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Forehand and Backhand Ability of Table Tennis Athletes: What is the Effect of Multiball Training?

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Abstract

Study purpose. This study sought to ascertain 1) How multiball training affected forehand shots. 2) The effect of multiball training on backhand shots. 3) Comparison of the results of forehand and backhand shot techniques with multiball training methods on the results of training athletes table tennis union sekar kemuning permai Cirebon City. The problem in this study is to determine the effect of table tennis multiball training on the ability of forehand and backhand shots at SKP PTM Athletes in Cirebon City.

Materials and methods. This study used an experimental method with a 'pretest - posttest group design'. The population in this study were 16 athletes of PTM SKP Cirebon City. Sampling of this study was done by purposive sampling. This instrument uses multiball training on forehand and backhand shot accuracy. Data analysis using t test significance level 52.08% (Forehand) and 53.01% (Backhand).

Results. A count of 4.710, a t table of 2.365, and a significance level of 0.002 <0.05 indicated that (1) multiball training has an impact on forehand shots. (2) With a count of 3.550, t table 2.365, and a significant value of 0.009 <0.05, there is a multiball training effect on backhand shots. (3) The accuracy of both forehand and backhand shots has increased; the percentage of forehand results is 52.08%, while the percentage of backhand results is 53.01%.

Conclusion. From these results it can be concluded that there is a significant effect of multiball training on forehand and backhand accuracy.

Kata kunci: Multiball, Pukulan Forehand, Pukulan Backhand, Tenis Meja

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Introduction

Sport is an activity that involves a series of regular and planned movements that a person does to improve their functional abilities. In accordance with the goals to be achieved through sports activities, these activities are grouped into educational, recreational, health, and achievement sports. Sport is a positive activity if done properly and well. In sports there are positive values including; honesty, fair play, sportsmanship, empathy, sympathy, good mental attitude, responsibility, respect for others, discipline, motivation, and cooperation (Muhibbi, Yogaswara, Dhuha, & Abubakar, 2023). Sports achievement is a physical activity that has the intent and purpose to achieve achievement. Sport is an activity to train one's body, not only physically but also spiritually (Millah, Sudjarwo, & Subekti, 2018). Athletes as one component of sports actors certainly have a different personality from individuals who are less involved in the sports environment (non-athletes) (Setiyawan, 2017). Therefore, the application of sports psychology to support athletes' performance on the field needs to be done in order to achieve

optimal performance (Adriyanto & Prasetyo, 2021). The achievements obtained by athletes are not just achieved without continuous training and coaching (Ardi Gunawan, Said Junaidi, 2019). The process of preparing athletes for improved performance is called training (Maulana, S, P, & Sundari, 2023). Exercise is a systematic and continuous process by increasing the load (Putra, Emral , Arsil, & Sin, 2023).

Table tennis also has tremendous benefits for health, one of the important aspects in the game of table tennis is the ability to perform accurate forehand and backhand shots. Table tennis is a sport that is quite familiar among the public. This game is better known as ping pong (Andrijanto, 2023). Table tennis is a game that uses a small ball called ping pong and a bat in the form of a rubber-coated bet and a table specially designed as a game area that demands the ability of individuals to solve and think quickly and precisely (Adriyanto & Prasetyo, 2021). To get maximum results in achieving achievement, it is necessary to pay attention to table tennis, starting from physical condition, technique, tactics, and mental, as well as other supporters ranging from interest, talent, and motivation in sports (Sari & Antoni, 2020).

The important role of an athlete in training accuracy in setting targets cannot be separated from the various training methods provided by the coach. One of the duties of an athlete is to achieve the highest possible achievement to make a country, region, or agency proud. athletes who have been carefully prepared will certainly bring maximum results (Taftazani & Fauziah, 2019). The multiball training method is an important form of training programme to improve shot quality, because through this programme the coach is able to feed or design the speed of the ball while the athlete can feel the shot being trained. Multiball is also very useful for improving shot speed or reaction in an athlete. In addition, it can also improve the athlete's endurance and fitness. Training using multiple balls or multiballs is one of the exercises used by coaches. One of the goals of multiball training is to improve the athlete's forehand and backhand drive abilities (Satria Budi, 2020). The multiball method can also use machines or manuals provided by the coach or feeder (Isnandar Jamaluddin & Arwih, 2022).

Forehand and backhand techniques are basic stroke techniques that have the most important role in table tennis. Techniques that athletes must master so that the quality of playing table tennis can be maximised. The forehand stroke in table tennis is one of the core techniques. A forehand stroke as a stroke that comes from the direction of the hand or palm facing forward (Jusrianto, 2020). The forehand drive is often used by athletes to score points (Wafa & Pratama, 2021). Forehand and backhand are the basis that must be owned by each or a table tennis player. To be able to excel in the sport of table tennis games, it is necessary to support physical abilities in addition to effective and efficient basic techniques (M. Sahib Saleh, 2019). The backhand stroke is one of the important strokes in table tennis. However, many table tennis players have difficulty in hitting an effective and powerful backhand shot. One of the factors causing this is the lack of proper training that is effective in developing the technique and strength of the backhand shot (Meo, Wani, & Bile, 2024). A backhand shot is taken when the ball is to the left of the body. How to do it, lower the body position first and then move the hand towards the left waist. If you are left-handed with an elbow angle of 90 degrees move the hand and bet forwards, keep the elbow at 90 degrees and bet straight. Forehand Block is a technique that moves the bet to the right side of the body, the bet position closed, the front side of the bet facing down. Backhand Block is a technique that moves the bet to the left side of the body, the bet position is closed on the front side of the bet facing down. Training is the most important stage in the process of developing various abilities. Exercise can be done in everything, such as in sports, an athlete before competing is required to do training to improve his talent to the maximum with good intensity. Training is the process of getting athletes ready for more success. Additionally, training can also refer to a coach's capacity to optimize performance through a systematic training process based on knowledge and broadened by other disciplines (Amansyah, 2019).

This result means that t-count> t-table, which is (3.995> 1.796) or in other words the t-count obtained is greater than the limit number of rejection of the null hypothesis (Ho) required t-count value equal to or greater than the t-table value (Nurdin, 2020). The results of research and data analysis on the effect of multiball training on the accuracy of the forehand stroke target obtained by the t-count is greater than the t-table (8.476>1.753) and the effect of multiball training on the accuracy of the backhand fast spin target obtained (9.803>1.753), it can be concluded that in this study there is an effect of multiball training on the accuracy of fast spin forehand and backhand target strokes, at PTM Taruna Bajang Mataram table tennis athletes (Dika Pratama & Nurdin, 2021). The results showed that the forehand drive variable target accuracy ability had an effect on multiball training on table tennis playing skills, because from the results of the correlation analysis a correlation coefficient of 0.230 was obtained, meaning the category was low or weak. While the backhand drive has an influence on multiball training on table tennis playing skills, a correlation coefficient of 0.972 is obtained, which means a strong category. The relationship between the two given is quite strong and needs to be considered in multiball training on the skills of athletes.

The results of previous studies show that the multiball training method has a significant effect in improving the ability to hit forehand drives and backhand drives. However, this study will focus on the effect of the multiball training method on the basic techniques of forehand block and backhand block in PTM SKP Cirebon City table tennis athletes.

Materials and Methods

Study participants

The authors of this study included the 84 members of the Cirebon City SKP PTM athletes group in their sample. A population is a category for generalization made up of items or people with specific attributes chosen by researchers for analysis before conclusions are made (Sugiyono, 2022).

The authors employed purposive sampling, a nonprobability sampling strategy, in this investigation. One sampling method with specific considerations is purposeful sampling (Sugiyono, 2022). In order to pick a sample of 16 table tennis players for this study, the author takes into account a number of factors or criteria, such as: (1) Is a Cirebon City PTM SKP member. (2) The sampled athletes ranged in age from 7 to 18. (3) There are eight male and eight female athletes. (4) Being involved in the training process.

Study organization

This study uses an experimental design. The purpose of the experimental design is to determine the effect of multiball training on the accuracy of forehand and backhand shots of PTM SKP athletes in Cirebon City. Researchers can manipulate variables that let other factors impact the study's findings by employing an experimental design. The quantitative research approach, which is carried out through experiments, determines the independent variable (treatment) and the dependent variable (outcome) under controlled conditions (Sugiyono, 2022). The impact of multiball training serves as the study's independent variable, and the outcomes of forehand and backhand shot approaches serve as its dependent variable.

Statistical analysis

Pretest and posttest findings, along with test and treatment paperwork, provided the data for this investigation. One method of gathering information regarding the subject of direct study is through testing. For data collecting, accurate data has been gathered. The pretest and posttest methods used in this study serve as data collection methods that will be treated prior to administering a posttest so that conclusions may be drawn from the posttest. Pretest and posttest findings for striking forehand and backhand blocks were gathered for this study.

For ease of understanding below is figure 1 of table marking two targets to the right of the tester, the area is 30cm x 30cm, the second area is 60cm x 60cm.

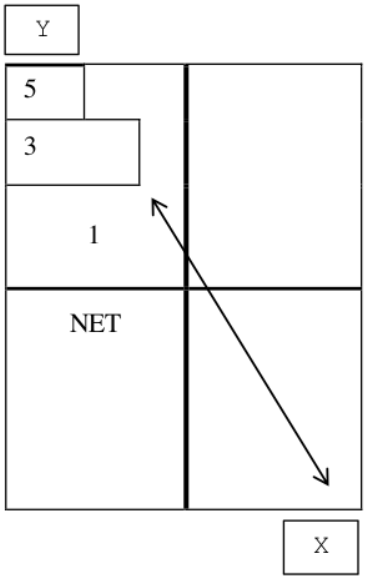

Figure 1. Forehand Block Accuracy Instrument
Source**:** (Aris Widiantoro, 2022)

Description:
X : testi
Y : feeder

Scoring instructions: (1) The scoring is carried out by 3 people, 1 person records, 1 person holds a stopwatch, and 1 person observes the ball entering the target, (2) The ball entering the 30 cm square target is worth 5, and the ball entering the 60 cm square target area is worth 3, the ball not entering the remaining target is worth 1, (3) The first ball of the testi is not recorded or not counted, (4) The recorder totals the score of each forehand block for 30 seconds, (5) The highest score of the forehand block for 30 seconds used for ease of understanding below is figure 2 table marking (table marking) marking two targets on the right of the testi, the area of 30 cm 30 cm, the second area is 60 cm x 60 cm.

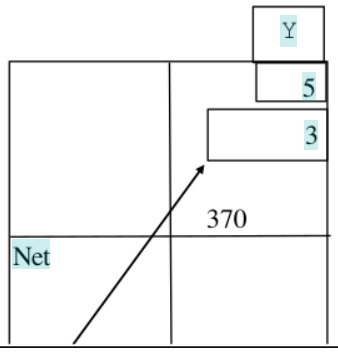

Figure 2. Backhand Block Accuracy Instrument
Source: (Aris Widiantoro, 2022)

Description:
X : testi
Y : feeder

Scoring instructions: (1) The scoring is carried out by 3 people, 1 person is the recorder, 1 person holds the stopwatch, and 1 person observes the ball entering the target, (2) The ball entering the 30 cm square target is worth 5, and the ball entering the 60 cm square target area is worth 3, the ball not entering the remaining target is worth 1, (3) The first ball of the test is not recorded or not counted, (4) The recorder totals the scores of each forehand block for 30 seconds, (5) The highest score of the forehand block for 30 seconds is used.

Results

The pretest and posttest findings of PTM SKP Cirebon City forehand and backhand shots are as follows:

Table 1. Results of Forehand Stroke Accuracy of PTM SKP Table Tennis Athletes in Cirebon City

Experiment		Control	
Pre-test	Post-test	Pre-test	Post-test
16,88	18,75	17,75	17,38

From table 1, it can be seen that the density of forehand shots of PTM SKP Cirebon City table tennis athletes experienced fluctuating conditions with the largest average in the experimental group's posttest results with a value of 18.75 and the lowest in the experimental group's pretest results with a value of 16.88.

Descriptive analysis of forehand shot accuracy using the SPSS 26 application obtained the following results:

Table 2. Descriptive Analysis of Forehand Punches

Descriptive Statistics - Forehand						
		N	Minimum	Maximum	Means	Std. Deviation
Experiment	Pre-test	8	10	25	16.87	5.668

	Post-test	8	11	28	18.75	6.319
Control	Pre-test	8	8	34	17.75	8.013
	Post-test	8	9	31	17.38	6.844
	Valid N (listwise)	8				

Based on table 2, the results of forehand shot accuracy are as follows: (1) Pretest for the experimental group has a maximum value of 25, a minimum value of 10, an average of 16.87 and a standard deviation of 5.668. (2) The posttest for the experimental group has a maximum value of 28, a minimum value of 11, an average of 18.75 and a standard deviation of 6.319. (3) The pretest for the control group had a maximum value of 34, a minimum value of 8, an average of 17.75 and a standard deviation of 8.013. (4) The posttest for the control group had a maximum value of 31, a minimum value of 9, an average of 17.37 and a standard deviation of 6.844. The control group pretest had a maximum value of 34, a minimum value of 8, an average of 17.75 and a standard deviation of 8.01. The posttest for the control group had a maximum value of 31, a minimum value of 9, an average of 17.38 and a standard deviation of 6.844.

Table 3. Results of backhand shots of PTM SKP table tennis athletes in Cirebon City

Experiment		Mastering	
Pre-test	Post-test	Pre-test	Post-test
15,38	16,88	14,50	14,00

Table 3 shows that the density of backhand strokes of PTM SKP Cirebon City table tennis athletes experienced fluctuating conditions with the largest average in the experimental group's posttest results with a value of 16.88 and the lowest in the control group's posttest results with a value of 14.00.

Descriptive analysis of backhand accuracy using the SPSS 26 application obtained the following results:

Table 4. Backhand Descriptive Analysis

Statistik Deskriptif – *Backhand*						
		N	Minimum	Mximum	Means	Std. Deviation
Experiment	Pre-test	8	10	24	15.38	5.041
	Post-test	8	11	25	16.88	5.463
Kontrol	Pre-test	8	9	25	14.50	4.957
	Post-test	8	9	24	14.00	4.986
	Valid N (listwise)	8				

Based on table 4, the results of backhand accuracy are as follows: (1) Pretest for the experimental group has a maximum value of 24, a minimum value of 10, an average of 15.38 and a standard deviation of 5.041. (2) Posttest for the experimental group has a maximum value of 25, a minimum value of 11, an average of 16.88 and a standard deviation of 5.463. (3) The pretest for the control group had a maximum value of 25, a minimum value of 9, an average of 14.50 and a standard deviation of 4.957. (4) The posttest for the control group had a maximum value of 24, a minimum value of 9, an average of 14.00 and a standard deviation of 4.986.

Data Normality Test

Test the normality of the data using Chi Kuadrat. The rule used to determine whether a distribution is normal or not is if the significance value is greater than 0.05 (sig> 0.05), then it

is normal and if the significance value is less than 0.05 (sig < 0.05) then the data is said to be abnormal.

Table 5. Normality Test Results of Forehand and Backhand Stroke Accuracy Data

Normality Test						
	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistik	Df	Sig.	Statistik	Df	Sig.
Prestest-Forehand	,137	8	200*	,938	8	,595
Postest-forehand	,172	8	200*	,932	8	,538
Prestest-Backhand	,280	8	,065	,866	8	,139
Posttest-backhand	,241	8	,191	,859	8	,118

Based on table 5, It is evident that PTM SKP Cirebon City's forehand and backhand shot accuracy pretest-posttest statistics table tennis athletes has a significance value> 0.05. So it can be seen that the throw data is normally distributed.

Homogeneity Test

The homogeneity test is carried out to determine the similarity of variance or to test that the data obtained comes from a homogeneous population. The decision-making criteria are accepted if the significance value is greater than 0.05 (sig> 0.05).

Table 6. Results of Homogeneity Test for Forehand and Backhand Stroke Accuracy

Group		Total F	Df	Sig.	Description
Mastering	*Forehand*	0,133	1 : 14	0,721	Homogen
	Backhand	0,117	1 : 14	0,798	
Experiment	*Forehand*	0,194	1 : 14	0,666	
	Backhand	0,141	1 : 14	0,743	Homogen

The pretest-posttest results on the accuracy of the forehand and backhand shots of PTM SKP Cirebon City As can be seen in Table 6 above, table tennis players have a significance value>0.05, suggesting that the data is homogeneous.

Correlation Test

To ascertain whether or not there is a link between the data, the correlation test is utilized. The SPSS 26 program is used for the analysis, and if the findings indicate a significance value less than 0.05, the data is considered correlated; if the results indicate a significance value more than 0.05, the data is considered uncorrelated.

Additionally, the information above leads to the conclusion that if the Pearson correlation value is greater than rtable, the research is said to have a relationship; if it is less than rtable, no association is found. The findings of this study's correlation test are displayed in table 7:

Table 7. Correlation Test Results of Forehand and Backhand Stroke Accuracy

Correlation		
	Pretest Forehand	Posttest Forehand

PretestForehand	Correlation Pearson	1	.988**
	Sig. (2-ekor)		.000
	N	8	8
PosttestForehand	Correlation Pearson	.988**	1
	Sig. (2-ekor)	.000	
	N	8	8
		Pretest Backhand	Posttest Backhand
Pretest Backhand	Correlation Pearson	1	.977**
	Sig. (2-ekor)		.000
	N	8	8
Posttest Backhand	Correlation Pearson	.977**	1
	Sig. (2-ekor)	.000	
	N	8	8

Based on the data from the PTM SKP Cirebon City table tennis athletes' forehand and backhand accuracy test results, the significance value is <0.05, or 0.000 <0.05, indicating that there is a correlation between the data. In order to determine whether or not there is a relationship between the data from the forehand and backhand accuracy test results of PTM SKP Cirebon City table tennis participants, the Pearson correlation value is also compared with rtabel.

Based on the correlation test analysis data above, it shows that the data of PTM SKP Cirebon City table tennis athletes for pearson correlation the results of forehand shot accuracy of 0.988> r table 0.707, then the data on the results of forehand shots there is a relationship and the results of backhand shot accuracy of 0.977> r table 0.707, then the data on the accuracy of backhand shots there is a relationship.

Hypothesis Test Results

In this study, t test analysis was used to examine the hypotheses, this test is basically used to determine the partial effect between multiball variables on the accuracy of forehand and backhand shots. At a significant level (a) 5% or a = 0.05. The results of the t test in this study can be seen in table 8 as follows:

Table 8. Test Data of Forehand and Backhand Stroke Accuracy

Variables	t Count	Table t	Df	Sig	Description
		Forehand			
Mastering	0,664	2,365	7	0,528	Not significant
Experiment	4,710	2,365	7	0,002	Important
		Backhand			
Mastering	1,000	2,365	7	0,351	Not significant
Experiment	3,550	2,365	7	0,009	Important

Based on the t test in table 8 testing the multiball variable on forehand shot density resulted in a statistical value of tcount 4.170 and t table 2.365, with a significance value of 0.002. Because the count is 4.170> t table 2.365, and the significance value is 0.002 <0.05. The

alternative hypothesis (Ha), which states that "multiball training has a significant effect on the accuracy of forehand and backhand shots of PTM SKP table tennis athletes in Cirebon City," is accepted when the findings demonstrate a significant difference.

Based on the t test in table 8 testing the multiball variable on the accuracy of the backhand shot produces a statistical value of tcount 3.550 and table t 2.365, with a significance value of 0.009. since the significant value is 0.009 <0.05 and the count is 3.550> t table 2.365. The alternative hypothesis (Ha), which states that "multiball training has a significant effect on the accuracy of forehand and backhand shots of PTM SKP table tennis athletes in Cirebon City," is accepted when the findings demonstrate a significant difference.

Discussion

A review of previous research in the form of Efforts to Improve Forehand Topspin Punches with Multiball Training for Beginner Age PTM Briliant Blitar Table Tennis Athletes. The results of the study can be concluded that the provision of training programmes with multiball to beginner athletes of PTM Brilliant Blitar can improve forehand topspin shot skills.

In addition, research (Hakim, Bismar, Sahabuddin, & Pratama, 2022) obtained the results that the multiball training model on forehand and backhand tennis court shot techniques in FIK UNM Makassar students. Students at FIK UNM Makassar's forehand and backhand tennis court shots are significantly impacted by the multiball training methodology. Research results (Dhaniel Erlangga, Muh Isna Nurdin Wibisana, 2022) obtained the results that robbopas media as a medium for practicing multiball on athletes. From the multiball training model with robbopas media, it is very feasible to use and there is a significant effect on the results of forehand and backhand shots on athletes.

According to the research, athletes require a thorough and engaging understanding of the training program in order to comprehend and participate in the material. Additionally, the training program necessitates updating training methods, particularly in table tennis. Based on the successful outcomes of this study, the researchers developed a new hypothesis: PTM SKP athletes in Cirebon City's accuracy of forehand and backhand table tennis strokes may be impacted by table tennis training using the multiball training method.

The data from the pretest and posttest of forehand and backhand shot techniques revealed that the accuracy of the forehand and backhand shots of PTM SKP Cirebon City table tennis athletes had a significance value > 0.05, which is in line with the findings of training research using the multiball method in the normality test. Thus, it is evident that the throw data follows a normal distribution. The data is homogeneous since the homogeneity test of the pretest and posttest outcomes of the forehand and backhand shot techniques produced results with a significance value > 0.05. According to the correlation test analysis data above, the PTM SKP Cirebon City table tennis athletes' data for Pearson correlation indicates that the accuracy of their forehand punches is 0.988> r table 0.707, indicating a relationship between the two types of punches, and the accuracy of their backhand punches is 0.977> r table 0.707, indicating a relationship between the two types of punches.

Additionally, pretest and posttest findings are hypothesized. (1) A statistical value of tcount 4.170 and ttable 2.365, with a significance value of 0.002, were obtained when the multiball variable was tested on forehand shot density. Given that the significance value is 0.002 <0.05 and the count is 4.170> ttable 2.365. The outcome then demonstrates a notable difference. (2) A statistical value of tcount 3.550 and t table 2.365, with a significant value of 0.009, were obtained when the multiball variable on backhand stroke density was tested. Given that the significance value is 0.009 < 0.05 and the count is 3.550 > table 2.365. The outcome then demonstrates a notable difference.

Conclusions

Based on the previous chapter's explanation of the data processing and analysis results, the authors can draw the following conclusions: (1) The precision of forehand block shots made by SKP PTM athletes in Cirebon City is impacted by table tennis multiball training. (2) The precision of backhand block shots made by PTM SKP athletes in Cirebon City is impacted by table tennis multiball training. (3) The accuracy of PTM SKP Cirebon City table tennis players' forehand and backhand block shots varies significantly depending on their multiball training.

The author makes a number of recommendations in light of the research's outcomes and observations made during its implementation at PTM SKP Cirebon City, including: 1) For the club's table tennis instructors. (1) Help players by offering guidance, examples, and direction throughout training, particularly in table tennis, so that athletes are prepared and able to absorb the information provided during the training process. (2) Using technologies to assist athletes in performing workouts in various ways so they can gain a better understanding of table tennis throughout training. (3) assisting athletes by offering fresh motivation and excitement for performing workouts with previously untested equipment in order to make them enjoy their training and help them comprehend table tennis instruction. 2) For Future Researchers In the event that future researchers wish to carry out additional table tennis research, this study will serve as reference material and information that will be helpful when conducting research with a larger sample size and various fundamental stroke techniques, such as basic chop techniques.

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Conflict of interest

All things considered, the authors affirm that this study has no conflicts of interest.

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