

The Effect of Plyometric Training on *Pencak Silat* Kicks: Literature Review

El efecto del entrenamiento pliométrico en las patadas de *Pencak Silat*: Revisión de la literatura

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Abstract. *Pencak silat* is one of Indonesia's cultural heritages that requires special skills, especially in matches that emphasize kicking techniques. The right training methods can improve the strength and speed needed for kicks in *pencak silat*. This study aims to determine the effect of plyometric training on kicks in *pencak silat*. This study employs a literature review design, searching the Scopus, DOAJ, and Google Scholar databases for articles published within the last 5 years (2019 to 2024). The inclusion criteria are experimental study designs related to plyometric training on *pencak silat* kicks. Data extraction includes objectives, samples, interventions, and research results. The search results in the database produced 292 studies, and there were 11 that met the criteria. According to the review results, plyometric training can significantly increase the strength and speed of kicks in *pencak silat*, particularly crescent kicks, sidekicks (T), and straight kicks. The results of this study indicate that *silat* athletes can adopt plyometric training to improve their kicking ability significantly.

Keywords: plyometrics, leg muscles, explosive power, kicks, *pencak silat*.

Resumen. El *pencak silat* es uno de los patrimonios culturales de Indonesia que requiere habilidades especiales, sobre todo en los combates que hacen hincapié en las técnicas de patada. Los métodos de entrenamiento adecuados pueden mejorar la fuerza y la velocidad necesarias para las patadas en *pencak silat*. Este estudio pretende determinar el efecto del entrenamiento pliométrico sobre las patadas en *pencak silat*. Este estudio emplea un diseño de revisión de la literatura, buscando en las bases de datos Scopus, DOAJ y Google Scholar artículos publicados en los últimos 5 años (2019 a 2024). Los criterios de inclusión son diseños de estudios experimentales relacionados con el entrenamiento pliométrico en patadas de *pencak silat*. La extracción de datos incluye objetivos, muestras, intervenciones y resultados de investigación. Los resultados de la búsqueda en la base de datos produjeron 292 estudios, y hubo 11 que cumplieron los criterios. Según los resultados de la revisión, el entrenamiento pliométrico puede aumentar significativamente la fuerza y la velocidad de las patadas en *pencak silat*, en particular las patadas de media luna, las patadas laterales (T) y las patadas rectas. Los resultados de este estudio indican que los atletas de *silat* pueden adoptar el entrenamiento pliométrico para mejorar significativamente su capacidad de dar patadas.

Palabras clave: pliometría, músculos de las piernas, potencia explosiva, patadas, *pencak silat*.

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Introduction

The Malay people created *Pencak silat*, one of the original cultures of the Indonesian nation, from prehistoric times to combat harsh nature and ensure their survival against ferocious animals and hunting, ultimately leading to the development of self-defense movements (Lubis & Wardoyo, 2016). It comprises two categories: the fighting category and the art category. The fighting category necessitates using arms and legs to score points (Adam et al., 2022). The basic techniques of *pencak silat* consist of punches, kicks, applying horse stances, blocks, falls, sweeps, cuts, and locks (Ambarwati et al., 2024). In its competition category, the most frequently used attack technique is the foot attack (kick), because a foot attack that enters the opponent cleanly gets a score of 2, while a punch attack only gets a score of 1 (Lubis & Wardoyo, 2016). The competition category frequently employs kicks such as straight kicks, crescent kicks, sidekicks, and back kicks (Hidayat & Haryanto, 2021). A straight kick is an attack that uses one leg; the trajectory is forward, the impact is on the base of the inner toes, and the target is between the solar plexus and the chin (Gustama et al., 2021). A crescent kick is a kick that has a semi-circular trajectory inward, targeting all parts of the body using the back of the sole and the toes of the foot (Lubis & Wardoyo (2016). A side kick (T) is an attack with a straightforward trajectory; this kick hits the heel, sole, and

the outside of the sole, targeting all parts of the opponent's body (Efendi & Zulrafla, 2024). In contrast, a back-kick involves first turning the body, maintaining a posture that faces away from the opponent, and striking the sole or heel (Ali et al., 2022).

The implementation of a training program necessitates the correct training of four crucial aspects: technique, physical, tactical, and mental (Sulfa et al., 2024). *Pencak silat* is a full-body contact sport, so it requires prime physical condition (Wijaya et al., 2022). For *pencak silat* athletes, maintaining prime physical condition is crucial as it can enhance their ability to win matches, but it also requires support from other aspects (Wijaya et al., 2022). A *silat* athlete must possess certain components of physical condition, such as strength, endurance, speed, agility, flexibility, balance, power, accuracy, and reaction (Rohman & Effendi, 2019).

In the sport of *pencak silat*, one of the physical components, namely power, is very much needed as an element of energy in carrying out attacks (Munzir, 2022). Explosive power or power is the ability to direct strength quickly in a short time to provide the best momentum to the body or object in an explosive movement that is intact to achieve the desired goal (Bafirman & Wahyuri, 2019). Kicking techniques in *pencak silat* require leg muscle power. Athletes with good leg muscle power will also be able to perform kicking techniques well. Additionally, the purpose of leg

muscle power in kicks is to prevent the opponent from having time to dodge or block. Therefore, *pencak silat* athletes require the appropriate training method to enhance their leg muscle power. plyometric training is one of the training methods that can increase leg muscle power (Syafei et al., 2021). In *pencak silat* sports, a systematic and structured training process is necessary to achieve optimal results (Hariono et al., 2024).

Irianto (2018) stated that training is a process of systematically preparing an athlete's body to achieve the best level of performance by providing physical and mental loads regularly, directed, increasing, and repeatedly. (Bafirman & Wahyuri, 2019). stated that plyometric means exercises that are characterized by strong muscle contractions in response to speed, load, dynamics, or muscle range. Plyometric training is one of the right training methods to increase power (Bompa & Buzzichelli, 2019). The principles of plyometric training are as follows: stretching the muscles, progressive overload, and specific training (Bompa & Buzzichelli, 2019). Furthermore, in plyometric training, training intensity is critical to achieving optimal results (Bafirman & Wahyuri, 2019). Plyometric training forms are typically identical to jumping, hopping, bounding, thrusting, or training forms that use muscle amortization power (Sidik et al., 2019). Sports often use Plyometric training (PT) due to its proven ability to enhance the explosive power of lower leg muscles (Fonseca et al., 2021).

In *pencak silat* sports, effective kicks necessitate both speed and strength; routine training is necessary to generate power in each kick (Arif et al., 2021). Hayati & Endriani (2021) stated that plyometric training aims to increase the strength and speed of the athlete's kicks. Plyometric training in general can improve athlete performance, allowing athletes to kick stronger and faster in *pencak silat* matches.

Several studies above indicate the need for a more thorough investigation into plyometric exercises that can enhance kicks in *pencak silat* sports. This systematic review of the literature will reveal the effects of plyometric training, variations of training, duration of training, and intensity of training used based on the results of previous studies. This study aims to determine the effect of plyometric training on *pencak silat* kicks.

Methods

In this literature review, the article search strategy uses the PICOT method. The keywords used to search for articles using the phrase "plyometrics, leg muscle explosive power, kicks, *pencak silat*" were carried out using national

and international journal source database search tools, namely Scopus, DOAJ, and Google Scholar.

Inclusion and exclusion criteria were used to select articles to be used in this literature research. In this literature review, the inclusion criteria are as follows: The articles used focus on plyometric training and *pencak silat* kicks; the article's year of publication is within the last 5 years (2019-2024); the articles are in English; the articles can be accessed in full or full text; and the articles use an experimental study design. The exclusion criteria in this literature review include articles that don't concentrate on plyometric training and *pencak silat* kicks, articles published outside the last 5 years (2019–2024), articles that aren't in English, articles that aren't accessible in full or full text, and articles that employ an observational study design. In addition, the results of the research search and selection are presented using a PRISMA flow diagram consisting of four stages of data collection, namely, (1) identification, (2) screening, (3) eligibility, and (4) included (see Figure 1).

Population and Sample

The population in this study consisted of articles published in international journals related to the impact of plyometric training on improving *pencak silat* kicks. The selected samples were articles published in international journals published in 2019-2024 and articles in English.

Data Analysis

The researcher used an annotated bibliography analysis. An annotation is a simple summary of a journal article or other written source, while a bibliography is a list of sources on a single topic. Here are some things to consider when analyzing an annotated bibliography:

1. Identify the sources referenced
2. Qualifications and purpose of the author
3. A simple summary of the content
4. The importance of the referenced source in answering the problem that has been formulated.

Using keywords to search for articles in the database, a total of 292 articles were found. After filtering by determining the publication year period (2019-2024), language, and type of article, a total of 20 articles were obtained. Furthermore, the articles were selected based on inclusion and exclusion criteria according to relevance, and a total of 16 articles were obtained. Of the 16 articles that met the full-text requirements, there were 5 duplicate articles, so the final results of the feasibility study were 11 articles. Figure 1 displays the flowchart of the article selection process.

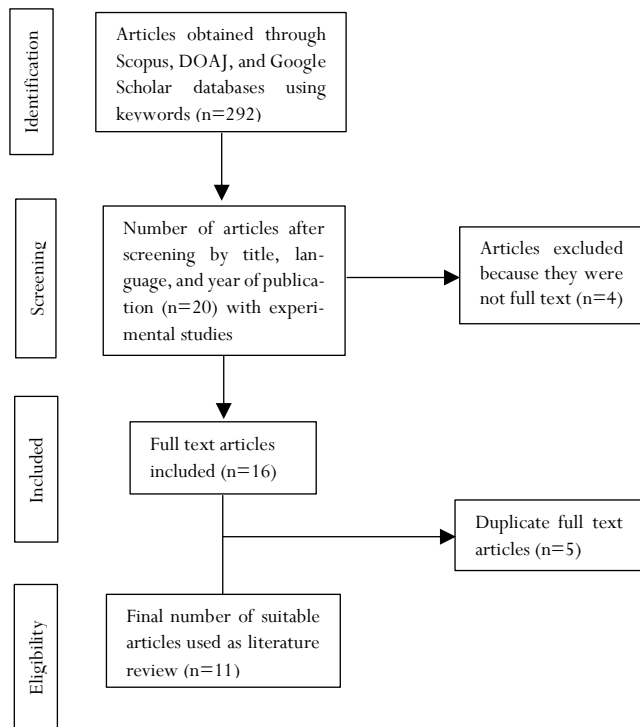


Figure 1. The Prism Chart used in the literature search

In the last 5 years, several international studies have shown that plyometric training can affect martial arts kicks. Eleven articles found in this literature review (table 1 and table 2) showed that plyometric training has an important role in improving the results of *pencak silat* kicks (Al as'ad et al., 2021; Amrullah & Hanif, 2019; Fuorteino et al., 2023; Gustiana, 2021; Ihsan & Utami, 2020; Lubis, et al., 2024; Sinulingga et al., 2023; Sudiana et al., 2023; Sudirman et al., 2022, 2024; Syahri et al., 2019).

Table 1. An Overview of Article Findings

Category	n
Year of Publication	
2019	2
2020	1
2021	2
2022	1
2023	3
2024	2
Study Design	
Experiment with pre-test and post-test group design	4
Experiment with 2x2 factorial design	2
Experiment with a 3 x 2 factorial design	2
Quasi-experiment with pre-test and post-test group design	1
Quasi-experiment with pre-test-post test two group design	1
Quasi Experiment with Non Randomized pre-post control group design	1
Types of Kicks	
Crescent kick	6
Side kick (T)	1
Straight kick	4

Results

Table 2. Summary of Literature Review on the Effect of Plyometric Training on *Pencak Silat* Kicks

Source	Research Design	Sample	Type of Plyometric Exercise	Type of Kick	Exercise Duration & Intensity	Research results
(Amrullah & Hanif, 2019)	Experiment (2x2 factorial design)	32 teenage <i>silat</i> athletes in <i>Tangerang</i> city	Stride jump crossover and box jump	Crescent kick	Duration: 5 weeks/ 3 times a week. Intensity: 70–85%.	Significant difference between the effectiveness of the two plyometric exercises on the ability of the crescent kick in terms of the motivation group owned by the athletes.
(Syahri et al., 2019)	Experiment (2x2 factorial design)	20 male <i>silat</i> athletes from the <i>Terlat Sakti Bengkulu pencak silat</i> school	Single-leg hurdle hop and single-leg bounding	Side kick (T)	Duration: 5 weeks/ 3 times a week	Plyometric training and leg flexibility have a significant effect on the speed of sidekicks in male <i>silat</i> athletes from the <i>Terlat Sakti Bengkulu pencak silat</i> school.
(Ihsan & Utami, 2020)	Quasi-experiment (pre-test-post test two group design)	16 male athletes from Martial Arts Training Center of <i>Tangan Mas Lubuk Basung</i>	Modified squat jump and split jump	Straight kick	Duration: 5 weeks/ 3 times a week	Plyometric training shows significant results on straight kick speed.
(Gustiana, 2021)	Experiment (pre-test and post-test group design)	40 FPOK UPI students	Single-leg stride jump and stride jump crossover training	Straight kick	Duration: 5 weeks/ 3 times a week. Intensity: 70–85%.	Single leg stride jump training has a more significant effect than stride jump crossover training on improving straight kick results in <i>pencak silat</i> .
(Al as'ad et al., 2021)	Quasi-experiment (Non Randomized pre-post control group design)	33 members of the PSP Pekalongan club	Single-leg hurdle hops and alternate jump	Straight kick	Duration: 5 weeks/ 3 times a week. Intensity: 70–85 %.	Plyometric single leg hurdle hops training increases the speed of both right and left straight kicks more than plyometric alternate jump training.
(Sudirman et al., 2022)	Experiment (3 x 2 factorial design)	56 students of the <i>pencak silat</i> program	Box jumps, squat jumps, and depth jumps.	Crescent kicks, Sickle kick, T kick, and back	Duration: 8 weeks/ 3 times a week.	The plyometric training method is more influential

				kick.	Intensity: <i>low – high</i>	than the circuit and continuous training methods on <i>pencak silat</i> kicking skills.
(Sinulingga et al., 2023a)	Experiment (3x2 factorial design)	25 men	Standing jump box, box drill, depth jump	Crescent kick	Duration: 8 weeks/ 2 times a week. Intensity: high-intensity	Plyometric training can increase the explosive power of <i>pencak silat</i> athletes' crescent kicks. Standing depth jumps are superior to box drills and depth jumps in increasing leg muscle explosive power.
(Sudiana et al., 2023)	Quasi Experiment (pre-test and post-test group design)	30 male junior <i>pencak silat</i> athletes	Stair jump and reaction box jump	Straight kick	Duration: 8 weeks/ 3 times a week. Intensity: 70–85%	Plyometric stair jump and reaction box jump exercises have a significant effect on the frequency of straight kicks of junior <i>pencak silat</i> athletes.
(Fuorteino et al., 2023)	Experiment (pre-test-post test group design)	30 PSHT students of SMA Negeri 4 Sekayu	Lateral jump over barrier plyometric exercise	Crescent kick	Duration: 5 weeks/ 3 times a week. Intensity: 45 – 85%.	The speed of the <i>pencak silat</i> crescent kick of PSHT students of <i>SMA 4 Sekayu</i> is influenced by plyometric lateral jump over barrier exercises.
(Lubis et al., 2024)	Experiment (pre-test-post test group design)	20 university <i>pencak silat</i> athletes	Side-to-side ankle hops, standing to jump and reach, front cone hops, standing long jump, lateral jump over the barrier, double leg hops, lateral cone hops, and plyo box jump 30 cm.	Crescent kick	Duration: 6 weeks/ once a week Intensity: Low to moderate.	The 6-week PFIT program has a significant impact on power, strength, flexibility and speed of the crescent kick.
(Sudirman et al., 2024)	Experiment (pre-test-post test group design)	40 4th semester students of the Sports Education Study Program	Two-foot ankle hop, standing to jump over the barrier, multiple hop and jump barrier hop, box drill front, and box drill multiple boxes to box jumps.	Crescent kick	Duration: 7 weeks/ twice a week	Plyometric training can be applied to increase the explosive power of the crescent kick.

Several types of plyometric exercises that have been found to have an effect on kicks in *pencak silat* include (1) stride jump crossover, box jump, depth jumps, standing jump box, box drill, lateral jump over barrier, side to side ankle hops, standing jump and reach, front cone hops, standing long jump, double leg hops, lateral cone hops, *plyo* box jump 30 cm, two-foot ankle hop, standing jump over barrier, multiple hop and jump barrier hop, box drill front, and box drill multiple box to box jumps (influence on crescent kicks); (2) single leg hurdle hop, single leg bounding, depth jumps (influence on side kicks); and (3) squat jump, split jump, single leg stride jump, stride jump crossover training, single leg hurdle hop, alternate jump, depth jumps, stair jump, reaction box jump (affects straight kicks) (Al as'ad et al., 2021; Amrullah & Hanif, 2019; Fuorteino et al., 2023; Gustiana, 2021; Ihsan & Utami, 2020; Lubis, et al., 2024; Sinulingga et al., 2023; Sudiana et al., 2023; Sudirman et al. 2022, 2024; Syahri et al., 2019).

Plyometric Training and the Crescent Kick

A total of 6 studies conducted by Amrullah & Hanif (2019), Fuorteino et al. (2023), Lubis, et al. (2024), Sinulingga et al. (2023), and Sudirman et al. (2022, 2024) showed that plyometric training has a significant effect on the explosive power of the crescent kick. Amrullah & Hanif (2019) conducted a study using a 5-week plyometric training program, which revealed that the high-achieving motivation group experienced a greater impact from plyometric stride jump crossover training on their crescent kick ability.

Meanwhile, box jump training had a stronger effect on the crescent kick in the low-motivation group.

Furthermore, Sudirman et al. (2022) found that plyometric training outperformed circuit and continuous training in improving *pencak silat* kicking skills over 8 weeks. Additionally, there is an interaction between training methods, leg muscle explosive power, and kicking skills. Sinulingga et al. (2023) conducted a study using an 8-week plyometric training program, which revealed that plyometric standing jump, box drill, and depth jump training can enhance the explosive power of sickle kicks in *pencak silat* athletes. Standing depth jump is superior to box drill and depth jump in increasing leg muscle explosive power.

Fuorteino et al. (2023) conducted a study that demonstrated the impact of leg muscle explosive power training, specifically plyometric lateral jump over barrier training, on the *pencak silat* sickle kick speed of *PSHT SMA 4 Sekayu* students over 5 weeks. Lubis et al. (2024) found that a 6-week plyometric, frequency, and interval training (PFIT) training program significantly enhanced the power, strength, flexibility, and speed of the sickle kick. Furthermore, Sudirman et al. (2024) discovered that a 7-week plyometric training program can enhance the explosive power of the sickle kick.

Plyometric Training and Side Kicks (T)

Research conducted by Syahri et al. (2019) showed that plyometric training in the form of single-leg hurdle hop and

single leg bounding for 5 weeks and leg flexibility had a significant effect on the speed of T kicks on male pugilists of the sakti trained pencak silat college Bengkulu.

Plyometric Training and Straight Kicks

A total of 4 studies conducted by Al as'ad et al., (2021), Gustiana, (2021), Ihsan & Utami, (2020) and Sudiana et al., (2023) showed that plyometric training can increase the results of straight kick speed. For instance, Ihsan & Utami (2020) research demonstrated that plyometric training with split squat and squat jump modifications significantly improved straight kick speed, and split jump modification training outperformed squat jump modification training. Research conducted by Gustiana (2021) research demonstrated a significant difference between single-leg stride jump training and stride jump crossover training over 5 weeks, revealing that single-leg stride jump training significantly enhanced the results of *pencak silat* straight kicks.

Moreover, Al as'ad et al. (2021) conducted a study comparing the effectiveness of single-leg hurdle hops and alternate jump training over 5 weeks. They found that single-leg hurdle hops significantly increased the speed of both right and left straight kicks, compared to plyometric alternate jump training. Furthermore, Sudiana et al. (2023) conducted an 8-week training program and found that both plyometric stair jump and reaction box jump training significantly increased the frequency of straight kicks in junior *pencak silat* athletes, with no significant difference observed between the two training methods.

Discussion

The Plyometric Training Forms for Pencak Silat Kicks

The plyometric training forms in the eleven articles found are plyometric training forms that contain elements of jumps. In the first article, the plyometric training forms used are stride jump, crossover, and box jump (Amrullah & Hanif, 2019). The second article uses the plyometric training forms of single-leg hurdle hop and single-leg bounding (Syahri et al., 2019). The third article uses a modified form of plyometric squat jump and split jump training (Ihsan & Utami, 2020). The fourth article uses the plyometric training forms of single-leg stride jump and stride jump crossover training (Gustiana, 2021). The fifth article uses single-leg hurdle hops and alternate jumps (Al as'ad et al., 2021). The sixth article uses box jumps, squat jumps, and depth jumps (Sudirman et al., 2022). The seventh article uses a standing jump box, box drill, and depth jump (Sinulingga et al., 2023). The eighth article employs stair jumps and reaction box jumps (Sudiana et al., 2023). The ninth article employs a lateral jump over barrier plyometric exercise (Fuorteino et al., 2023). The tenth article uses side-to-side ankle hops, standing to jump and reach, front cone hops, standing long jump, lateral jump over the barrier, double leg hops, lateral cone hops, and *plyo* box jump (30 cm) (Lubis et al., 2024). The eleventh article employs a

two-foot ankle hop, a standing jump over a barrier, multiple hops and jumps, a box drill front, and a box drill back. The article also incorporates multiple box-to-box jumps (Sudirman et al., 2024).

There are many forms of plyometric training to train the explosive power of the leg muscles, which will affect the results of the kick. Athletes should choose a form of plyometric training that contains elements of jumping because jumping can cause contractions in the leg muscles. Plyometric training that incorporates elements of jumping, such as single-leg stride jump, stride jump crossover training, depth jump, and reaction box jump, is recommended for athletes (Bafirman & Wahyuri, 2019). Several reviewed articles demonstrate that plyometric training, which incorporates elements of jumping, significantly enhances the explosive power and kick performance of athletes, as it triggers explosive contractions in the leg muscles. However, the selection of this form of plyometric training must still consider the characteristics of the individual athlete and be carried out under the guidance of an experienced trainer to maximize the benefits of training and reduce the risk of injury.

Plyometric Training's Duration and Intensity

In the first article, the duration of plyometric training is carried out routinely to improve the type of crescent kick, which is 3 meetings a week for 5 weeks with an intensity of 70-85%, the sixth article provides plyometric training to improve the three types of kicks, which is 3 meetings a week for 8 weeks with low-high intensity, the seventh article provides plyometric training to improve the type of crescent kick, which is 2 meetings a week for 8 weeks with high intensity, in the ninth article provides plyometric training to improve the type of crescent kick, which is 3 times a week for 5 weeks with an intensity of 45-85%, the tenth article provides plyometric training to improve the type of crescent kick, which is 1 meeting a week for 6 weeks with low to moderate intensity and the same is true in the eleventh article provides plyometric training to improve the type of crescent kick, which is 2 meetings a week for 7 weeks. Meanwhile, in the second article, the duration of plyometric training to improve the sidekick type (T) is 3 times a week for 5 weeks.

Then, in the third article, the duration of plyometric training to improve the straight kick type is done routinely 3 times a week for 5 weeks; in the fourth and fifth articles, plyometric training to improve the straight kick type is 3 times a week for 5 weeks with an intensity of 70-85%; and in the eighth article, plyometric training to improve the straight kick type is 3 times a week for 8 weeks with an intensity of 70-85%.

According to the eleven articles, athletes can perform plyometric training 2-3 times on a regular and routine basis per week. Guidelines for implementing plyometric training begin with warm-up exercises for 5-10 minutes, followed by core exercises with an ideal number of repetitions of 8-10 times (e.g., plyometric squat jump, split jump, single leg

hurdle hops, etc.), then ending with a cool-down for 5-10 minutes (Bafirman & Wahyuri, 2019). After three weeks of training, athletes gradually increase the number of sets of plyometric training, resting for one to two minutes between sets to restore the muscle nervous system that plyometric exercises have suppressed (Bafirman & Wahyuri, 2019). This is done to maximize training results and reduce the risk of injury.

The Effect of Plyometric Training on Pencak Silat Kicks

The literature review from the first, seventh, ninth, tenth, and eleventh articles demonstrated that plyometric training on the crescent kick increased the leg muscles' explosive power, which in turn affected the speed of the crescent kick. The sixth article's results demonstrated a significantly higher increase in the plyometric training group compared to the circuit and continuous training groups. Plyometric training can alter the muscles and nerves, enabling faster movements dilakukan (Amrullah & Hanif, 2019; Fuorteino et al., 2023; Lubis, et al., 2024; Sinulingga et al., 2023; Sudirman et al., 2022, 2024).

The second article's results revealed that plyometric training in the form of single-leg hurdle hop and single-leg bounding increased the speed of the straight kick. Because plyometric training is fast and explosive, it can increase the speed of the straight kick. Plyometric single-leg hurdle hop and single-leg bounding exercises have the same movement pattern, which is to test leg muscle strength. Therefore, this exercise is excellent for increasing straight kick speed because it allows athletes to develop leg muscle strength quickly and explosively (Syahri et al., 2019).

Meanwhile, the third, fourth, fifth, and eighth articles show that after plyometric training was given on straight kicks, there was an increase in the frequency of the speed of the *silat* athletes' straight kicks. Plyometric training employs body weight as a load, emphasizing swift and powerful muscle contractions. It employs diverse movement variations, enabling athletes to enhance their muscle strength and speed, thereby enhancing the speed of their straight kicks (Al as'ad et al., 2021; Gustiana, 2021; Ihsan & Utami, 2020; Sudiana et al., 2023).

Based on some of the articles above, shows that plyometric training can influence various types of pugilist kicks. The benefits of plyometric training include increasing muscle explosive strength to get a strong and fast kick due to rapid muscle contraction movements that develop fast muscle fibers (fast-twitch), plyometric training can also increase kick frequency by increasing muscle strength and kick speed. Therefore, plyometric training is highly recommended for pugilists to optimize their kicking performance. Of course, by still paying attention to the FITT principle (frequency, intensity, time, and type) of training to get maximum results and reduce the risk of injury.

Conclusion

The results of the literature review that has been conducted show that several forms of plyometric training are carried out on athletes, namely with a frequency of 2-3 times a week for 5-8 weeks, with low to high intensity, recommended repetitions of 8-10 repetitions per set, and 1-2 minutes of rest per set. Athletes engage in a variety of plyometric training forms, such as split jumps, squat jumps, depth jumps, box jumps, single-leg hurdle hops, and lateral jumps over barriers. Various plyometric exercises can influence athlete kicks by enhancing muscle strength explosively, resulting in strong and fast kicks, and by increasing the frequency of athlete kicks to achieve optimal values during the match.

This literature review has limitations, namely that the journals reviewed were only the last five years, and the studies used did not include a more detailed quality assessment, such as the duration of training during one session, the number of sets, and the volume of training. Furthermore, the eleven literature reviews from the identified articles failed to provide a detailed explanation of the impact of plyometric training on back kicks.

Apart from crescent kicks, straight kicks, and sidekicks, martial artists frequently employ back kicks in their fighting styles. So in further research, a literature review can be conducted on the effect of plyometric training on kicks that not only include crescent kicks, sidekicks, and straight kicks but also on back kicks.

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