

The effect of plyometric exercise and leg muscle strength on the power limb of wrestling athletes

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Published online: June 30, 2022

(Accepted for publication June 15, 2022)

DOI:10.7752/jpes.2022.06176

Abstract

This study aims to find out: (1) the difference in influence between plyometric exercises side-to-side box shuffle and box jump on limb power; (b) differences in the influence of players who have high and low leg muscle strength against limb power; and (c) the interaction between plyometric exercises side-to-side box shuffle and box jump and limb muscle strength to leg power in wrestling athletes. This type of research is an experiment using a 2 x 2 factorial design. The population in this study was a South Coastal District wrestling athletes who numbered 38 people. The sample in this study amounted to 20 people who were taken using purposive sampling techniques, then performed ordinal pairing to divide each group. The instrument used is to measure the strength of the leg muscles, namely the leg and back dynamometer, while the power of the limbs uses vertical jump. The data analysis technique used is ANOVA two-way. The results showed that: (1) There was a significant difference in influence between plyometric side-to-side box shuffle and box jump exercises against power limbs in wrestling athletes, with a value of F 4.865 and a significance value of $p 0.045 < 0.05$. The side-to-side box shuffle exercise group was higher (good) compared to the box jump exercise group with a post-test average difference of 8.41. (2) There is a significant difference in influence between athletes who have the high and low leg muscle strength to leg power in wrestling athletes, with proven valueS F 20.74 and significance values $p 0.000 < 0.05$. Athletes who had high leg muscle strength were higher (good) compared to players who had low leg muscle strength, with an average post-test difference of 17.38. (3) There is a significant interaction between plyometric exercises (side-to-side box shuffle and box jump) and leg muscle strength (high and low) to leg power in wrestling athletes, with a value of F 41.819 and a significance value of $p 0.000 < 0.05$. There is a significant difference in influence between plyometric side-to-side box shuffle exercises and box jump on the increase in leg power in wrestling athletes. The side-to-side box shuffle exercise group was higher (good) than the box jump training group against the increase in leg power. There is a significant influence comparison between athletes who have high and low leg muscle strength to the increase in leg power in wrestling athletes. Athletes who have high leg muscle strength are higher (good) than athletes who have low leg muscle strength against the increase in leg power. There is a significant interaction between plyometric exercises (side-to-side box shuffle and box jump) and leg muscle strength (high and low) to the increase in leg power in wrestling athletes.

Keywords: side-to-side box shuffle, box jump, limb power, limb muscle strength

Introduction

Exercise performance is a sport that builds, and improves sportsmen in a planned, tiered, and prolonged with the support of science and sports technology. For this reason, the government has the right to direct, focus, guide, and help, in the implementation of sports by following the laws and regulations. Exercise is one of the containers to increase human resources, by exercising regularly and continuing to improve a person's physical and mental qualities. Mansur et al., (2018) said that to achieve great achievements in competitive sports, it takes a prime physical condition in the right with the needs and demands of the sport. The state of prime sports must be the need of every athlete, most importantly for sports that demand long-duration heavy performance. Many advantages obtained from an excellent physical condition, are easy-to-understand environmental skills, reducing the risk of injury, maintaining physical performance, strengthening post-workout recovery, and increasing self-confidence. Karyono, (2016) said that the components of the state of the body include strength (strength), speed (speed), endurance energy, muscle explosive power, agility (agility), balancing (balance), flexibility, and coordination. The state of the body is a unity of components that cannot be separated, either ascension or maintenance (Khalili Moghaddam & Lowe, 2019).

One of the sports that also do coaching is the sport wrestling. The sports branch needs to achieve minimum factors of the state of the body, such as in wrestling which dominantly uses strength factors, until the parameters of robustness must be different from other sports branches. In wrestling itself, the more necessary factors are the factors of strength, muscle resistance energy, power, flexibility, and universal cardiovascular

endurance energy that is the parameter of success such as presented in the collection of exercise condition training modules.

Juhanis, (2016); Sybil et al., (2018) report there are 4 (four) bottom elements that support wrestling, namely (1) The state of the body, which aims to increase the athlete's physical skills to increase at peak conditions that are useful for carrying out sports activities in achievement. (2) Mental, is the driving energy and driver to carry out physical skills, methods, and tactics in carrying out sports activities. (3) Method, is something movement and proof in practice as well as possible to make a complete solution that is certainly in the branch of exercise. (4) Tactics, is a tactic of ideas used during matches to find victory sportsmanship".

In exercising wrestling, 2 styles are contested both nationally and internationally, are the freestyle (Free Style) and the style of Greco Roman Greece (Greco Romaine). Freestyle is a method of wrestling that allows wrestlers to hit both legs of the opponent is hooking, pulling the legs in the match with the provisions set (Juhanis, 2016; Tabasi et al., 2022). Roman grego style is a wrestling game method that prohibits wrestlers from hitting the pelvic floor part of the pelvic floor such as scuttle, pulling legs, folding opponents". Qualified wrestling athletes are not only obliged to understand the method of expertise, but also must-have components of good physical condition to support athletes to achieve their desired achievements.

Wrestling is a branch of martial arts that uses mixed movements of pull, thrust, transport, and spin and focuses on the method of slams, rolls, and locks tried to reduce the stability of opponents and increase the movement of invasion in a set. The movements below are very meaningful so they must be trained always, for that not only the training methods needed but also the training of various components of the body as a supporter of appearances when competing. Wrestling is one of the exercises that rely on strength and endurance (Chernenko, et al., 2020; Rahmani, 2014) One method of exercising wrestling is the slam method which is a raid that has value. The slamming method is tried by transporting the opponent which after that continues with the movement of dropping him onto the mat. The slam method consists of several variables, namely the tank of the waist seam, the shoulder slamming method, the slamming method, and others. To carry out something the slam method requires some components that must be trained always to get optimal results.

Safitri et al., (2017) revealed that the largest contribution of waist slams to wrestling is the power of the limbs when compared to other components of physical conditions in the sport of wrestling. If the athlete has good limb power then it will get maximum waist hardness results. Leg power can be trained with weight training, such as the results of a study that found that there was a significant difference in the effect of barbell squats and resistance band squats on increasing leg power (Nasrulloh et al., 2021). Afif & Nasrullah, (2016) also found that bodyweight training can also significantly increase the athlete's leg muscle power with a significant value of 0.000 ($p < 0.000$). Plyometric exercises given to athletes can make a good contribution to athletes because when jumping the load is heavier, so muscle fibers work heavier and contract very strongly so that it can increase the athlete's power.

Sourced from the results of observations that researchers tried in September 2021 in the south coast wrestling gym building wrestling coach Gestrojoni said that the skill of slamming wrestling athletes is still low when compared to the skill of rolling, meanwhile if a wrestler can understand the method of slamming to get more easily get value. Researchers obtained the last information on the ground from wrestling coaches when athletes conducted a power leg test with a vertical jump test showing that the average jump by 31 centimeters, the results came in less type. The training program that again runs is still lacking in training the power of the athlete's limbs. More exercise is more exercise in arm muscles, aerobics, infiltrating methods, and sparing between athletes. Thus, arm muscles and cardiovascular endurance are not balanced with the strength of the leg muscles and leg power.

Power means a lot in wrestling, especially in the cutting method because without the use of good muscle strength, it does not want to form a good slam method, as well as the opposite of good muscle strength to form something good editing method. Power is used in the slam method, especially in the waist slam method. There is a contribution of limb power to the results of waist slams in the sport of wrestling, this is because when wrestlers hold their arms, lift and slam opponents strongly and quickly so that the opponent cannot escape, it can be done when wrestlers have good power (Kad, 2011). Arm muscle strength is used to pull and push the opponent to eliminate defense stability. Simultaneously, the strength of the arm muscles and the strength of the leg muscles will pull and lift the opponent. Performing the slamming technique should pay attention: to (1) footrests to regulate the weight between the two feet. So the body will be stable and the base is sturdy. (2) The distance from the waist to the mattress is shorter or less than the distance from the waist down to the opponent because the shorter the stand means the closer to the base or base makes the body position more stable. (3) Try to make the opponent easily sway or shake because thus the condition of the opponent's body is unstable and easy to drop.

Low slamming skills in wrestling are affected by a lack of exercise in power. The power and power in the pinging slam are not only used for prefixes but also used when freeing slams. The strength of the foot grip when stepping on the mattress to create a large power needs to be combined with the coordination of other limbs. The strength of the leg muscles greatly affects the prefix results, when you want to do the waist slam. The waist slam is supported by the strength of the legs and back. The pedestal when slamming requires optimal limb strength so that the momentum of explosive energy can be channeled properly. Feet as a focus and back as reses

when slamming, the waist slams tried by each athlete certainly have nothing in common. The focus means a lot in the application of the waist slam, the explosive power is centered on the legs, if the focus is not sturdy until the waist slam is not optimal. The back is very supportive in the waistband. The movement of the waist belt must be supported by muscle contractions, not only that is the aspect that supports because in the waist slam there is a movement of the body resection forward. Each person has a different level of strength so the results obtained in each person's slam will be different. Power limbs are needed in carrying out waist slams, and the strength of the back muscles has a very meaningful role in the success of slams that want to distribute meaningful energy for research. Great strength wants to allow a person to have a more fittingly planned slam, to create optimal performance. Muscle strength wants to be able to train by observing the number of sets in the training stage (Nasrulloh & Wicaksono, 2020).

Exercise is a process in sports activities to improve the ability found in athletes most importantly on the skills and skills that are owned systematically and tried to match the period that has been established (Busch et al., 2013). Plyometric exercise is a mix of strength and speed to create a jump in energy, as well as the elasticity character of the muscle causing partially adjusting muscles, so that the coordination muscles are better and can make the strength more explosive (Chu & Meyer, 2013; Kanbak & Dağlıoğlu, 2020). Plyometric training shares the necessary stimuli and can increase explosive contractions (Arte et al., 2019; Greco et al., 2018; Mapato et al., 2018). Side-to-side box shuffle training shares a meaningful increase in the explosive energy of the limb muscles (Hamonangan & Wellis, 2020). Plyometric exercises side-to-side box shuffle are heavier in increasing the muscles of the legs and hips special muscles gluteals, gastrocnemius, bicep femoris, gluteus, Brevis soleus, extensor digitorum, and vastus lateralis with great speed and full power (Al Hafidz et al., 2020). Yanti et al., (2021) show that box jump training affects the increase in leg power, this is predicted to be the entwined reaction process and adjust the exercise from the use and physiological system when carrying out the jumping load is heavier, so that muscle fibers work heavier and contract very firmly. Thus the leg muscles are required to work continuously because carrying out this exercise must be continuous. With continuous contractions and increased load every 2 weeks, the strength of the leg muscles and the strength of the leg muscles will increase. The training program in this research uses its own weight body so that it reaches optimal movement, in contrast to the character of its power. The power of a person's limbs is influenced by one of them by the strength of the leg muscles. Strength is the skill of a muscle or a group of muscles to perform one contraction optimally against a prisoner or load.

Muscle strength means a lot to everyone and the athlete. This muscle strength is to strengthen athletes in carrying out movements in any exercise (Suchomel et al., 2016, 2018). A person who has good muscle strength can carry out and carry out heavy work for a long time. Physically fresh people want to have strong muscles and can work effectively. Nasrulloh & Wicaksono, (2020) said that the increase in muscle work skills due to exercise is caused by physiological changes that are entwined in the neuromuscular system (adjusting to the neuromuscular system). The increase in muscle strength leads to stronger muscle contractions (increased power), repetition of contractions more lightning (increased speed), and long-lasting exercise periods(increase muscle endurance). Sourced from the background that has been presented earlier, until researchers are interested in carrying out research adrift the influence of plyometric exercises side-to-side box shuffle and box jump and Limb Muscle Strength to Power Limbs In South Coast Wrestling Athletes.

Materials and Methods

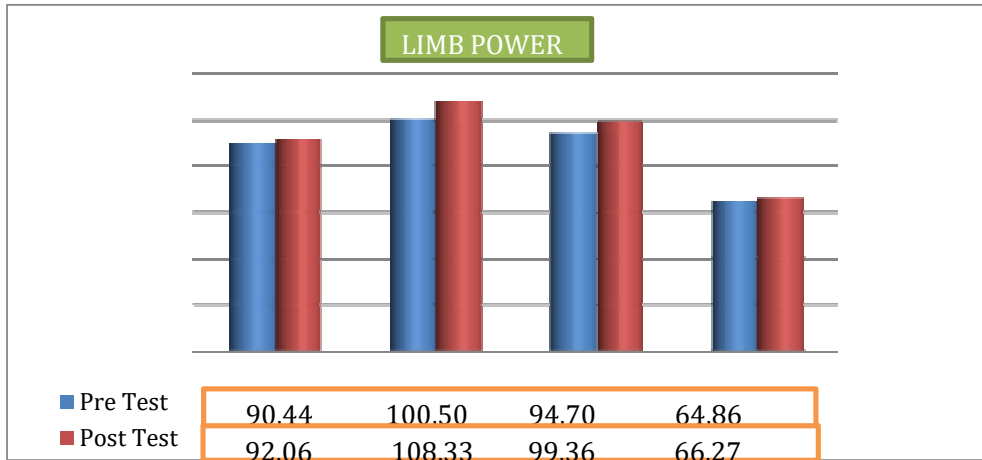
This research uses an experimental research model with a 2 x 2 factorial design. This method of testing is to test the effect of one or more variables on other variables. Sudjana, (2020) reports that factorial experiments are designs that can share the treatment/manipulation of 2 variables freely or more at a time that coincides to look at the impact of each variable freely, separately, and coincide with bound variables and the effects that are entwined due to the interaction of some variables. This experimental research used 2 groups that received different treatments, namely the provision of plyometric side-to-side box shuffle and box jump. The population in this study amounted to 38 people, and the illustrations in this study amounted to 20 people. The withdrawal method uses the purposive sampling method. This research has received approval from all samples who have filled out statements of ability to be research samples and have qualified the research code of ethics. The method of gathering information in this research is tested and measured. When before trying pretest and post-test measurements, illustration first measured the strength of the leg muscles, to recognize the strength of the high and low leg muscles. To measure the strength of the limb muscles in this study is to use a leg and back dynamometer with a validity value of 0.82, and a reliability value of 0.93 (Widiastuti, 2015). The instrument to measure limb power as an early test or pretest is to use a vertical jump with a validity value of 0.978 and a reliability value of 0.989 (Widiastuti, 2015). After that, the treatment or exercise was distributed 18 times with a frequency of 3 x a week. And ended with the final test or post-test to measure the power of the limbs using a vertical jump board to recognize the comparison of the power score of the limbs after the treatment.

The method of information analysis used in this research using SPSS 20 is to use ANOVA 2-way at the level of significance $\alpha = 0.05$. Next to compare the average companion treatment used Tukey test, (Sudjana, 2020). When it reached the utilization of ANOVA 2-way (ANOVA two-way) needs to be tried the prerequisite test is: (1) normality test and (2) variant homogeneity test and hypothesis test.

Results

Chapters of research results and reviews will be presented in series, among others: (1) information on research results, (2) tests of pre-analysis, and (3) hypothesis tests. Hypothesis tests in this study will be presented inline, among others: (a) a comparison of the influence between plyometric exercises Side-to-side box shuffle and box jump on the increase in power limbs in wrestling athletes; (b) a comparison of the influence of athletes who have the large and low leg muscle strength to the increase in leg power in wrestling athletes; and (c) the interaction between plyometric side-to-side box shuffle exercises and box jump and leg muscle strength to the increase in leg power in wrestling athletes. In full, it will be presented as follows.

Figure 1. Pretest Rod Diagram and Post-Test Power Limbs



Information :

A1B1: Athletes who were given a side-to-side box shuffle exercise model with high leg muscle strength

A2B1: Athletes who are given training with a box jump training model with high leg muscle strength

A1B2: Athletes who were given a side-to-side box shuffle exercise model with low leg muscle strength

A2B2: Athletes who were given training with a box jump training model with low leg muscle strength

Sourced in graphic figure 1 above, showing that the power limbs of group A1B1 average pretest of 90.44 kg m/ sec and face a rise in the post-test of 92.06 kg m/ sec, the A2B1 group averages 100, 50 kg m/ sec, and faces an increase in the post-test of 108.33 kg m/ sec, The A1B2 group averaged 94.70 kg m/ sec and faced a post-test increase of 99.36 kg m/sec, the A2B2 group averaged 66.86 kg m/sec and faced a post-test increase of 66.27 kg m/sec.

1. Prerequisite Test Results

a. Test of Normality

The test of the normality of information in this study was used by Shapiro-Wilk. The results of the information normality test tried in each analysis group were tried with the SPSS application program version 20. 0 for windows with a significance level of 5% or 0.05. A summary is presented in Table 1 as follows.

Table 1. Summary of Normality Test Results

Group	P	Significance	Information
Pretest A1B1	0,307		Usual
Posttest A1B1	0,382		Usual
Pretest A2B1	0,927		Usual
Posttest A2B1	0,333	0,05	Usual
Pretest A1B2	0,792		Usual
Posttest A1B2	0,934		Usual
PretestA2B2	0,593		Usual
Posttest A2B2	0,450		Usual

Sourced from statistical analysis of normality tests that have been tried using the Shapiro-Wilk test, all pretest, and post-test power limb information is obtained from the results of the normality test of significance value information p 0.05, which means normally distributed information.

b. Homogeneity test

Homogeneity tests are tried to test the equations of some illustrations that are homogeneous or not. The homogeneity test tests the similarity of variants between pretest and post-test. The homogeneity test in this study

is the Levenes Test. The results of the homogeneity test are presented in Table 2 as follows.

Table 2. Summary of Homogeneity Test Results

F	df1	df2	Sig.
0.84	3	16	0.492

Sourced from statistical analysis of homogeneity tests that have been tried using the Levene Test. The calculation results obtained significance values $0,492 \geq 0,05$. This means that the information group has homogeneous variants. Thus the population has similar variants or homogeneity.

2. Hypothesis test results

Testing the research hypothesis is tried to be sourced on the results of information analysis and interpretation of ANOVA 2-way analysis. The sequence of hypothesis testing results that are adjusted to the hypothesis formulated earlier, is as follows.

a. Hypothesizes the difference in influence between side-to-side box shuffle and box jump exercises on increased limb power

The initial hypothesis reads, "There is a significant difference in influence between plyometric side-to-side box shuffle and box jump exercises on the increase in limb power in wrestling athletes". Sourced from the results of the analysis obtained information in Table 3 is as follows.

Table 3. ANOVA Test Results between Side-to-side box shuffle exercises and Box jumps against Limb Power Enhancement

Source	Type III Sum of squares	Df	Mean Square	F	Sig.
Training Group	353.556	1	353.556	4.854	0.043

From the results of the ANOVA Test Table 3 above can be seen that the significance value p is 0,043 and the value of F is 4,854. Because the significance value p of $0.043 < 0.05$, means H_0 is rejected. Thus there is a significant comparison of influences. Sourced from the results of the analysis the group exercises a side-to-side box shuffle of 95,71 is bigger (good) than the box jump training group of 87,30 with a post-test average margin of 8.41. This means that the research hypothesis, which reports that, "There is a significant difference in influence between plyometric side-to-side box shuffle and box jump exercises on the increase in power limbs in wrestling athletes", has been tested.

b. The hypothesis of the difference in influence between athletes who have high and low leg muscle strength against increased limb power

The second hypothesis reads, "There is a significant difference in influence between athletes who have high and low leg muscle strength on the increase in leg power in wrestling athletes". The results of the calculation are presented in Table 4 as follows.

Table 4. ANOVA Test Results in Difference Between Athletes Who Have High and Low Leg Muscle Strength against Increased Limb Power

Source	Type III Sum of squares	Df	Mean Square	F	Sig.
Leg Muscle Strength	1510.496	1	1510.496	20.74	0.000

From the results of the ANOVA test in Table 4 above, it can be seen that the significance value p is 0,000 and the value of F is 20,74. Because the significance value p of $0.000 < 0.05$, means H_0 is rejected. Being told about this means there is a significant difference in influence. Sourced from the results of the analysis in fact athletes who have a large leg muscle strength of 100,20 is greater (good) than athletes who have low leg muscle strength of 82,82, with a post-test average margin of 17.38. This means that the research hypothesis, which reports that, "There is a significant difference in influence between athletes who have high and low leg muscle strength on the increase in leg power in wrestling athletes", has been tested.

c. Interaction between plyometric exercises (side-to-side box shuffle and box jump) and leg muscle strength (high and low) to increase limb power

There is a significant interaction between plyometric exercises (side-to-side box shuffle and box jump) and leg muscle strength (high and low) to the increase in leg power in wrestling athletes. The results of the calculation are presented in Table 14 as follows.

Table 5. ANOVA Test Results Interaction between Plyometric Exercises (side-to-side box shuffle and box jump) and Leg Muscle Strength (High and Low) to Increased Limb Power

Source	Type III Sum of squares	Df	Mean Square	F	Sig.
Exercise Method*Leg strength	3045.759	1	3045.759	41.819	0.000

From the results of the ANOVA test in Table 5 above can be seen that the significance value of p is 0,000 and the value of F is 41. 819. Because the significance value p is $0,000 < 0,05$, it means H_0 is rejected. "There is a significant interaction between side-to-side box shuffle and box jump" muscle strength and large and low leg strength to increase leg power in wrestling athletes, have been tested.

After it was proven that there was an interaction between plyometric exercises (side-to-side box shuffle and box jump) and leg muscle strength (large and low) against the increase in leg power in wrestling athletes, it needs to be tried further tests using the Tukey test. The results of the further tests can be seen in Table 6 below:

Table 6. Post Hoc Test Summary

Group	Interaction	Mean Difference	Std.Error	Sig.
	A1B2	-5.7810	3.63920	0.398
A1B1	A2B1	-13.1680*	3.63920	0.005
	A2B2	25.6860*	3.63920	0.000
	A1B1	5.7810	3.63920	0.398
A1B2	A2B1	-7.3870	3.63920	0.196
	A2B2	31.4670*	3.63920	0.000
	A1B1	13.1680*	3.63920	0.005
A2B1	A1B2	7.3870	3.63920	0.196
	A1B2	38.8540*	3.63920	0.000
	A1B1	-25.6860*	3.63920	0.000
A2B2	A1B2	-31.4670*	3.63920	0.000
	A2B1	-38.8540*	3.63920	0.000

Sourced in Table 6 the results of Tukey test calculations on the characteristics of an asterisk(*) show that couples who have interactions or partners that are significantly different are: (1) A2B1- A2B2,(2) A2B2,(3) A2B1- A1B2,(4) A1B1- A1B2,(5) A2B1, instead the other spouses are declared not to have a comparison of influences. 1) A1B2- A1B1,(2) A2B1- A1B2.

Discussion

Reviews of the results of this research share further understanding override the results of the analysis of information that has been submitted. Sourced from hypothesis testing creates 3 groups of analytical conclusions: 1) There is a meaningful comparison of influences between the main factors of the research; 2) Comparison of influence between athletes who have the large and low leg muscle strength to the increase in leg power in wrestling athletes; 3) There is a meaningful interaction between the main factors in the form of 2-aspect interaction. Reviews of the results of the analysis can be further explained as follows.

1. The difference in influence between plyometric exercise side-to-side box shuffle and box jump on increased power limbs in wrestling athletes.

The hypothesis test is known that there is a significant ratio of influences between plyometric side-to-side exercise and box jump on the increase in limb power in wrestling athletes. The side-to-side box shuffle exercise group was larger (good) than the box jump training group against the increase in power limbs. In contrast to biomechanical analysis, side-to-side box shuffle movements associate with more muscle groups in the basic limbs than box jump movements. Side-to-side box shuffle movements dole more weight to the hip muscles, legs, and back of the base, as well as hooking the muscles that balance the knees and ankles. This discovery is supported by some the previous research (Shallaby, 2010; Singh et al., 2015). One-foot jump progressions are more efficient than double-leg jump progressions. This discovery does not change with some facts (Makaruk et al., 2011). Side-to-side box shuffle exercises are more efficient to increase leg muscle power (Patra & Dinata, 2020). Recent findings support the hypothesis that single-leg jumping and double-leg jumps using boxes can increase the speed and explosive energy of leg muscles (Kusnanik & Isnaini, 2015). Bompa & Buzzichelli, (2019) commented that the side-to-side box shuffle exercise that was run for 6 weeks with details of exercise 3 times in 1 week in a disciplined manner and in line with the exercise program that has been prepared until this exercise will greatly help significantly increase the strength of the limb muscles needed in various special sports sports.

Side-to-side box shuffle training shares a meaningful increase in the explosive energy of the limb muscles (Hamonangan & Wellis, 2020). Plyometric exercises side-to-side box shuffle increase the muscles of the legs and hips special muscles gluteals, gastrocnemius, bicep femoris, gluteus, Brevis soleus, extensor digitorum, and vastus lateralis at great speed and full of energy (Al Hafidz et al., 2020). This exercise requires more weight for the hip muscles, legs, and back of the base, as well as hooking the muscles that balance the knees and ankles. This is intertwined because its application only uses one leg where the load in training is only supported by one leg only on the box while jumping to the side instead the other leg is located on the floor while

exploring the flow of jump movements, so it also takes the position of the knee and ankle balance muscles to protect the balancer during training.

Plyometric is a training method used by athletes that can be observed and plyometric training can also be tried on all types of exercise to increase strength, energy, and efficient explosives for children and young people (Abd & Elsayed, 2012; Genç & Dağlıoğlu, 2021). Behm et al., (2017) reported that by adjusting to plyometric training, the neuromuscular system is conditioned to react more rapidly to the stretch-shortening cycle (SSC). Muscle contraction is very sturdy which is a reaction of dynamic loading or lightning stretch from the muscles participating. The impact caused by muscle hypertrophy is to cause the formation of increased leg muscle strength (Nasrulloh et al., 2020). This statement is reinforced by research results from (Prasetyo & Nasrulloh, 2017) which reported the formation of increased muscle strength. Not only the increase in the strength of the leg muscles, but the speed of the leg muscles will also increase with the number of jumping movements that are tried lightning and repeatedly. Trapping circuit training with 80% intensity at 1: ½ interval, with changes in strength increasing by 43.78%, speed increasing by 31.42% and agility increasing by 9.66.% (Nugroho et al., 2021). So the increase in muscle strength and speed of the leg muscles directly wants to affect the increase in energy of the limb muscles. This is based on two meaningful factors contained in explosive energy, namely muscle strength, and muscle speed.

2. The difference in influence between athletes who have high and low leg muscle strength against the increase in leg power in wrestling athletes.

The results of the analysis showed that there was a significant influence comparison between athletes who have high and low leg muscle strength to the increase in leg power in wrestling athletes. Athletes who have high leg muscle strength are higher (good) than athletes who have low leg muscle strength against the increase in leg power.

Athletes who have high leg muscle strength are better than low leg muscle strength against leg power. Power can be affected by 2 components, namely strength, and speed, either the speed of nerve stimulation or the speed of muscle contraction. The explosive energy of the muscles produced by the power of the limb muscles affects the transfer of horizontal to vertical momentum. This is to be influenced by the thrust energy generated from the change in momentum because the jumping feature is a precision movement that must be tried by concentrating muscle explosive energy. Explosive energy is the result of the 2 components of the state of the body, the strength and speed formulated; $Power = Force \text{ (strength)} \times Velocity \text{ (speed)}$. From the formula, it can be concluded that the explosive energy is not separated from the problem of strength and speed so that under the main aspects of explosive energy are strength and speed until all aspects that affect the two components of the body state above want to affect the explosive energy (Widiastuti, 2015). Strength is a very meaningful component to improve the state of the body in totality (Harsono, 2015). This is due to (1) strength is the driving energy of each physical activity; (2) force plays a meaningful role in protecting athletes/persons from possible injury, and (3) strength can support the skills of the physical condition more effectively. Although many sports activities require more agility, flexibility or flexibility, speed, explosive energy, and so on, these factors are always combined with aspects of strength to get good results.

3. The interaction between plyometric exercises (side-to-side box shuffle and box jump) and leg muscle strength (high and low) to increase leg power in wrestling athletes.

Based on the results that have been presented in the results of this study if there is a significant interaction between plyometric exercises (side-to-side box shuffle and box jump) and leg muscle strength (high and low) to the increase in leg power in wrestling athletes. The results of the research showed that the procedure of side-to-side box shuffle training is a more efficient procedure used for athletes who have the low leg muscle strength and jump box training is more efficiently used for athletes who have high leg muscle strength. This is due to side-to-side box shuffle exercises when the action nervous system and nervous system response work until the muscles also contract very firmly and lightning to create good speed and in conclusion, the muscles are adapted to be trained optimally.

Conclusions

Sourced from the results of research and the results of analysis of information that has been tried, the following conclusions are obtained. 1) There is a significant difference in influence between plyometric side-to-side box shuffle exercises and box jump on the increase in leg power in wrestling athletes. The side-to-side box shuffle exercise group was higher (good) than the box jump training group against the increase in leg power. 2) There is a significant influence comparison between athletes who have the high and low leg muscle strength to the increase in leg power in wrestling athletes. Athletes who have high leg muscle strength are higher (good) than athletes who have low leg muscle strength against the increase in leg power. 3) There is a significant interaction between plyometric exercises (side-to-side box shuffle and box jump) and leg muscle strength (high and low) to the increase in leg power in wrestling athletes. The results showed that the procedure of side-to-side box shuffle training is a more efficient procedure used for athletes who have the low leg muscle strength and box jump training is more efficiently used for athletes who have high leg muscle strength.

Acknowledgment This research article can be done well thanks to the help of various parties, therefore the researchers thanked as much as possible to the Academic Guidance Lecturer in Sports Science University.

Conflict of interest

We know of no conflicts of interest associated with this publication, and there has been no significant financial support for this work that could have influenced its outcome. As the corresponding author, I confirm that the manuscript has been read and approved for submission by all the named authors.

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