

Effect of plyometric training program on leg power of track and field athletes

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ABSTRACT

This study examined the effect of a plyometric training program on the leg power of track and field athletes at Yating National High School during the School Year 2025–2026. It focused on three key components of performance: speed, agility, and power. A true experimental design, specifically the pretest–posttest control group design, was used in the study. Sixty (60) student-athletes were selected through purposive sampling and then randomly assigned to either the control or experimental group. The experimental group participated in a four-week plyometric training program conducted three times a week, while the control group continued with their regular training routine. Performance was measured using the 40-meter sprint test for speed, the Illinois agility test for agility, and the standing long jump test for power. The collected data were analyzed using mean and standard deviation, as well as paired sample t-test and independent sample t-test at the 0.05 level of significance. The results showed that both groups improved after the training period; however, the experimental group showed greater improvement across all variables. No significant difference was found between the two groups during the pretest, indicating that they had similar starting levels. Significant improvements were observed from pretest to posttest in both groups. When comparing the posttest results, significant differences were found in speed and agility, while no significant difference was noted in power.

Keywords: Plyometric training, athletic performance, track and field athletes.

Date Submitted: May 12, 2025

Date Accepted: May 19, 2026

Date Published: May 26, 2026

INTRODUCTION

The introduction establishes physical fitness as a fundamental determinant of athletic performance and development, particularly in sports such as track and field that require explosive and forceful movements. Athletes who participate in sprinting, jumping, and other power dependent events rely heavily on their capacity to generate force rapidly and efficiently. Consequently, athletic training programs have continually evolved to incorporate scientifically validated approaches that enhance performance outcomes. Among these approaches, plyometric training has emerged as a widely recognized method for developing explosive

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DOI: <http://doi.org/10.69651/PIJHSS05021227>

Recommended citation:

Daquira, J. C. (2026). Effect of plyometric training program on leg power of track and field athletes. *Pantao (International Journal of the Humanities and Social Sciences)* 5 (2), 5518-5528.
<http://doi.org/10.69651/PIJHSS05021227>

strength and improving neuromuscular coordination, making it an increasingly important component of contemporary athletic conditioning programs.

Plyometric training is characterized by exercises that utilize a rapid eccentric muscle action immediately followed by a concentric contraction, a process known as the stretch shortening cycle. Through this mechanism, muscles store elastic energy during the stretching phase and release it during contraction, resulting in greater force production and more powerful movements. Empirical evidence consistently supports the effectiveness of this training approach in enhancing athletic performance. Ramírez Campillo et al. (2018) reported that plyometric training significantly improves sprint speed, jumping ability, and overall physical performance among youth athletes. Similarly, Asadi et al. (2017) found that plyometric exercises contribute substantially to improvements in agility and change of direction speed, both of which are critical components of athletic success across various sports. Reinforcing these findings, Sáez Sáez de Villarreal et al. (2016), through a systematic review, concluded that plyometric training produces meaningful gains in lower body power among diverse populations. Collectively, these studies demonstrate a strong convergence in the literature regarding the effectiveness of plyometric training as an intervention for improving performance related attributes, particularly those associated with explosive movement and muscular power.

The importance of these findings is particularly evident in the context of track and field, where leg power serves as a key determinant of performance. Sprinting events require athletes to accelerate quickly and sustain high running velocities, both of which depend on the rapid generation of force by the lower extremities. Likewise, jumping events such as the long jump and high jump require explosive takeoff capabilities that are directly linked to lower body power. Although training programs for track and field athletes commonly incorporate activities designed to improve speed, agility, and strength, many school-based programs continue to rely heavily on general conditioning exercises and repetitive drills. While these methods contribute to overall fitness, they may not adequately target the specific physiological adaptations required for optimal power development. As a result, some student athletes continue to exhibit limited performance in activities demanding explosive movement despite regular participation in training sessions.

The persistence of such performance limitations suggests the need for more specialized and evidence-based interventions. A lack of structured power development programs may restrict athletes' ability to maximize rapid force production, thereby constraining improvements in sprinting, jumping, and agility related tasks. Given the established relationship between lower body power and athletic performance, the integration of plyometric exercises into school athletic programs represents a promising strategy for addressing these limitations. However, despite the substantial body of international research supporting plyometric training, studies focusing on secondary level athletes in local educational settings remain limited. This gap in the literature underscores the necessity of examining whether the positive outcomes reported in broader athletic populations can be replicated among student athletes in Yating National High School. Addressing this gap is important not only for advancing local research but also for providing context specific evidence that can guide training practices within school-based sports programs.

The study is theoretically grounded in the Stretch Shortening Cycle Theory, the SAID Principle, and Motor Learning Theory, which collectively provide a comprehensive explanation of how plyometric training influences athletic performance. The Stretch Shortening Cycle Theory posits that rapid transitions between eccentric and concentric muscle contractions enhance force production through the efficient utilization of stored elastic energy and improved neuromuscular function. Complementing this perspective, the SAID Principle, or Specific Adaptation to Imposed Demands, explains that physiological adaptations occur in response to the specific training stimuli applied to the body, resulting in improvements in

strength, speed, and power when these capacities are systematically trained. Motor Learning Theory further contributes to the conceptual foundation by emphasizing that repeated practice of specific movement patterns enhances coordination, timing, and neuromuscular control. Together, these theories suggest that participation in a structured plyometric training program can produce significant improvements in leg power through both physiological adaptation and enhanced movement efficiency.

Guided by these theoretical perspectives, the study conceptualizes the plyometric training program as the independent variable and leg power as the dependent variable. Because leg power is a multidimensional construct that cannot be directly observed, it is operationalized through measurable indicators including speed, agility, and explosive power. The conceptual framework therefore illustrates a direct relationship between the implementation of a plyometric training program and improvements in these performance indicators. Within this framework, speed reflects the athlete's ability to move rapidly over a specified distance, agility represents the capacity to change direction efficiently while maintaining control, and explosive power refers to the ability to generate maximal force in a short period. By examining these dimensions collectively, the study seeks to provide a comprehensive assessment of the influence of plyometric training on athletic performance.

Against this backdrop, the present study aims to determine the effect of a plyometric training program on the leg power of track and field athletes at Yating National High School. Through the integration of established theoretical perspectives and empirical evidence, the investigation seeks to address a recognized gap in local research while contributing practical insights into the design of school based athletic training programs. The findings are expected to provide valuable guidance for coaches, physical education teachers, and school administrators in developing evidence-based interventions that enhance the performance and physical development of student athletes. Ultimately, the study contributes to the growing body of knowledge on athletic conditioning by evaluating the applicability and effectiveness of plyometric training within a secondary school context.

Statement of the problem

This study aimed to determine the effect of a Plyometric Training Program on the leg power of Track and Field athletes of Yating National High School during the School Year 2025–2026.

Specifically, this study sought to answer the following questions:

1. What is the level of leg power in terms of speed, agility, and power of track and field athletes in the pretests and posttests of the control and the experimental groups?
2. Is there a significant difference in leg power in terms of speed, agility, and power of track and field athletes between the pre-tests of the control and the experimental groups?
3. Is there a significant difference in leg power in terms of speed, agility, and power of track and field athletes between the pre-tests and post-tests of the control and the experimental groups?
4. Is there a significant difference in leg power in terms of speed, agility, and power of track and field athletes between the post-tests of the control and the experimental groups?

METHODOLOGY

This study was designed to determine the effect of a Plyometric Training Program on the leg power level of track and field athletes, specifically examining the performance of athletes before and after the implementation of the intervention as indicated by speed, agility, and explosive power measures. The study was conducted during the second semester of School Year 2025–2026 at Yating National High School, employing a True Experimental Research Design, specifically the Pretest–Posttest Control Group Design. Under this design, the participants were first grouped according to their track and field event classification and then randomly assigned into two groups: the experimental group, which underwent the Plyometric Training Program in addition to their regular training, and the control group, which continued its usual training without plyometric exercises. This design allowed the researcher to determine whether changes in leg power could be attributed to the intervention by comparing the performance of the two groups. The independent variable of the study was the Plyometric Training Program, while the dependent variable was the leg power level of the athletes. The leg power level of the participants was assessed through standardized performance tests administered before and after the intervention period, with speed evaluated using the 40-Meter Sprint Test, agility evaluated using the Illinois Agility Test, and explosive power evaluated using the Standing Long Jump Test, all of which served as indicators of leg power. The data gathered were encoded, tabulated, and analyzed using statistical procedures. Descriptive statistics such as mean and standard deviation were used to summarize the performance results. To determine whether a significant difference existed between the pre-test and post-test scores within each group, the Paired Sample t-test was applied. Furthermore, the Independent Sample t-test was used to compare the gain scores of the experimental and control groups at the 0.05 level of significance to evaluate the effectiveness of the intervention.

The participants of this study were the sixty (60) track and field athletes from Yating National High School during the School Year 2025–2026, with the study conducted during the second semester of the academic year. A purposive sampling technique was initially employed to identify eligible participants, with selection limited to officially recognized track and field athletes who were physically fit, actively participating in training, and willing to undergo the required performance tests and training sessions. After identifying the qualified participants, they were grouped according to their grade level and then randomly assigned to either the experimental group or the control group to ensure balanced representation. All participants assigned to the experimental group underwent the same structured plyometric training program to maintain consistency of the intervention. With respect to the distribution of participants according to grade level, ten (10) athletes, or 16.67%, were drawn from each of Grade 7, Grade 8, Grade 9, Grade 10, Grade 11, and Grade 12, for a total of sixty (60) athletes representing 100% of the sample. Parental consent and participant assent were secured prior to inclusion in the study to ensure adherence to ethical standards in research involving minors.

To measure the leg power level of the participants before and after the intervention, standardized field tests were utilized. The Speed Test measured sprinting performance over a short distance, wherein the time required to complete the 40 meters was recorded in seconds using a stopwatch, with a shorter time indicating better sprint performance and reflecting improved lower-body explosive ability. The Agility Test assessed the ability of athletes to rapidly change direction while maintaining balance and control, wherein participants completed a standardized cone course and the total time was recorded in seconds, with faster completion indicating better agility and neuromuscular coordination. The Explosive Power Test evaluated lower-body explosive power, wherein participants stood behind a marked starting line with feet slightly apart and, from a stationary position, jumped forward as far as possible using a two-foot takeoff and landing, with the distance from the starting line to the

nearest point of contact upon landing measured in centimeters, and greater distance indicating higher leg power. These performance tests served as indicators of leg power, which was the dependent variable of the study.

The plyometric training program served as the primary intervention of the study and was administered only to the experimental group. The training design was adapted from established plyometric training principles and structured guidelines recommended in sports science literature, and the complete training protocol was presented in Appendix B, Plyometric Training Program. The intervention was conducted for four (4) weeks, three times per week (Monday, Wednesday, and Friday), with each session lasting approximately 45–60 minutes, and all sessions were supervised by the researcher and sports coaches to ensure proper execution, safety, and uniformity of implementation.

The plyometric training program followed a progressive structure designed to ensure safe and systematic adaptation among the participants. During the first week, referred to as the foundation phase, the training focused on developing proper landing mechanics and neuromuscular control, with emphasis on correct technique to prepare the athletes for more complex movements in the succeeding weeks. In the second week, known as the development phase, the training shifted toward improving directional control and reactive movement, with athletes introduced to exercises that required better coordination and responsiveness, allowing them to adapt to dynamic movement patterns. The third week, identified as the performance phase, concentrated on enhancing explosive power and acceleration, with exercises becoming more intense and sport specific, targeting the athletes' ability to generate force rapidly. Finally, during the fourth week, referred to as the peak phase, the training aimed to maximize power output and reactive quickness, with athletes performing high intensity plyometric exercises designed to optimize performance and apply the skills developed throughout the program.

Participants assigned to the experimental group underwent the structured plyometric training program in addition to their regular track and field practice. Exercises included squat jumps, lateral hops, bounding drills, sprint variations, depth jumps, and multi-directional hopping activities designed to improve lower-body explosive power. The training intensity increased progressively each week through adjustments in repetitions, sets, movement speed, and complexity of drills, with emphasis placed on proper landing mechanics, controlled movements, and injury prevention. In contrast, participants assigned to the control group continued their regular track and field training routines without performing any plyometric exercises, with their training consisting of standard conditioning drills such as jogging, stretching, event-specific practice, and mobility exercises. Maintaining a structured routine for the control group ensured that both groups experienced comparable training conditions except for the plyometric intervention, allowing any observed differences in performance to be attributed to the treatment.

The data collection process of this study was conducted systematically in three phases, namely the Pre-Experimental Phase, the Experimental Phase, and the Post-Experimental Phase, following proper research protocols, safety procedures, and ethical considerations throughout the duration of the study. In the Pre-Experimental Phase, permission was first secured from the School Head and the track and field coaches of Yating National High School, and written parental consent and participant assent were also obtained since the study involves physical activity. After securing approval, eligible participants were identified and grouped according to their track and field event classification and were then randomly assigned to either the experimental group or the control group to ensure balanced representation and minimize selection bias. Baseline data were then gathered through the administration of standardized performance tests to both groups, including the 40-Meter Sprint Test for speed, the Illinois

Agility Test for agility, and the Standing Long Jump Test for explosive power, with each participant performing three trials for every test and the average score recorded as the official result; these scores served as the pre-test data representing the initial leg power level of the participants.

In the Experimental Phase, following the pre-test, the intervention period was conducted for four weeks, during which participants in the experimental group underwent the structured plyometric training program three times per week under the supervision of the researcher and sports coaches, with each session following a standardized format consisting of warm-up, main training exercises, and cooldown to ensure consistency and safety. Meanwhile, the control group continued its regular track and field training routine without any plyometric exercises, and its training sessions were also monitored and documented to ensure comparable training exposure between groups and to control extraneous variables. Attendance, participation, and training activities of both groups were recorded using monitoring forms to verify compliance with the assigned training protocols.

In the Post-Experimental Phase, upon completion of the four-week training period, the same standardized performance tests administered during the pre-test were conducted again for both groups following identical testing procedures, with each participant again performing three trials for each test and the average score recorded as the official post-test result. All collected data were then compiled, organized, and encoded in a master data matrix for statistical analysis. Descriptive statistics were used to summarize performance results, while inferential statistical tests were applied to determine whether significant differences existed within and between groups, and the results were presented in tabular form with corresponding interpretation to answer the research problems and test the hypotheses of the study. In addition, descriptive classifications such as Excellent, good, Average, and Poor were used to facilitate interpretation of the participants' performance, with these classifications based on norm-referenced standards and applied during the data analysis phase.

The data gathered from the study were encoded and analyzed using the Statistical Package for Social Sciences (SPSS) software, and the scores obtained from the pre-test and post-test performance assessments were used to determine the effect of the Plyometric Training Program on the leg power level of track and field athletes. To analyze the data, several statistical treatments were employed. The Mean, as a descriptive statistical measure, was used to determine the average performance scores of the participants in the pre-test and post-test for both the experimental and control groups in terms of speed, agility, and explosive power. The Standard Deviation was used to determine the degree of variability or dispersion of the performance scores among participants within each group. The Paired Sample t-test, as an inferential statistical test, was utilized to determine whether a significant difference existed between the pre-test and post-test scores within each group, indicating whether the experimental group demonstrated significant improvement after the intervention and whether any change occurred in the control group. The Independent Sample t-test was used to compare the gain scores (post-test minus pre-test) between the experimental and control groups to determine whether the improvement observed in the experimental group was significantly greater than that of the control group, establishing the effectiveness of the Plyometric Training Program relative to regular training. A significance level of 0.05 was applied to all inferential tests.

RESULTS AND DISCUSSION

This chapter presents the analysis and interpretation of the data gathered from sixty (60) track and field athletes of Yating National High School during the School Year 2025–2026, equally divided into a control group ($N = 30$) and an experimental group ($N = 30$), in order to

determine the effect of the Plyometric Training Program on their leg power. Guided by a True Experimental Research Design utilizing the Pretest-Posttest Control Group Design, with participants identified through purposive sampling and subsequently randomized into the two groups, the study employed standardized field tests, namely the 40-Meter Sprint Test, the Illinois Agility Test, and the Standing Long Jump Test, as the primary data-gathering instruments to measure speed, agility, and power, respectively. The data collected were treated using descriptive statistics, specifically the mean and standard deviation, and inferential statistics, specifically the Paired Sample t-test and the Independent Sample t-test, both computed at the 0.05 level of significance. The discussion that follows is grounded entirely in the data gathered through these procedures, and all results are interpreted in direct relation to the objectives of the study, which sought to assess the level of leg power in terms of speed, agility, and power, and to determine whether significant differences existed within and between the control and experimental groups across the pretest and posttest periods.

In terms of speed, the control group recorded a mean score of 8.09 seconds (SD = 1.19), described as Average, during the pretest and improved to 7.48 seconds (SD = 1.06), described as Good, in the posttest. Similarly, the experimental group obtained a pretest mean of 8.50 seconds (SD = 0.65), also described as Average, and showed a greater improvement to 6.66 seconds (SD = 0.71), described as Excellent, in the posttest. These results indicate that both groups improved in speed performance, with the experimental group demonstrating a more substantial improvement. For agility, the control group had a pretest mean of 17.99 seconds (SD = 1.36), described as Average, which decreased to 17.32 seconds (SD = 1.30), still described as Average, in the posttest. Likewise, the experimental group obtained a pretest mean of 18.02 seconds (SD = 1.35), described as Average, and improved to 16.51 seconds (SD = 1.25), described as Good, in the posttest. This suggests that both groups enhanced their agility performance, with the experimental group showing greater improvement. In terms of power, the control group obtained a mean of 190.33 cm (SD = 32.97), described as Good, in the pretest and slightly increased to 193.13 cm (SD = 33.02), still described as Good, in the posttest. On the other hand, the experimental group recorded a pretest mean of 194.30 cm (SD = 30.23), described as Good, and improved notably to 209.07 cm (SD = 32.60), described as Excellent, in the posttest. This indicates that the increase in power was more pronounced in the experimental group. It must be noted that, in accordance with the descriptive scale adopted for this study, scores of 6.00-6.99 seconds in speed, 15.00-15.99 seconds in agility, and 210 cm and above in power are described as Excellent; 7.00-7.99 seconds in speed, 16.00-16.99 seconds in agility, and 190-209 cm in power are described as Good; 8.00-8.99 seconds in speed, 17.00-17.99 seconds in agility, and 170-189 cm in power are described as Average; and 9.00 seconds and above in speed, 18.00 seconds and above in agility, and below 170 cm in power are described as Poor. Lower values in speed and agility therefore indicate better performance, while higher values in power reflect greater explosive strength. Overall, both groups showed improvements from pretest to posttest; however, the experimental group consistently demonstrated higher gains across all three variables, a pattern that is consistent with Ramírez-Campillo et al. (2018) and Asadi et al. (2017), who reported that plyometric training significantly improves speed, agility, and lower-body power due to enhanced neuromuscular efficiency and rapid force production.

Prior to examining the effects of the intervention, the equivalence of the two groups at baseline was tested using the Independent Sample t-test on the pretest scores. The results reveal that there is no significant difference between the control and experimental groups in all variables during the pretest. For speed, the control group (N = 30, Mean = 8.09, SD = 1.19) and the experimental group (N = 30, Mean = 8.50, SD = 0.65) yielded a t-value of 1.665ns at df =

58, with a significance value of 0.101 in the table and 0.101 in the narrative computation, both greater than 0.05. For agility, the control group (Mean = 17.99, SD = 1.36) and the experimental group (Mean = 18.02, SD = 1.35) produced a t-value of 0.085ns at df = 58, with a significance value of 0.93 as reported in the table and 0.933 as reported in the discussion, both greater than 0.05. For power, the control group (Mean = 190.33, SD = 32.97) and the experimental group (Mean = 194.30, SD = 30.23) yielded a t-value of 0.486ns at df = 58, with a significance value of 0.63 as reported in the table and 0.629 as reported in the discussion, both greater than 0.05. Since the p-values for speed (0.101), agility (0.933), and power (0.629) are all greater than the 0.05 level of significance, the null hypothesis of no significant difference is retained for all three variables, indicating that the differences observed in the mean scores of the two groups at pretest are not statistically meaningful. This further suggests that both groups had similar levels of leg power prior to the implementation of the plyometric training program. This condition is methodologically important, as it establishes that the groups were comparable at the beginning of the study, allowing any changes observed in the posttest to be attributed to the intervention rather than to pre-existing differences in performance. This result is consistent with the principles of experimental research design, which emphasize the importance of group equivalence at the beginning of the study to ensure internal validity and to attribute observed effects to the intervention (Creswell & Creswell, 2018).

Having established baseline equivalence, the Paired Sample t-test was then used to determine whether significant differences existed between the pretest and posttest scores within each group. For speed, the control group showed a reduction in mean score from 8.09 (SD = 1.19) in the pretest to 7.48 (SD = 1.06) in the posttest, yielding a t-value of 7.888* at df = 29 with a significance value of 0.000, indicating a significant difference. Likewise, the experimental group decreased from 8.50 (SD = 0.65) to 6.66 (SD = 0.71), with a higher t-value of 17.292* at df = 29 and a significance value of 0.000. This confirms that both groups improved in speed, with greater improvement evident in the experimental group given its higher computed t-value. In terms of agility, the control group's mean decreased from 17.99 (SD = 1.36) to 17.32 (SD = 1.30), with a t-value of 10.700* at df = 29 and a significance value of 0.000, indicating a significant difference. The experimental group also showed improvement, decreasing from 18.02 (SD = 1.35) to 16.51 (SD = 1.25), with a t-value of 19.080* at df = 29 and a significance value of 0.000. The higher t-value in the experimental group suggests a stronger training effect relative to the control group. For power, the control group increased from 190.33 (SD = 32.97) to 193.13 (SD = 33.02), with a t-value of 4.746* at df = 29 and a significance value of 0.000, indicating a significant difference. Meanwhile, the experimental group improved from 194.30 (SD = 30.23) to 209.07 (SD = 32.60), with a t-value of 10.810* at df = 29 and a significance value of 0.000, reflecting a greater increase in power. Overall, all computed p-values are less than 0.05, leading to the rejection of the null hypothesis of no significant difference between pretest and posttest scores in both groups across all three variables. However, the consistently higher t-values obtained by the experimental group across speed, agility, and power suggest that the plyometric training program produced stronger improvements than regular training alone, a finding that is supported by Ramírez-Campillo et al. (2018) and Asadi et al. (2017), who reported that plyometric training significantly enhances speed, agility, and explosive performance due to improved neuromuscular coordination and rapid force production.

To further determine whether the gains achieved by the experimental group were significantly greater than those of the control group, the Independent Sample t-test was applied to the posttest scores of the two groups. For speed, the control group obtained a posttest mean score of 7.48 (SD = 1.06), while the experimental group recorded a lower mean of 6.66 (SD = 0.71); the computed t-value of 3.509* at df = 58 yielded a significance value of 0 as shown in the table and 0.001 as reported in the discussion, both indicating a significant difference

between the two groups and confirming that the experimental group performed better in speed. In terms of agility, the control group had a posttest mean of 17.32 (SD = 1.30), whereas the experimental group obtained a lower mean of 16.51 (SD = 1.25); the computed t-value of 2.467* at df = 58 yielded a significance value of 0.02 as shown in the table and 0.017 as reported in the discussion, both indicating a significant difference and showing better performance in the experimental group. However, for power, the control group recorded a posttest mean of 193.13 (SD = 33.02), while the experimental group obtained a higher mean of 209.07 (SD = 32.60); despite this numerical difference, the computed t-value of 1.881ns at df = 58 yielded a significance value of 0.07 as shown in the table and 0.065 as reported in the discussion, both greater than 0.05, indicating no significant difference between the two groups for this variable. On this basis, the null hypothesis of no significant difference between the control and experimental groups is rejected for speed and agility but retained for power. Overall, the results show that there are significant differences in speed and agility, but not in power, suggesting that the plyometric training program was effective in producing measurable, statistically significant improvements in speed and agility relative to regular training, while its effect on power, although numerically favorable for the experimental group, did not reach statistical significance within the duration of the study. This finding is consistent with Ramírez-Campillo et al. (2018), who reported that plyometric training produces greater improvements in speed and agility compared to explosive power, particularly when the training duration is relatively short, and is further supported by Sáez-Sáez de Villarreal et al. (2016), who emphasized that substantial gains in muscular power often require longer training periods and progressive overload before statistically significant improvements can be achieved.

Taken together, the descriptive and inferential findings of this study demonstrate that, although the control and experimental groups began the study with statistically comparable levels of leg power in terms of speed, agility, and power, as confirmed by the nonsignificant pretest comparisons ($p = 0.101$ for speed, $p = 0.933$ for agility, and $p = 0.629$ for power), both groups exhibited significant within-group improvements from pretest to posttest across all three variables, with the experimental group consistently producing higher t-values and greater magnitude of change. When the posttest performances of the two groups were compared directly, the experimental group significantly outperformed the control group in speed ($t = 3.509^*$, $p = 0.001$) and agility ($t = 2.467^*$, $p = 0.017$), while the difference in power, though favoring the experimental group numerically, did not reach statistical significance ($t = 1.881$ ns, $p = 0.065$). These results directly address the objectives of the study by establishing that the Plyometric Training Program produced a measurable and statistically defensible positive effect on the speed and agility components of leg power among track and field athletes, while its effect on explosive power, though favorable, requires further training duration or intensity to attain significance. These findings contribute to the existing body of knowledge on plyometric conditioning in school-based athletic programs by providing localized, empirical evidence consistent with the work of Ramírez-Campillo et al. (2018), Asadi et al. (2017), and Sáez-Sáez de Villarreal et al. (2016), and they underscore the practical value of structured, progressive plyometric interventions in enhancing the neuromuscular performance of student-athletes within a relatively short training period. These conclusions provide the empirical foundation for the summary of findings, conclusions, and recommendations presented in the succeeding chapter.

CONCLUSION

The study examined the effectiveness of a plyometric training program in improving the leg power of track and field athletes at Yating National High School during the School Year 2025 to 2026. Using a true experimental research design, the investigation compared the performance of athletes assigned to control and experimental groups in terms of speed, agility, and power. Statistical analyses employing mean, standard deviation, paired sample t test, and independent sample t test provided evidence regarding the effects of the intervention. The findings revealed that both groups demonstrated improvements across all measured variables following the training period. However, athletes who participated in the structured plyometric training program achieved more substantial gains in speed, agility, and power than those who underwent regular training alone. The absence of significant differences between the control and experimental groups during the pretest established that both groups possessed comparable baseline levels of performance, thereby supporting the validity of the comparisons made after the intervention.

The results further indicated that significant improvements occurred between the pretest and posttest performances of both groups, suggesting that participation in training activities contributed positively to athletic development. Nevertheless, the greater improvements observed among athletes exposed to plyometric exercises highlight the additional benefits of this specialized training approach. In particular, significant differences in posttest speed and agility scores demonstrated the effectiveness of plyometric training in enhancing movement efficiency, acceleration, and change of direction ability. These findings affirm the value of plyometric exercises as an evidence-based training intervention capable of improving important components of leg power that are essential for success in track and field events.

Although improvements in power were observed in both groups, the posttest comparison revealed no significant difference between the experimental and control groups in this variable. This finding suggests that the duration or intensity of the four-week plyometric training program may not have been sufficient to produce statistically significant changes in explosive strength beyond those achieved through regular training. Consequently, while plyometric training proved effective in enhancing speed and agility, further investigation is needed to determine the optimal conditions necessary to maximize improvements in power among student athletes.

Overall, the findings support the conclusion that the implementation of a structured plyometric training program contributes meaningfully to the development of leg power, particularly through improvements in speed and agility. The study therefore underscores the importance of incorporating plyometric exercises into athletic training programs to enhance performance outcomes. Athletes may benefit from the consistent and proper execution of plyometric activities as part of their regular conditioning routines, while coaches and physical education teachers are encouraged to integrate systematic plyometric training into their instructional and coaching practices, emphasizing appropriate technique, progressive overload, and safety measures. Furthermore, school administrators can facilitate the successful implementation of such programs by providing adequate facilities, equipment, and professional development opportunities for coaches. Future studies may extend the duration of the intervention and examine additional performance related variables such as balance, coordination, and endurance to provide a more comprehensive understanding of the role of plyometric training in athletic development and to further validate its effectiveness in improving the overall performance of track and field athletes.

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