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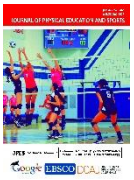

Plyometric Exercises and Concentration Levels on the Swim-Start Jump of Female Athletes in Metro Lampung

Reza Fadhlillah Aufar[1]✉ , Soegiyanto[2] & Tri Rustiadi[2]

[1] STKIP Dharma Wacana, Metro Lampung, Indonesia
[2] Universitas Negeri Semarang, Indonesia

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Abstract

This study aimed at finding out the difference in the influence of the plyometric jump to box and plyometric barrier hops training on start jump of swimming grab-start, finding out the difference in the influence between groups having high concentration level and groups having low concentration level on start jump of swimming grab-start, and analyzing interaction of plyometric training and the level of concentration on start jump of swimming grab-start. This was a kind of experimental research that used a quantitative descriptive method with a 2x2 factorial design. Additionally, it used the Statistical Product and Service Solution (SPSS) program to calculate the data. The results of the study revealed that there were differences in influence between groups using the plyometric jump to box training method with an average value of 2.623 and plyometric barrier hops training with the average value of 2.581, so that it resulted in the difference with the average value by 0.042, there were differences in influence between athletes who have a high concentration level with an average value of 2.629 and athletes who have a low concentration level with an average value of 2.575, so that it resulted in the difference with the average value by 0.054, and there was the interaction between groups using plyometric training method and concentration levels on start jump of swimming grab-start.

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✉ Correspondence address:
Soekarno Hatta, Mulyojati, Metro Barat,
Kota Metro, Lampung 34121
E-mail: rezafadh95@gmail.com

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INTRODUCTION

The swimming race starts with a start. The start movement in the butterfly stroke, breaststroke, and crawl stroke have the same technique using top start by bending the body and bending both knees, except for the backstroke which its start technique is from the pool/bottom start facing the wall and followed by both arms hold handlebar or start beam. In participating in the championship, swimmers are not enough by only having the ability to do good swimming movements, but also must be able to start, turn around, and finish properly. Many times found that a good swimmer becomes a loss in the race due to his improper start.

It is an advantage if swimmers have the ability in long-distance leap because the distance that should be taken in swimming can be reached by leap. Traveling time will be less if taken through the air because water has more friction force or greater resistance than air.

Swimming activity in Lampung has good advancement. It can be seen from some championships held in Lampung such as HAORNAS, Mayor Cup, GovernorCup, PORPROV, POPDA, and other championships held by swimming associations and agencies in Lampung. Additionally, the number of regions participating in the championship increases every year. The Tirta STO swimming pool, the Tejosari stadium swimming pool, and the Pahoman stadium swimming pool are the training and producing places for swimming athletes in the Metro, Lampung, ranging from the junior level to senior level of students. The role of swimming associations in Metro is very supportive as a facility for athletes from several schools and ages, so that many young prospective athletes can be released in Metro.

Swimming athletes from various regions in Lampung often participate in provincial level championships organized by swimming associations and agencies in Lampung. But there are still many weaknesses, especially for beginner athletes. It can be seen when they participated in regional championships in Bandar Lampung city. The athletes in the age group III (aged 10-12 years) when performed start jump of swimming grab-start were less optimal in the competition which influenced in athlete's achievements. This caused the athletes who did not have a glide and could not perform underwater movements and even behind other athletes before making a swimming movement.

The Tirta Kartika Metro and Fliper SC swimming clubs are part of several swimming facilities to create the athletes in Lampung which have training schedules every Monday to Saturday. The training finish in the afternoon from 3:00 p.m. to 5:30 p.m. with the coaches Mr. Jati Wiyono and Mr. Toni who have certificates in their fields. Then the researcher interviewed the coaches and athletes and found that the coaches and athletes sated the same thing called the training method on start jump of swimming grab-start which only carried out the basic technique on start jump in swimming grab-start and sometimes given the distance bar in front of the start beam, which is used as distance leap that requires the athlete to pass through the barrier bar.

Accordingly, it can be noted that the problem is it has not been known yet the influence of plyometric exercises on the start jump of swimming grab-start by coaches and athletes which causes the results on start jump of swimming grab-start bad and affect the athlete's performance. Therefore the researchers conducted a study of the start technique of swimming grab-start and the concentration level of the athletes to perform start jump of swimming grab-start using the training method of a plyometric jump to box and plyometric barrier hops. Therefore, this study was entitled "The Influence of Plyometric Exercises and Concentration Levels on the Start Jump of Swimming Grab-Start of Female Athletes in Metro, Lampung."

Swimming

Swimming is a sport that requires the best physical strength to obtain the highest achievement. One of the important physical conditions in swimming is the strength of the leg muscles. Especially in the technique of starting or

gliding, the length of the limbs and the strength of leg muscle carried out quickly is needed to get a far glide or repulsion (Anastain, 2012 in Amin, Subiyono, and Sumartiningsih, 2012). This sport is one type of water sport that is quite popular for people without any age limit because swimming is an activity that involves almost all parts of the muscle to move. It is an activity carried out by the one in the water as recreation, achievement, and economic activity.

Swimming is a popular water sport for everyone because all movements involve almost all the muscles of the body which is very beneficial for health and keeps the body fit (Susanto, 2010 in Arifin, 2014).

Supriyanto (2012) in Arifin (2014) argued that the benefits of swimming activities are to maintain and improve fitness, maintain a healthy body, for personal safety, to form physical abilities such as endurance, muscle strength and beneficial also for the development and physical growth of children, and educational, recreational, rehabilitation and achievement facilities.

Swimming activity has four styles, including butterfly stroke, backstroke, breaststroke, and crawl stroke.

Start

The start is the beginning of the race. A good and right start will contribute a lot in a race. The start is considered good and right when it produces a far glide. The glide is from the repulsion of limbs arm swing, and movement of the body. To meet high achievement, it is not enough to equip the swimmers with only the ability to do swimming movements properly, but they must perform start technique properly. If the start technique can be done well, right and fast, it will affect the movement of the glide. So that the gliding movement will cause an underwater movement that supports swimming activity.

Grab Start

Grab means gripping. This kind of start is widely used by international swimmers and introduced in 1972 by Mark Spotz (David Haller, in Pramono, 2014). Grab Start is one of the starting techniques in swimming used in the butterfly stroke, breaststroke, and crawl stroke with the foot position is parallel to the end of the start beam. Some objectives to achieve during grab start are: the athlete must react quickly and move the weight forward after the start, the body and legs must be positioned properly so that the maximum strength can be applied when the foot refuses from the start beam.

Figure 1. Swim Start Grab Start

Physical Condition

Physical condition in sports is defined as "the performance capacity of a sportsman" (Nossek, 1982 in Lufisanto, 2014). That is the ability of an athlete to carry out sports activities. This physical condition in the sports achievement environment is also known as "physical fitness." It plays a very substantial role in achieving top results. If the physical condition is not good, the results will not be excellent. Conversely, if the physical condition is good, then the results will be excellent. These conditions can be seen before (initial ability), during and after having a training process.

Power

The power of leg muscles is the power to use maximum strength within a very short space of time. Bintoro Teguh Yuwono (2015) in Sardiman, Hidayah, and Soekardi (2017) stated that the power of leg muscles is one of the elements forming the explosive power of the leg muscles. It is one of the physical components that athletes must have in which they must exert power explosively in the shortest possible time (Yoda, 2006 in Mertayasa, Rahayu, and Soenyoto, 2016).

Plyometric

Plyometrics derived from the Greek "plio" and "metric," each of which means "more" and "size." Plyometrics refers to exercises characterized by strong muscle contractions in response to fast and dynamic burden or stretching of the muscles involved (Furqon and Doewes, 2002 in Adhi, Sugiharto, and Soenyoto, 2017). Plyometric is a form of high-intensity exercise, aiming at increasing strength and speed towards forming power in athletes (Shava, Kusuma, and Rustiadi, 2017). It can also be interpreted as a training method to develop or increase explosive power, which is an important component of most sports achievements or performance. Plyometric movement refers to exercises characterized by muscle contraction in response to the fast and dynamic burden.

Jump To Box

Jump to box is a type of exercise found in plyometrics that is an exercise aimed to increase the power of the legs. Chu (1992) in Gumilar Zakaria, and Mudian (2018) stated that jump to box training is an exercise of jumping on a box and then jumping back and forth backward like the initial attitude using both legs together.

Figure 2. Plyometric Jump to Box

Barrier Hops

Barrier hops are one of the plyometric training methods and a kind of hopping exercise. Hooping is a plyometric training that increases the explosive power of the leg muscles. Barrier hops exercise trains power in which power is a combination of two elements of speed and strength. Barrier hops exercise is exercises carried out on the goals or barriers having a height approximately 80% of the average length of the sample legs with the distance between the goal of 1 meter determined by the ability of the sample to perform a maximum jumping sequence. A. Chu (1992) in Adzkar, Saichudin, and Hariyanto (2015) states that barrier hops exercise is an exercise carried out in a quick jumping sequence.

Figure 3. Plyometric Barrier Hops

Concentration

Cox (2002) in Supriyanto (2012) pinpointed concentration is the athletes' ability to focus on relevant information during the competition. This opinion is in line with Dalloway (1993) in Supriyanto (2012) which commented that concentration is needed to meet optimal achievement which is not only in shooting, archery, golf, tennis, swimming but also in almost all sports, including team sports. Factors that influence concentration include age, gender, experience, and knowledge. The age factor influences concentration ability because the ability to concentrate also develops according to the age of the individual. Similarly, in sports, the athletes' concentration can be increased in line with their age.

METHODS

This experimental study used a quantitative descriptive method with a 2x2 factorial design. Then, the Statistical Product and Service Solution (SPSS) program were used to calculate the data. The population in this study consisted of 24 female athletes in the age group III (aged 10-12 years) in Metro, Lampung. The

total sample of 20 female athletes in the age group III (ages 10-12 years) was selected based using a purposive sampling technique with the category of high concentration levels and low concentration levels. This study had two independent variables that consisted of plyometric exercises and concentration levels, and one dependent variable namely starts jump of swimming grab-start.

This study used a grid concentration exercise test as an instrument to calculate the concentration level of athletes and used the start jump of swimming grab-start test to find the result of the distance of the jump start of swimming grab-start.

RESULTS AND DISCUSSION

Based on the results in table 1, the F_{value} for the training method was 16,720, the F_{value} for concentration was 27,640, and the F_{value} for the training method and concentration was 5,460.

Table 1. The Result of a Two-Way ANOVA Test

Source	Type III sum of squares	df	Mean square	F	Sig.
Method_Exercise	.009	1	.009	16.720	.001
Concentration	.015	1	.015	27.640	.000
Method_Exercise * Concentration	.003	1	.003	5.460	.033

a. R squared = .137 (Adjusted R squared = -.025)

There is a difference in influence between groups using the plyometrics jump to box training method and the practice of plyometrics barrier hoops.

The results of SPSS analysis showed that F_{value} = 16,720 while F_{table} was at the 0.05 significance level of 3.59, which meant F_{value} was higher than F_{table} ($F_{value} > F_{table}$). Therefore, the research revealed the data obtained from the analysis of the plyometric jump to box training method group with an average value of 2.623, and the plyometric barrier hops training method with an average value of 2.581. Thus it can be concluded that the hypothesis stating that there is a different influence between groups using the plyometrics jump to box training method and plyometrics barrier hoops exercise is (H_a) accepted.

The SPSS analysis revealed that the result analysis of plyometric jump to box training method group with an average value of 2.623 and the plyometric barrier hops exercise method with an average value of 2.581 indicated that the group using the plyometric jump to box training method was better than the group using plyometric barrier hops for female swimming athletes in the age group III (aged 10-12 years) in Metro. This was proven by considering the average of start jump of swimming grab-start using the plyometric jump to a box, and plyometric barrier hops training methods that had a significant difference of 0.042.

There is a difference in influence between athletes who have high concentration levels and low concentration levels towards the jump start of swimming grab-start.

The analysis results of SPSS showed that F_{value} was 27,640 while F_{table} at the 0.05 significance level was 3.59, which means F_{value} was higher than F_{table} ($F_{value} > F_{table}$). It was found that the athletes having a high concentration level had an average value of 2.629, and athletes having a low concentration level had an average value of 2.575. Thus, it can be concluded that the hypothesis stating there is a difference in influence between athletes who have a high concentration level and athletes who have a low concentration level (H_a) is accepted.

The results of SPSS analysis showed the data of result analysis of athletes who had high concentrations with an average value of 2.629 and athletes who had low concentrations with an average value of 2.575 indicated that the groups that have high concentration levels were better than groups that had low concentration levels in female swimming athletes in the age group III (aged 10-12 years) in Metro. This was proven by considering the average concentration level test that has a high concentration level and a low concentration level with a significant difference of 0.054.

There is the interaction between groups using the plyometrics jump to box training method, and plyometrics barrier hops training

and the concentration level for the jump start of swimming grab-start.

The results of SPSS analysis showed that F_{value} was 5.460 while F_{table} at the 0.05 significance level was 3.59, which means that F_{value} was higher than F_{table} ($F_{value} > F_{table}$). Thus, it can be concluded that the hypothesis stating that there is the interaction between groups using the plyometrics jump to box training method and plyometrics barrier hops training and the concentration level of the jump start of swimming grab-start (H_a) is accepted.

After conducting research and calculating the data, it revealed that there is the interaction between the plyometric training method and the concentration level on the start jump of the swimming grab-start. The samples that have a high concentration level using the plyometric jump to box training method are better than the samples that have a high concentration level using the barrier hops training method. While samples that have a low concentration level using the plyometric jump to box training method are better than the samples that have a low concentration level using the plyometric barrier hops training method.

CONCLUSION

Based on the hypothesis analysis result, the conclusions of this research are: (1) there is the difference in the effect of the plyometric jump to box and plyometric barrier hops training method on the jump start of swimming grab-start results in female athletes in age group III in Metro, (2) there is the influence between athletes who have a high concentration level and athletes who have a low concentration level towards the jump start of swimming grab-start results in female athletes in the age group III Metro, (3) there is the influence of interaction between the plyometric training method and the concentration level on start jump of swimming grab-start in female athletes in the age group III in Metro.

REFERENCES

Adhi, B. P., Sugiharto, & Soenyoto, T. (2017). Pengaruh metode latihan dan kekuatan otot tungkai terhadap power otot tungkai. *Journal of Physical Education and Sports*, *6*(1), 7-13. Retrieved from https://journal.unnes.ac.id/sju/index.php/jpes/article/view/17315

Adzkar, R. Z., Saichudin, & Hariyanto, E. (2015). Pengaruh latihan plyometric (barrier hops) terhadap tinggi lompatan pemain bola basket tim putra smkn 12 malang. *Jurnal Kajian Ilmu Keolahragaan*, *4*(3), 179-183. Retrieved from http://journal.um.ac.id/index.php/sport-science/article/view/4926

Amin, N., Subiyono, H. S., & Sumartiningsih. (2012). Sumbangan power otot tungkai panjang tungkai kekuatan otot perut terhadap grab start. *Journal of Sport Sciences and Fitness, 1*(2). Retrieved from https://journal.unnes.ac.id/sju/index.php/jssf/article/view/1527

Arifin, B. (2014). Analisis gerak track start untuk memaksimalkan jarak lompatan start pada renang ditinjau dari kajian biomekanika (studi pada atlet renang sc eagle surabaya). *Jurnal Kesehatan Olahraga, 2*(1). Retrieved from https://jurnalmahasiswa.unesa.ac.id/index.php/jurnal-kesehatan-olahraga/article/view/6668

Lufisanto, M. S. (2014). Analisis kondisi fisik yang memberi kontribusi terhadap tendangan jarak jauh pada pemain sepakbola. *Jurnal Kesehatan Olahraga, 3*(1), 50-56. Retrieved from https://jurnalmahasiswa.unesa.ac.id/index.php/jurnal-kesehatan-olahraga/article/view/11163

Mertayasa, K., Rahayu, S., & Soenyoto, T. (2017). Metode latihan plyometrics dan kelentukan untuk meningkatkan power otot tungkai dan hasil lay up shoot bola basket. *Journal of Physical Education and Sports*, *5*(1), 24-31. Retrieved from https://journal.unnes.ac.id/sju/index.php/jpes/article/view/13275

Pramono, D. B. (2014). Perbandingan jarak lompatan antara grab start dan track start pada cabang olahraga renang (atlet renang sc eagle surabaya). *Jurnal Kesehatan Olahraga*, 2(1), 28-36. Retrieved from

https://jurnalmahasiswa.unesa.ac.id/index.php/jurnal-kesehatan-olahraga/article/view/6365

Sardiman, Hidayah, T., & Soekardi. (2018). Pengaruh latihan plyometric dan panjang tungkai terhadap peningkatan power lompatan dan smash kedeng sepak takraw. *Journal of Physical Education and Sports*, *6*(3), 286-290. Retrieved from https://journal.unnes.ac.id/sju/index.php/jpes/article/view/15098

Shava, I., Kusuma, D. W. Y., & Rustiadi, T. (2018). Latihan Plyometrics dan Panjang Tungkai terhadap Kecepatan Renang Gaya Dada Atlet Renang Sumatera Selatan. *Journal of Physical Education and Sports*, *6*(3), 266-271. Retrieved from https://journal.unnes.ac.id/sju/index.php/jpes/article/view/15056

Supriyanto, A. (2012). Penggunaan metode hypnotherapi untuk meningkatkan konsentrasi saat start dalam renang. *Jurnal Olahraga Prestasi*, *8*(2). Retrieved from https://journal.uny.ac.id/index.php/jorpres/article/view/10290

Zakaria, G., & Mudian, D. (2018). Pengaruh latihan plyometrics jump to box terhadap peningkatan power tungkai siswa kelas x pada permainan bola voli. *Biormatika: Jurnal Ilmiah Fakultas Keguruan dan Ilmu Pendidikan*, *4*(1). Retrieved from http://ejournal.unsub.ac.id/index.php/FKIP/article/view/211