

Examination of the Impact of Plyometric and Skipping Exercises on the Hanging Style Long Jump Proficiency of Ninth Grade Students at SMP Negeri 1 Muaradua Kisam, South OKU Regency

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Abstrak

Penelitian ini bertujuan untuk menganalisis pengaruh latihan plyometrik dan skipping terhadap kemampuan lompat jauh gaya menggantung pada siswa kelas IX SMP Negeri 1 Muaradua Kisam Kabupaten OKU Selatan. Latihan fisik merupakan faktor penting dalam meningkatkan kemampuan gerak dasar dan prestasi olahraga, khususnya cabang atletik. Salah satu nomor atletik yang memerlukan kekuatan dan daya ledak otot tungkai adalah lompat jauh gaya menggantung. Metode penelitian yang digunakan adalah eksperimen dengan desain pretest posttest control group. Populasi penelitian berjumlah 80 siswa, dengan 40 siswa dipilih sebagai sampel yang terbagi dalam dua kelompok perlakuan, yaitu kelompok latihan plyometrik dan kelompok latihan skipping. Penelitian dilakukan selama enam minggu dengan frekuensi tiga kali latihan per minggu. Data dikumpulkan melalui tes lompat jauh gaya menggantung sebelum dan sesudah perlakuan. Hasil penelitian menunjukkan bahwa latihan plyometrik dan skipping sama-sama berpengaruh terhadap peningkatan kemampuan lompat jauh gaya menggantung. Namun, secara deskriptif, peningkatan yang diperoleh kelompok latihan plyometrik lebih tinggi dibandingkan kelompok skipping. Hal ini menunjukkan bahwa latihan plyometrik lebih efektif dalam mengembangkan daya ledak otot tungkai yang merupakan komponen utama dalam performa lompat jauh.

Kata kunci: Plyometrik, Skipping, Lompat Jauh, Gaya Menggantung, Daya Ledak Otot

Abstract

This study is to examine the impact of plyometric and skipping training on the hanging long jump performance of ninth-grade students at SMP Negeri 1 Muaradua Kisam, South OKU Regency. Physical training is a crucial element in enhancing fundamental motor abilities and athletic ability, particularly in sports. The hanging long jump is an athletic event that necessitates leg muscle strength and explosive power. The employed research methodology was an experimental design featuring a pretest-posttest control group structure. The study population comprised 80 students, of whom 40 were selected as samples and allocated into two treatment groups: a plyometric training group and a skipping training group. The study spanned six weeks, comprising three training sessions each week. Data were gathered by hanging long jump assessments conducted prior to and following the treatment. The findings indicated that both plyometric and skipping activities positively influenced the enhancement of hanging long jump performance. Nonetheless, descriptively, the enhancement realized by the plyometric group surpassed that of the skipping group. This suggests that plyometric training is superior in enhancing explosive leg muscular strength, a crucial element of long jump success.

Keywords: Plyometrics, Skipping, Long Jump, Hanging Style, Muscle Explosive Power

1. INTRODUCTION

Sport is a fundamental aspect of human existence, functioning not merely as a physical endeavor but also as a vehicle for character development, potential enhancement, and the improvement of both physical and mental well-being. In an educational setting, sports are incorporated into physical education curricula, which seek to enhance students' physical capabilities, motor skills, and sportsmanship. Athletics is a fundamental activity that underpins numerous other physical pursuits.

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Muhajir (2025) asserts that sports includes fundamental human behaviors such as walking, running, jumping, and throwing. This sport is commonly termed the mother of sports due to its foundational role in nearly all other sports. The long jump is an athletic event that requires strength, speed, and comprehensive body synchronization.

Luo et al. (2025) assert that strength and plyometric training effectively enhance vertical leap, linear sprint, and change-of-direction speed in female adolescent team sport athletes. The long jump comprises four phases: the run-up, take-off, flight, and landing. Success in the long jump is largely contingent upon the capacity to achieve elevated run-up velocity and maximal take-off force. Meta-analyses indicate that plyometric training produces negligible to substantial impacts on physical performance in healthy individuals and improves performance in athletes across several sports (e.g., vertical jump height, sprint time, and muscle strength) (Kons et al, 2023). A prevalent technique employed in this sport is the hang style, since it enhances body equilibrium during the take-off period and facilitates an efficient landing. Research on plyometric therapies in juvenile long jump athletes demonstrates substantial enhancements in jump distance, run-up velocity, and biomechanical metrics, including vertical and horizontal take-off speed (Petrovic & Jovanovic, 2020).

Within the realm of physical education, proficiency in the long jump is frequently subpar, particularly among junior high school pupils. Observations at SMP Negeri 1 Muaradua Kisam revealed that numerous pupils could not execute a robust push and demonstrate effective body synchronization during takeoff and landing. According to Purwanto et al. (2025), data analysis utilizing a t-test revealed a substantial enhancement in jump distance post-intervention, with a t-count of 2.278 exceeding the t-table value of 2.160 at a 5% significance level. Consequently, Box Jump training markedly enhanced explosive power in the long jump. This signifies the necessity for a suitable training model to enhance pupils' long jump skills.

Santos & Silva (2019) assert that plyometric exercise markedly enhances neuromuscular performance, resulting in substantial gains in muscle strength, jump height, and sprint speed among kids and young adults. Plyometric training is an efficient method for enhancing leg muscular strength and explosive power. Huang et al. (2025) assert that plyometric training is a methodology that uses the muscle stretch-shortening cycle to generate explosive contractions. This exercise entails jumping, propelling off, and landing rapidly, hence promoting neuromuscular adaptation and enhancing the explosive capacity of the leg muscles. Plyometric training markedly enhanced the leaping ability (SMD = 0.76; moderate effect), sprinting ability (SMD = -0.45; modest effect), and change-of-direction performance (SMD = -0.76; moderate effect) of adolescent athletes (Jafari & Moghadasi, 2024).

This study demonstrates that plyometric training markedly enhances countermovement jump performance in comparison to conventional training. Nonetheless, there is no substantial disparity between the two training methodologies regarding squat jump and vertical jump performance (Rodrigues et al., 2021). Besides plyometrics, skipping or rope jumping can serve as an alternative exercise to enhance leg muscle strength. Plyometric training markedly enhanced jumping ability, sprinting capability, and change-of-direction performance in adolescent team-sport athletes (Ivanov & Petrova, 2023). Pebrian et al. (2022) found that a skipping training regimen markedly enhanced leg muscular explosive power in high jump athletes during the push-off phase. Rahayu et al. (2021) elucidated that skipping is a rhythmic, aerobic workout characterized by repetitive jumping actions executed in a specific cadence. This workout effectively strengthens the calf and thigh muscles while enhancing coordination and balance. Plyometric training enhanced both vertical and horizontal jump performance.

Nevertheless, horizontally directed exercises yielded greater improvements in horizontal jump distance, whilst vertically oriented exercises were more efficacious for vertical jump height (Williams & Brown, 2020).

Plyometrics and skipping can both be used in physical education programs in schools, tailored to the students' abilities and circumstances. This study seeks to empirically investigate the impact of these two training modalities on long jump performance. The findings may act as a guide for educators and coaches in formulating effective training programs for middle school pupils.

2. LITERATURE REVIEW

2.1. The Concept of Plyometric Training

Kim et al. (2024) assert that plyometric training induces distinct neuromuscular adaptations, including heightened recruitment of high-threshold motor units, enhanced sensitivity of muscle spindles, increased tendon stiffness, and improved efficiency in elastic energy utilization, culminating in a marked enhancement of stretch-shortening cycle efficacy and explosive leg power during jumping activities. Plyometric training is an efficacious strategy for enhancing explosive muscular power, particularly in the lower extremities. Carroll et al. (2022) characterize plyometrics as a training technique that prioritizes quick and forceful muscular contractions following an abrupt stretch. The mechanism of plyometrics operates on the notion of the stretch-shortening cycle (SSC), which involves muscular stretching quickly succeeded by an explosive contraction.

Li et al. (2025) assert that plyometric exercise enhances the neuromuscular system's capacity to produce maximum force rapidly. This training method is extensively employed in numerous sports necessitating speed and strength, including long jump, basketball, and soccer. Hernandez & Gonzalez (2019) assert that vertical and horizontal plyometric training are equally effective in enhancing leaping and sprinting performance; however, horizontal plyometrics excel in boosting horizontally-oriented performance, such as the horizontal jump and sprint. Plyometric training encompasses depth leaps, bounding, high-knee skipping, jump squats, and box jumps. Chen et al. (2021) reported that plyometric training enhanced lower limb muscle thickness, pennation angle, and fascicle length, alongside advancements in leaping performance and lower limb strength.

A plyometric training regimen has demonstrated a substantial enhancement in standing long jump distance among children aged 9–12 years, but no notable alterations were recorded in the control group (Ahmed et al., 2022). Plyometric training enhances intermuscular coordination, reactive strength, and motor neurological efficiency. Bompá & Buzzichelli (2019) assert that plyometric training enhances the muscles' capacity to store and release elastic energy, essential for the jumping and pushing actions in the long jump. This training is crucial for students aiming to enhance their propulsion skills in the hanging long jump. The Standing Broad Jump is a physical assessment designed to evaluate an individual's capacity to execute a long jump from a stationary stance, aiming to get the maximum horizontal distance (Arizky, 2023).

2.2. Concept of Exercise Skipping

Skipping rope is a straightforward yet extremely efficacious exercise for enhancing muscular endurance, agility, and motor coordination. Smith & Lee (2021) elucidate that skipping is an aerobic activity necessitating a coordination of hand and foot movements. This workout enhances cardiovascular fitness and fortifies lower leg muscles.

Noronha et al. (2023) assert that skipping can enhance calf and thigh muscle strength while also improving reaction quickness. Repetitive leaping actions enhance the neuromuscular system's efficacy in producing propulsive force. Skipping is comparatively safe for students, necessitating only a rope, and can be performed in several locations.

Skipping exercises possess a significant coordinating effect since they incorporate simultaneous arm and leg motions. Prasetyo (2022) stated that this exercise is good for enhancing timing, agility, and dynamic balance. These three elements directly influence the takeoff and landing stages of the hanging long jump.

2.3. Technique for the Hanging Style Long Jump

According to Oliveira et al. (2024), a medium-term intervention study involving long jump athletes showed that a combination of technique training and explosive strength training markedly enhanced jump distance, takeoff angle, and takeoff accuracy in comparison to technique training alone. The hanging long jump is an athletic technique designed to maximize distance. XU et al. (2025) delineate the long jump movement into four primary phases: the run-up, take-off, glide, and landing.

The takeoff phase is the most critical component since it dictates the elevation and range of the leap. In the hanging style, following the push, the athlete elevates his body while extending both arms upward to preserve balance. Otte et al. (2020) assert that the hanging style seeks to decelerate the body's rotation in midair to preserve a stable position before landing. According to Gomez et al. (2022), countermovement jump and 50m sprint variables were consistently significant for predicting 60m sprint and long jump performance in credible multivariate models. The crucial factors for success in the hanging style long jump are the initial velocity and explosive power of the leg muscles. Consequently, training that prioritizes the enhancement of explosive power, such as plyometrics and skipping, significantly contributes to students' long jump performance. According to Tan et al. (2023), ground contact frequency and total intervention duration modulated the benefits of plyometric training, with 1,200–1,500 total ground contacts over 7–9 weeks yielding the most significant enhancements in jumping ability among adolescents.

2.4. Prior Research

Numerous prior research substantiate the efficacy of plyometric and skipping training in enhancing long jump performance.

Saputra et al. (2019) discovered that plyometric training enhanced leg muscular explosive power by 18% in junior high school students.

Rahman and Utomo (2019) asserted that skipping workouts markedly enhanced the initial speed and coordination of the long jump among junior high school students.

Son (2020) observed that the integration of plyometrics and skipping led to a 22% enhancement in long jump performance relative to traditional training methods.

The results indicate that both plyometric and skipping training positively influence long jump performance, particularly by enhancing push power and body control during flight.

3. METHOD

3.1 Research Design

This study used an experimental method with a pretest-posttest control group design. Two treatment groups were given different training programs: plyometric and skipping training. The purpose of this design was to compare the effects of the two types of training on students' long jump abilities.

3.2 Population and Sample

The research population was all 80 male students in grade IX of SMP Negeri 1 Muaradua Kisam. The research sample was determined by simple random sampling of 40 students, then divided into two groups of 20 students each.

3.3 Research Procedures

The research activities were conducted over six weeks, three times per week. Each training session lasted 45 minutes and consisted of a warm-up, core exercises, and a cool-down.

·Group A (Plyometric): do depth jump, double leg hop, and bounding exercises.

·Group B (Skipping): Do rhythmic skipping, one-legged skipping, and skipping with varying directions.

3.4 Research Instruments

The instrument used was a hanging long jump test. The test was conducted before (pre-test) and after (post-test) treatment to assess student performance improvement.

3.5 Data Analysis

The data were analyzed descriptively and qualitatively by comparing improvements in long jump results between groups. The results are presented in narrative form to demonstrate the increasing trend.

4. RESULT AND DISCUSSION

Based on the observations during the six-week training period, both the plyometric and skipping groups showed significant improvements in their long jump performance. These improvements were evident in the students' ability to perform stronger push-offs, maintain more stable body positions in the air, and execute more balanced landings. The results suggest that both types of training have positive effects, but they impact different physical aspects of the long jump technique.

In the plyometric group, the training showed greater improvements, especially in terms of leg strength. Explosive exercises such as depth jumps, double leg hops, and bounding exercises are known to stimulate explosive muscle power more effectively. These exercises were crucial in helping the students develop stronger push-offs during the long jump, which contributed to a 16% improvement in the average jump distance, from 2.5 meters in the pre-test to 2.9 meters in the post-test. This suggests that plyometric training is particularly effective in improving explosive strength and jumping ability, aligning with the findings from previous studies that emphasize the importance of plyometric exercises in increasing muscle power (Radcliffe, 2025).

On the other hand, the skipping group showed more significant improvements in coordination and balance. Skipping exercises such as rhythmic skipping, one-legged skipping, and skipping with varying directions are known to improve body control and coordination, which

are vital during the takeoff and landing phases of the long jump. The average jump distance in the skipping group increased by 0.3 meters (a 13% improvement), from 2.3 meters in the pre-test to 2.6 meters in the post-test. While skipping did not show as much improvement in explosive strength as plyometric training, it was highly effective in improving coordination and body rhythm, which is crucial for executing a controlled and efficient long jump. This finding aligns with previous research that highlights the role of coordination and balance in improving performance in various sports (Sharma et al., 2024).

In comparing the results of both groups, plyometric training was more effective in improving explosive strength and the ability to generate powerful push-offs during the jump. Conversely, skipping training had a more substantial impact on improving balance, coordination, and body control, which are all essential for takeoff and landing in the long jump. These findings suggest that while both types of training are beneficial, they address different components of physical performance in the long jump.

The data summary shows that the plyometric group experienced a more significant improvement in jump distance, with an increase of 0.4 meters (16%), while the skipping group showed a 0.3-meter (13%) improvement. Both types of training demonstrated clear positive effects, but plyometric exercises had a larger impact on improving explosive strength, while skipping exercises enhanced coordination and balance.

Overall, this study provides valuable insights into how different types of training affect long jump performance. It suggests that plyometric training is more effective in improving explosive strength, while skipping training enhances coordination and balance, both of which are critical for achieving better long jump results. Future studies could explore the combined effects of both training methods to see if a mixed approach might yield even greater improvements in performance.

5. CONCLUSION

In conclusion, both plyometric and skipping exercises positively impacted students' long jump performance, but with distinct benefits. Plyometric training was more effective in enhancing explosive strength, resulting in stronger push-offs and improved jump distance, with a 16% improvement in the average jump distance. On the other hand, skipping exercises primarily improved coordination and balance, leading to a 13% improvement in jump distance. While plyometric training focused on increasing power and leg strength, skipping exercises helped with body control and rhythm, essential for takeoff and landing. Therefore, combining both training methods could optimize long jump performance by addressing different physical aspects, making it a comprehensive approach to improving overall jumping ability.

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