in both distance and consistency demonstrate the potential of well-designed, targeted exercises to significantly improve athletic performance in throwing events. However, the variability in individual responses to the training program underscores the complex nature of athletic development and the necessity for personalized training approaches. Although the sample size was limited, the magnitude of improvement observed indicates that the implemented training protocol has the potential to significantly enhance shot put performance across a broader range of athletes. These findings contribute valuable insights to the field of athletic training and performance optimization in shot put, offering a foundation for future research and practical applications in coaching and athlete development. The study's results emphasize the importance of continually refining and adapting training methodologies to maximize athletic potential in specialized events like shot put, where technical precision and physical power are equally crucial for success.

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