The effect of shadow training using consecutive steps and cross steps on the agility of the footwork of badminton athletes

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Abstract: This study aims to determine the effect of sequential and crossed step shadow exercises, as well as the differences between the two on improving footwork agility badminton athlete PB Wiratama Jaya Yogyakarta. This research is a quasi-experimental study, with a two group pre-test post-test design. The sample in this study amounted to 22 male athletes. The instrument in this study used a series of foot exercises proposed by Tohar. Data analysis techniques on hypothesis testing using the t test. The results showed: first, there was an effect of sequential step shadow training on the agility of the athlete's footwork PB Wiratama Jaya Yogyakarta with a t value of -4.5 and a calculated significance of 0.001. Second, there is an effect of cross-step shadow training on the agility of the athlete's PB Wiratama Jaya Yogyakarta footwork with a t value of -4.667 and a calculated significance of 0.001. and third, there is no significant difference between sequential step shadow training and cross step shadow training in increasing the agility of the footwork athlete PB Wiratama Jaya Yogyakarta. This is based on data obtained from the t value of -1.353 with a significance of 0.191.
Keywords: Footwork, Sequential Step Shadow, Cross Step Shadow, Agility

PRELIMINARY

Badminton is one of the most popular sports in Indonesia. This is because badminton is a sport of achievement. Badminton sports achievements can be carried out through a gradual and continuous development and development program supported by sports science and technology (IPTEK), human resources (HR), and natural resources (SDA) optimally.

The development of badminton in Indonesia is supported by the number of training camps by the Indonesian Badminton Association (PBSI) Branch Managers in every City and Regency. Schools or badminton clubs are one of the places to develop young athletes whose existence is very important to create young players. Badminton athlete coaching should be done in stages, both in schools, clubs, and training camps in order to achieve maximum performance. Training targets and training programs are packaged in stages according to the athlete's ability, which is important so that the results of a training process can be achieved properly. The coaching program within a certain period of time is a combination of training processes that are systematically designed, tiered, continuous, repeated and increasingly improved to be able to achieve peak performance (Zhannisa & Sugiyanto, 2015).

Exercise is a systematic activity process, (Sukadiyanto, 2011). Systematic is a training process that is carried out in an orderly, planned manner, using certain patterns and systems, continuous from simple to complex, from easy to difficults, (Irianto, 2002). The goals and objectives of training are to improve physical quality in general, develop specific physical potential, add and perfect techniques and strategies, and improve the quality and psychological abilities of athletes in competition. As for the important components of training, among others; (1) volume measure of exercise quantity, (2) duration of exercise time, (3) repetitions of the number of repetitions in one exercise item, (4) the set number of repetitions of one exercise item, (5) the series of the number of sets in the exercise item, (6)) intensity

measures of quality include percentage (%), (7) density measures of the degree of exercise density, (8) complexity of training variations, (Irianto, 2002).

There are four aspects of training that must be carefully considered and practiced, namely, physical training, technical training, tactical training and mental training, (Harsono, 1988). Therefore, these four aspects must be practiced carefully in order to achieve maximum performance. The use of technology, variations in exercises, changes in the efficiency and effectiveness of an exercise relies on the training model given. In implementing a more precise and accurate training program, sports technology assistance is needed for coaches and athletes (Septadinus & Novselia, 2019). However, this is very unfortunate because early childhood coaching is still not able to be fully utilized. This fact occurs because the training model is less effective and efficient. The components of the physical condition in badminton are endurance, leg muscle explosiveness, and agility (Zhannisa et al., 2018). Physical condition is the basic foundation for undergoing the training process in achieving an achievement(Festiawan et al., 2020). The Agility factor is one of the important biomotor components in badminton (Al Farisi, 2018). The increase in speed, agility and jumping height of badminton players is influenced by footwork training (Fawzi & Jayadi, 2018).

Agility is a person's ability to change direction quickly and precisely without losing balance. Agility is a combination of speed, agility, reaction speed, balance, flexibility and neuromuscular coordination, (Kardjono, 2008). Agility in badminton can be seen when chasing shuttlecocks, forward right and left movements, right and left side movements, right and left backward movements that require very fast and accurate movements without reducing body balance. The agile movements of the badminton players need to be trained in the right and appropriate methods in order to increase the athlete's agility properly. As well as applying the principles of training in accordance with badminton. One of the exercises to increase agility is shadow badminton.

The shadow badminton exercise is one of the simplest exercises to do but this exercise is not maximal in its implementation. One of them is in the footwork technique. In general, the steps are divided into three step techniques, namely, consecutive steps, both for steps forward, sideways or behind the right and left feet moving sequentially or side by side, alternating steps or crossing (such as running or walking), right and left feet. taking turns, and a wide stride with a jump, one or two small steps and ending with a wide stride with a jump (Muhajir, 2004). One of the models of footwork training is shadow badminton training. Shadow badminton is in the form of picking up and placing the shuttlecock on the edges of the badminton court, and moving to imitate the shadow movements of the six corners of the field (Purnama, 2010). In addition to training speed and agility, they also train mastery of the field and train coordination of movements so that they can maintain balance when there are difficult balls during play.

The automation of sequential steps and cross steps is obtained from the results of the footwork exercise. Footwork is the ability of the feet to support the body to move in all directions quickly, so that it can position the body in such a way as to make effective hitting movements (Purnama, 2010). Someonehaving good footwork will easily change direction at a different position, but still lack of attention to footwork techniques during shadow exercises. The training program should combine exercises using cross-step, consecutive, or step jumping techniques.

Kuntze, Mansfield, & Sellers, (2010) conducted a study comparing three badminton footwork techniques and found that the step-in lunge was beneficial for reducing long muscle recovery demands. (Lin et al., 2015) conducted a study comparing three and two steps forward for badminton where the results showed that the movement time with three steps forward was significantly faster than two steps forward in badminton. (Subarjah & Hidayat, 2007) explaining to train leg movements can be done in several ways, namely by taking the shuttlecock in a certain position and making a movement / stepping in a certain direction which is called a shadow or shadow movement. Shadow badminton is an exercise that is done by imagining being in a game. In badminton there are six target footwork areas, namely (1) movement to the left of the face, (2) movement to the right of the face, (3) movement to the left side, (4) movement to the right side, (5) movement to the right and back , and (6) movement to the left and back, (Poole, 2013).

The problems that occur in the field at this time apart from the lack of technical attention in determining the goal of shadow training, speed is a factor that is always a concern when doing these exercises, and without paying attention to footwork. Footwork is fundamental to producing a quality

shot when done in good position. A player to be able to hit in a good position, the player must have movement speed (Abdillah & Lismadiana, 2018). A combination of footwork training models in increasing the agility of badminton players by following training principles from easy to difficult, from simple to complex (Subarkah & Novitaria, 2018). The results of the analysis required that the various methods of footwork training by adjusting the characteristics of the athletes to make training more enjoyable and increase the enthusiasm of athletes in footwork training. Footwork training with fun playing methods can improve badminton footwork for children aged 6-12, (Suharto, 2019).

PB Wiratama Jaya in applying the shadow badminton training model is less varied. The ability results from training are still varied and not maximal, especially in the agility of the legs. Based on the problems described, this study aims to determine the effect of shadow training using consecutive steps and cross-step shadow on the agility of footwork in children aged 10-12 years at PB Wiratama Jaya, and to find out whether there are differences in the results of the two exercises and if there are differences in the training. shadow technique which step results in better foot agility.

METHOD

This research is an experimental research. Experimental research is research that is carried out strictly to determine the cause and effect between variables, (Maksum, 2012). In this experimental research, including quasi-experimental. The research design used in this study was Two Groups Pre-test Post-test Design ", the research contained pre-test and post-test. Because in this study there are two experimental groups, the "Two Groups Pre-test Post-test Design" is a research design that can produce differences in the effect of consecutive steps and cross steps on footwork agility.

This research was conducted in PB. Wiratama Jaya Yogyakarta, which is located in two training sites, namely GOR SMA 1 Kasihan Bantul and GOR Bantul. The treatment time was carried out 16 meetings with training frequency 3 times a week, namely on Monday, Friday, and Saturday.

The population used in this study were PB athletes. Wiratama Jaya Yogyakarta, amounting to 34 athletes. From this population, a sample of 22 athletes was obtained which were obtained from a sampling technique using purposive sampling.

The sample in this study was a sample of 22 athletes with the following criteria: 1) athletes who are actively training in PB. Wiratama Jaya Yogyakarta. 2) the players are male athletes, 3) aged 10-12 years, and 4) have participated in training for at least 6 months. Then all samples obtained from the purposive sampling technique were subjected to a pre-test. Then the sample is divided into two by dividing the groups using ordinal pairing with each group totaling 11 athletes. Previousthe whole sample did*pre-test*Initial test with a 30-second 6-corner leg circuit test to define groups. The pre-test results are ranked and ordered from the highest to the lowest. Then paired with the ABBA pattern, in which group A was given sequential step technique treatment in shadow training, while group B was treated with the cross-step technique in shadow training. the treatment time was given as many as 16 meetings described by(Soegiardo, 1991) the training process for 16 times can be said to be trained, because it will show an increase who settled down. Furthermore, the post-test final test with a series testWork 6 corners for 30 seconds.

Collecting data in this study using measurement tests. The test instrument used for the initial (pre-test) and final (post-test) measurements uses a series of foot exercises with a validity value of 0.706 and a reliability of 0.808, (Tohar, 1992). This footwork series test is held to measure the agility of footwork by stepping forward right left, right side left, and right back left of the badminton court. The data collected in this study is pre-test data obtained from the number of athletes' ability to perform a series of footwork tests for 30 seconds, while the post-test will be obtained from the number of athletes carrying out a series of footwork tests for 30 seconds after the sample is treated using the method. the sequential step shadow exercise and the crossed step shadow exercise.

The data analysis technique used the t test. The data analyzed were the test data on a series of foot exercises, both pre and post test. Analysis using parametric statistics with the help of SPSS 16. Ujiprerequisite includes normality test and homogeneity test. The normality test aims to ensure normal data or not using testing *kolmogrof-smirnov.* To find out whether the data is normal or not, the data distribution of each variable can be seen from the significant value, if the calculated significance value> 0.05, the data is declared to be normally distributed. However, if the calculated significance value <0.05 thenthe data is declared not normally distributed.

The second prerequisite test is a homogeneity test which aims to ensure that the variants of each group are the same or similar. The terms of the homogeneity test are the same as the normality test, that is, if the significant level is> 0.05 then the datadeclared homogeneous. Conversely, if the significant level <0.05, the data is declared not homogeneous. In this study, researchers used the Levene Statistic analysis technique using SPSS 16.

The first and second hypotheses aim to determine the effect of sequential step shadow training and cross-sectional shadow training on the agility of athlete's footwork. PB. Wiratama Jaya Yogyakarta, it is necessary to analyze using paired sample t test or independent t test with a significant level of 5%, namely by comparing the pre-test and post-test results with each group. If it is found that it is significant <than 0,05 then Ho is rejected and Ha is accepted, which means that there is a significant effect. The third hypothesis in this study aims to determine whetherThere is a difference or not between the sequential step shadow exercise and the cross step shadow exercise to the agility of the footwork. Furthermore, the data obtained were analyzed using the independent sample t test with a significant level of 5%, namely by comparing the gain data on the increase in agility of the group that was given sequential step shadow training and cross-step shadow training, the data was sought for the difference between the pre-test and post-test each group. The independent t test in this study used SPSS 16. If it was found that it was significant <than 0.05, then Ho was rejected and Ha was accepted, which means that there is a difference and there is one that is more effective.

RESULTS AND DISCUSSION

Result

The results of the study can be seen in Table 1, the results of the increase in sequential step groups, cross-step groups, statistical analysis of the results of the data and the average results for each group.

Table 1. Data on Consecutive Step Shadow Group Improvement Results

No.	*Pre-Test*	*Post-Test*	**Enhancement**
1	12	13	1
2	13	13	0
3	12	14	2
4	11	12	1
5	12	13	1
6	14	15	1
7	13	14	1
8	10	11	1
9	11	11	0
10	10	10	0
11	12	13	1
Mean	11,8182	12,6364	0.8182

Based on the statistical analysis data in Table 1, it can be seen that the sequential step shadow group has an average pre-test of 11.8182, an average post-test result of 12.6364, and an average increase from pre-test to post-test. the six-corner leg circuit test is 0.8182.

Table 2. Research Data of Cross Step Shadow Group

No.	*Pre-Test*	*Post-Test*	Enhancement
1	11	13	2
2	10	10	0
3	12	15	3
4	12	12	0
5	12	13	1
6	14	15	1
7	13	14	1
8	14	15	1

9	11	13	2
10	13	14	1
11	10	12	2
Mean	12	13,2727	1.2727

Based on the statistical analysis data in Table 2, it can be seen that in the shadow group the crossed steps have an average pre-test of 12, an average post-test result of 13.2727, and an average increase of pre-test and post-test series. if the six corners are 1.2727.

Table 3. Normality Test Results

Group	Kolmogrov-Smirnov		Ket
	Sig. Count	Sig. 5%	
Pre-test Shadow Sequential Steps	0.200	0.05	Normal
Post-test Shadow Sequential Steps	0.100	0.05	Normal
Pre-test Shadow Cross Steps	0.200	0.05	Normal
Post-test shadow Cross Steps	0.200	0.05	Normal

From the results of normality testing using Kolmogrov-Smirnov which was carried out with the help of SPSS 16, it was stated that the test data of the pre-test results of the agility series of six-corner foot exercises in badminton athletes PB. Wiratama Jaya Yogyakarta, the sequential step shadow group has a calculated significance of 0.200, and the post-test data has a calculated significance of 0.100. For pre-test data, the cross-step shadow group has a calculated significance of 0.200, and the post-test data has a calculated significance of 0.200. From all of these data, all of them have a calculated significance greater than 0.05, which is the tolerance limit for the Kolmogrov-Smirnov normality test at the 5% significance level with the help of the SPSS 16 program. So that all samples in this study were normally distributed.

Homogeneity Test

The homogeneity test in this study used the Levene's test with a significant level of 5% with the help of the SPSS 16 program. If the significance level is greater than 0.05, the data for the two groups are homogeneous.

Table 4. Homogeneity Test Results

Group	Levene's statistics	Sig.
Consecutive steps	0.471	0.500
Steps crossed	0.098	0.758

The results of the homogeneity test using the levene's test which was carried out with the help of SPSS 16, stated the data on the agility test of a series of six corner foot exercises in badminton athletes PB. Wiratama Jaya Yogyakarta, it was found that the results data in the sequential shadow group had a significant levelamounting to 0.500 and the data in the cross-step shadow group has a significant level of 0.758. Both data in each group have a greater significance levelof 0.05, which is the tolerance limit for the homogeneity of the Levene's test at a significant level of 5% with the help of the SPSS 16 program. Then it is concluded that the two data groups are homogeneous.

Hypothesis Test

First and Second Hypothesis Test

The first and second hypotheses in this study were to determine the effect of sequential and cross-step shadow training on the agility of the badminton athlete's PB footwork. Wiratama Jaya Yogyakarta.

Table 5. Calculation Results Paired Sample t Test Pre-test Post-test Shadow Group Sequential and Cross Steps

Group	Paired Sample t Test			Ket
	t	Sig-hit	Sig 5%	
Pre-test Post-test shadow sequential steps	-4.5	0.001	0.05	Sig
Pre-test Post-test shadow cross steps	-4,667	0.001	0.05	Sig

Based on the results of the paired sample t test data on the pre-test and post-test results of the sequential step shadow group, it can be seen that the t value of -4.5 shows that t count <-t table which is -2.2281 with a significance count of 0.001 <0.05. Based on the results of the paired sample t test, it can be concluded that Ho1 is rejected and Ha1 is accepted or the hypothesis states that there is an effect of sequential step shadow training on the agility of the footwork of PB badminton athletes. Wiratama Jaya Yogyakarta, accepted.

Based on test data *paired sample t test* on the data of the pre-test and post-test results of the cross-step shadow group, It can be seen that the t value is -4.667, this shows that the t count <-t table is -2.2281 with a calculated significance of 0.001 <0.05. Based on the results of the paired sample t test, it can be concluded that Ho2 is rejected and Ha2 is accepted or the hypothesis states that there is an effect of cross-step shadow training on the agility of the footwork of badminton athletes PB. Wiratama Jaya Yogyakarta, accepted.

Third Hypothesis

To find out whether there is a difference between sequential step shadow training and cross step shadow exercise on the agility of PB badminton athlete footwork. Wiratama Jaya Yogyakarta.

Table 6. Calculation Results of the Independent Sample t Test

Group	Independent Sample t Test			Ket
	t	Sig-hit	Sig 5%	
Sequential step shadow gain - crossed step shadow	-1,353	0.191	0.05	Not significant

Based on the data from the independent sample t test results in Table 6, it can be seen that the test results between the increase in data experienced by the successive shadow group and the data on the increase in the cross-step shadow group have a t-calculated value of -1.353> -2.0860 and a calculated significance of 0.191,> 0.05, then Ho3 is accepted and Ha3 is rejected, so it can be concluded that the hypothesis that says, there is no significant difference between the effect of sequential step shadow training and cross-step shadow training in increasing the agility of the footwork of badminton athletes PB. Wiratama Jaya Yogyakarta, accepted.

Discussion

Exercise is a systematic activity process that is carried out regularly, planned, and continuously with a certain system. Success in the training process is very dependent on the quality of the training carried out, (Sukadiyanto, 2011). The training process is a combination of activities from several supporting factors, including the physical, technical and tactical factors of the coach, facilities, mental psychology, knowledge and experience and other factors. This process is inseparable from the training principles that are applied and carried out with the objectives and training assignments that have been determined by the trainer. The purpose of training is to improve athlete's performance in the form of fitness, skills and energy capacity. In the sport of badminton, there are several factors that are very supportive to realizing the ability to play badminton well, namely tactics, techniques and physicality.The basic badminton technique has quite complex movements (Prasetyo, Hadi & Ilham, Habibi, 2018). For skilled badminton players, it is necessary to master the basic techniques of badminton, (Yuliawan & Sugiyanto, 2014). The basic technicalities of badminton are divided into two parts, namely the technique without the ball and the technique of striking. Techniques without the ball include: ready stance, racket grip, and footwork techniques, (Budiwanto, 2013). Basic badminton game techniques include: holding a racket (grips), footwork techniques, techniques to master strokes, and techniques to master stroke patterns, (Mardiana & Purwadi, 2011). Footwork exercises provide effectiveness for improving stroke ability and other basic techniques in badminton, (Nandika et al., 2017).

The characteristics of badminton players require fast and explosive movements (Nugroho et al., 2018). Athletes need the ability to move quickly and change direction as quickly as possible without losing balance (AĞAOĞLU & Ergin, 2017). So that the physical factors of badminton athletes according to(Purnama, 2010)required to develop physical components, one of which is agility. Agility is the ability to change the direction and position of the body quickly and precisely while moving without losing balance.*Footwork* is a means of control needed in badminton so as to produce precise, fast, and agile

foot movements that trigger effectiveness in reaching the shuttlecock (Kusuma et al., 2015). With training methods such as shadows, drills, and strokes can improve movement coordination, speed and muscle endurance (Cahyaningrum et al., 2018).

*Footwork*badminton can be done with several techniques of footsteps which include consecutive steps and crossing. With a variety of footsteps, players can move as efficiently and effectively as possible to produce a good shot. Improving the ability of badminton footwork for early childhood requires variation in training so that children become more active in doing footwork exercises, (Dlis et al., 2019). In the classification of developmental ages 10-12 years are in the adolescent stage practice aimed at increasing muscle strength, cardiac endurance, and various skill exercises and begin to practice proper and correct technique in athletes (Sukamti, 2011). So based on the above opinion, athletes aged 10-12 years are ready to receive agility training and correct foot step techniques in badminton. This study examines the effect of shadow training using sequential step techniques and shadow training using cross-step techniques in badminton athletes PB. Wiratama Jaya Yogyakarta, which consists of 22 athletes and divided into two groups, namely a shadow step group who is given shadow training using consecutive steps and a shadow crossed step who is given shadow training using the cross step technique. By testing the normality test, data homogeneity, and hypothesis testing.

Based on the results of research and discussion, proved that the shadow training method using the sequential step technique or the cross step technique has the same effect in increasing the agility of the footwork. This is in line with previous studies. Research result(Saputra & Sepdanius, 2019)that shadow training has a significant effect on increasing the agility of badminton athletes. In the 6-point shadow training method it can improve agility where before being given the training an average of 7.51 while after being given training an average of 6.84 in the zig-zag run test, (Hamid & Aminuddin, 2019). Other research by(Nirendan & Murugavel, 2019) aims to determine the effect of shadow training on the motor components of badminton players aged 12-16 years as many as 30 athletes. It was concluded that the results of agility increased significantly due to the effect of shadow training through the shuttle run test. Research result concluded that footwork and shadow exercises have an effect on agility, so that continuous footwork and shadow exercises in accordance with a well-structured training program can improve agility in badminton, (Islamiah & Sepdanius, 2019). One footwoork training model with back and forth front and back either with directions or without directions affects the agility of badminton players (Hasanah et al., 2017). Based on the results of research studies which have explained that footwork and shadow exercises have a significant effect on agility. Footwork and shadow exercises have met the training criteria in increasing the agility of badminton athletes (Rifai et al., 2020). Footwork training with more reps than sets with a maximum pulse will build the muscles, bones and joints more trained (Astrawan, 2020).

Shadow training is one of the agility training models that are often given by coaches so that an increase in agility can occur, although the cross-step technique is more often used in shadow training than in sequential step techniques but both are footwork techniques that are performed when playing badminton. The effect of 12-week shadow exercise on the physical performance of aged children, (Yüksel & Aydos, 2018). The results of the study show that shadow exercise has a positive effect on individual performance at the age of children. So it can be concluded that shadow training using sequential step techniques or cross-step techniques can improve the agility of PB badminton athletes' footwork. Wiratama Jaya Yogyakarta.

The factors that influence the results of this study are the sampling technique, the seriousness of the athletes in carrying out the treatment, the ability of the athletes to carry out a series of foot exercises, and the training program given. Another factor that influences the results of the study is that athletes participate in sequential step shadow treatment activities and cross step shadow properly, this can be seen from the athlete's adaptation to training. progress every day. Change in footstepsFor athletes, both the consecutive shadow step and the crossed step shadow group, the crossed step shadow group experienced greater changes than the athletes who performed the sequential step shadow group. In shadow training, cross-step athletes are easier to do because of the techniques they are used to. Whereas in sequential shadow steps, athletes need adaptation in performing technique steps that are not used to be done

Thus, it is natural that the shadow training method using crossed steps has a greater average value than the shadow training method using the sequential step technique in increasing the agility of the

footwork of badminton athletes PB. Wiratama Jaya Yogyakarta. Although in testing the hypothesis and statistics, the two techniques are not significant or there is no difference.

CONCLUSION

Based on the results of data analysis, descriptions, examination of research results, and discussion, it can be concluded that there is an effect of sequential step shadow training and cross-step shadow training on the agility of badminton athlete PB Wiratama Jaya Yogyakarta's footwork and there is no significant difference between sequential step shadow training and shadow training. cross steps towards the agility of badminton athlete PB Wiratama Jaya Yogyakarta footwork. The results of this study indicate that the sequential and cross-cutting shadow exercises can be a recommendation for coaches and athletes of PB Wiratama Jaya Yogyakarta in particular, and PB in general. For PB Wiratama Jaya Yogyakarta coach, to always provide an effective and efficient training program for his athletes. Provides a variety of training models and is well programmed, especially training programs to improve footwork agility. As a recommendation for PB Wiratama Jaya Yogyakarta coaches and other coaches that in agility training with the shadow method there are variations in doing it, namely by consecutive steps and crossing and both of these exercises can both improve the agility of badminton athlete PB Wiratama Jaya Yogyakarta's footwork, and for further researchers. , in order to add variables other than the existing variables in this study so that research on the agility of the footwork of badminton athletes can be identified more broadly.

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