

The Influence of Handgrip and Motor Exercise on Ability to Play Table Tennis

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Abstract: This study aims to determine motor handgrip exercises on the ability to play table tennis either partially or simultaneously. The population and sample in this study were 104 students at Elementary School 5 of Rambang. The method used in this study is a quantitative method. The data collection techniques used observation and test techniques. The data analysis technique uses parametric statistical tests with the t-test formula. The results of this study concluded that: (1) There is a partial effect of handgrip training on the ability to play table tennis. The results of the analysis of the coefficient of determination of the first hypothesis test partially obtained t-count $3.897 > t\text{-table } 1.987$; (2) There is a motoric effect on the ability to play table tennis. The results of the analysis of the coefficient of determination of the second hypothesis test obtained t-count $3.839 > t\text{-table } 1.810$; (3) There is a simultaneous effect of handgrip and motoric exercises on the ability to play table tennis. The results of the analysis of the coefficient of determination of the third hypothesis test obtained F-count $> F\text{-table or } 13.587 > 0.967$.

Keywords: Handgrip, Motor Exercise, Table Tennis Playing Skills.

A. Introduction

The learning of Sports and Health Physical Education taught in Elementary Schools is emphasized on efforts to spur physical, mental, emotional and social growth and development. According to (Rohani, 2017) states that the types of activities taught in elementary school broadly include two activities namely main activities and optional activities. Several selected activities within the scope of physical education through games and sports, one of which is table tennis which is an example of sports using a net that can be done outside and inside the classroom which does not require a large space. In the education unit level curriculum, one of them states that the learning strategy is to implement Active, Innovative, Creative, Effective, and Enjoyable Learning (PAIKEM). The PAIKEM learning strategy is one of the strategies that can be applied in learning, because its field of work focuses on how to: (1) organize learning materials, (2) deliver or use learning methods, and (3) manage learning (Dimiyati & Mujiono, 2016). To achieve the three ideas mentioned above, a teacher can modify learning tools and can be linked to the conditions of the learning

environment. Teachers can increase or decrease the complexity and difficulty level of teaching assignments by modifying the equipment used in carrying out these skills, for example the media, length, length, height or lightness of the equipment used (Djamarah, 2015).

Physical Education is basically an integral part of the education system as a whole, aiming to develop aspects of health, physical fitness, critical thinking skills, emotional stability, social skills, reasoning and moral action through physical and sports activities. In line with that, Subagiyo (2018) stated that: In general, the purpose of physical education in elementary schools is to spur physical, mental, emotional, and social growth and development in harmony in efforts to form and develop basic movement abilities, in still values, attitudes, and get used to healthy living (Subagiyo, 2018).

Sudjana (2010) argues that the teaching method is the method used by the teacher in establishing relationships with students during the lesson. The learning method is a technique used in the teaching and learning process, if an appropriate learning method is used, the learning outcomes will be maximized.

According to Ardi et al., (2013) that each skill assignment given to students must be broken down into small parts and follow an adjusted sequence, there are students who learn faster than others, there are those who are slow in responding to assignments, for this reason assignments must be adapted to the abilities of each student. to be more challenged and emphasized so don't be afraid to try new ideas.

For teachers introducing new things is a big innovation, this will have a big impact on two things, firstly students are actively involved in the motion learning process and secondly students gain new knowledge. The researcher wanted to know whether there were any problems faced by the teacher in teaching small ball, bearing in mind that table tennis is rarely taught in elementary school.

Regarding the ability to play table tennis in this study, the technique of holding the bet is the most important first step in learning table tennis. If from the start the method of holding the bet is wrong, then the player will have difficulty learning the next game technique. According to Sutarmin (2017) the quality of table tennis is also influenced by the technique of holding a racket or bet (handgrip). Therefore, every table tennis player must master the basic techniques of holding a bet. The various techniques for holding the bat are as follows: (1) shake hand grip, (2) penholder grip. 1) The shake hand grip is the most famous way of holding the bat in the world. This method provides an opportunity to play well, especially in doing backhand shots. The technique of holding the shake hand grip is like someone doing a handshake. This technique is very popular with table tennis athletes in European countries, because it is multipurpose. With this technique, players can use both sides of the bet

so that they can easily hit the ball, both forehand and backhand. 2) Penholder grip is the number 2 (two) bet holding technique in the world. This method is best for forehand shots, but difficult for backhand shots. Players who use the penholder grip have fast foot movements, which makes them able to play with lots of forehand strokes.

According to Verducy (2013) motor learning is a set of processes related to practice or experience that led to permanent changes in skilled behavior. Furthermore, Tomoliyus (2016) explains that motor learning is learning that is focused on mastering movement skills through masculine responses as a result of training. In motor learning, the material studied is movement patterns of body skills, for example movements in sports.

One of the game sports that is included in the Basic Competency material for Sports and Health Physical Education Subjects in Elementary Schools is practicing variations and combinations of specific movements in a variety of simple and or traditional small ball games. One of the small ball games taught is table tennis. According to (Muhajir, 2016) Table tennis is a game that uses a table as a field bounded by a net (net) that uses small balls made of celluloid material and the game uses a bat or what is called a bet. There are 4 pieces of equipment needed to play table tennis: table, net, bat and ball.

Table tennis or ping pong is a sport that involves two or four players hitting a light ball called a ping pong ball on a table using a small solid racket called a bat. The game is played on a table divided by a net. Except for the initial serve, the rules of the game are: the player must bounce the ball to the opponent's table and the opponent must return it. Points will occur if opposing players fail to return the ball. The game is fast and requires fast response as well. Spinning the ball (spin technique) will distort the direction of the ball so that it will be difficult for the opponent to return it (Sutarmin, 2017).

Given the importance of this table tennis game material for students, the teacher tries to find solutions so that table tennis playing skills can increase. Efforts made by the teacher is to use the drill method or training method. By using the training method students can do the exercises repeatedly so that students become accustomed to doing these movements and in the end students' skills in playing table tennis will be formed. This is in accordance with the expert opinion (Larry, 2017) which states that in school learning, especially in physical education subjects, the drill method (exercise) is well used in training sports skills. By doing the exercise repeatedly the students' understanding is more and students are ready to use their skills because they are used to it.

Based on the results of interviews and observations of researchers as well as consultations with teachers in the field of physical education who teach upper grades IV, V and VI at SD Negeri 5 Rambang, why learning table tennis is rare and can be said to have never been taught. The first problem is that students prefer baseball and badminton sports because they can cover many students and all students can move so that it is more fun. It should be noted that the student's response in exercising becomes an influence for the teacher to provide learning material. Teachers who lack experience have an effect on teaching methods that are still minimal in updating, for example the teacher delivers in the same way every year because the teacher is still fixated on beds and tables which are standard and standard forms of learning regardless of conditions in the field, Zang (2012) explains that three qualities to become an excellent coach are knowledgeable about table tennis trends, inspirational and innovative. The second problem is the equipment the school has for the table tennis learning process at SD Negeri 5 Rambang only has 4 beds and 1 table while the number of students available is very large, this really doesn't support the learning process. Ideally, in packing learning, there are at least 4 tables and 16 beds, so that there are not many students waiting. For this reason, small ball learning, especially table tennis, is often not taught to students because of limited tools. Many students wait so that the motion process cannot be maximized, in the end students feel bored or bored quickly.

In table tennis there are several techniques that need to be learned, namely how to hold the bat, how to stand, hit and footwork. It is undeniable that in the teaching and learning process which is classical in nature (only conveying theory without being directly practiced) will face heterogeneous problems with regard to students' abilities. The lack of creativity of a physical education teacher in packaging physical education learning material is considered to be the cause, so that many of the students do not complete the Minimum Completeness Criteria (KKM). For this reason, a physical education teacher is required to be able to master various models or approaches to practical learning, so that learning can take place properly and with good quality. Based on the observation and evaluation of the PJOK learning outcomes on table tennis skills for students at SD Negeri 5 Rambang, some students did not achieve the Minimum Completeness Criteria (KKM), with a KKM standard of 70. The students' table tennis playing skills did not go well, there were still many participants. students who have not been able to carry out the basic techniques of table tennis properly and correctly, many students in Class SDN 5 Rambang in the learning process are still not active and there are many mistakes made by students in carrying out basic technical movements for playing table tennis. In the learning process of table tennis games for students at SD Negeri 5 Rambang for the 2021/2022 academic year. Of the 143 students, only 104 students were able to play table tennis. According to the researchers' observations, during the last two years in the learning process of playing table tennis, many students have not mastered the basic

techniques of playing table tennis. The basic reason for the above factors is that out of a total of 143 students, they only have two table tennis balls. Of the number of students mentioned above, schools should have at least five table tennis tables and 20 bets. while learning table tennis that has been done so far is learning to play directly.

B. Methods

Suryabrata (2015) suggests that research is a process, namely a series of steps that are carried out in a planned and systematic manner in order to obtain problem solving or obtain answers to certain questions. Arikunto (2015) the research method is a scientific way to obtain data that has special rational, empirical and systematic characteristics. Sugiyono (2015) suggests that the quantitative research method can be interpreted as a research method based on the philosophy of positivism, used to examine certain populations and samples. This research is called quantitative research with an ex post facto approach. Described by Sugiyono (2015) that research is conducted after an incident has occurred. Ex post facto research aims to find causes that allow changes in behavior, symptoms or phenomena caused by an event, behavior, symptoms or phenomena caused by an event, behavior or things that cause changes in the independent variables as a whole that have occurred.

The population of this study was SD Negeri 5 Rambang and the sample was taken using a purposive sample, namely students at SD Negeri 5 Rambang with a total sample of 104 students. Furthermore, the main technique in sampling is using a test. To find out the results of the research findings, the collected test data were analyzed using the SPSS For Windows Version 21 software application program through 3 (three) stages, namely: (1) descriptive analysis, (2) analysis requirements test, and (3) test hypothesis. Furthermore, knowing the results of the research findings, the collected test data was analyzed using the SPSS For Windows Version 21 software application support program through 3 (three) stages, namely: (1) descriptive analysis, (2) analysis requirements test, and (3) test hypothesis.

C. Results and Discussion

The First Hypothesis (Partial Hypothesis Effect of Handgrip Training to Play Table Tennis on Ability)

Based on the hypothesis proposed in this study, namely that there is an effect of handgrip training on the ability to play table tennis using the parametric statistical formula t-test), with reference to the following analysis steps.

Table 1. The Results of Test Effect of X₁ on Y (t-test) Partially

Model	Coefficients ^a			t	Sig.
	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta		
1 (Constant)	1,978	,258		7,663	,000
Handgrip	,333	,086	,360	3,897	,000

a. Dependent Variable: To Play Table Tennis Ability

The results of the coefficient analysis obtained t-count of 3.897. criteria for testing the hypothesis if t-count > t-table then Ha is accepted whereas if t-count < t-table then Ha is rejected and to determine t-table searched at $\alpha = 5\%$: $2 = 2.5\%$ (2-sided test) with degrees of freedom (df) = n-k or df = 104 - 2 = 102 (n is the number of samples and k is the number of independent variables). With a two-tailed test (significant = 0.025) the results are obtained for a t-table of 1.987. based on the explanation above, namely t-count = 3.897 and t-table = 1.987, then t-count > t-table which means Ho is rejected and Ha is accepted. Thus, it can be said that partially it is stated that there is an effect of handgrip training on the ability to play table tennis of the SD Negeri 5 Rambang students.

Table 2. Results of Analysis of the Coefficient of Determination The Effect of Handgrip Exercise on the Ability to Play Table Tennis

Model	Model Summary			
	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,360 ^a	,130	,121	,19726

a. Predictors: (Constant), Handgrip

b. Dependent Variable: To Play Table Tennis Ability

Based on the first hypothesis test, the results of the analysis of the coefficient of determination using a simple linear regression equation for the effect of handgrip training on the ability to play table tennis based on the output value of the Summary Model obtained an R number of 0.360. Thus, it can be said that handgrip training has a less strong effect on the ability to play table tennis with proven correlation values between 0.200 - 0.399. The coefficient of determination R Square (R²) is 0.130 which means that the percentage effect of handgrip training has a relationship with the ability to play table tennis at SD Negeri 5 Rambang by 13%.

The Second Hypothesis (Partial Motor Hypothesis to Play Table Tennis on Ability)

Based on the assumptions of previous researchers in the research hypothesis, it is stated that there is a motoric influence on the Ability to Play Table Tennis, with reference to the following analysis steps. Based on the results of the analysis of partial hypothesis testing (t-test) the effect of motor influence on the ability to play

table tennis using the SPSS For Windows version 21 software application aid program is shown in the table below as follows.

Table 3. Partial Effect Test Results of X₂ on Y (t-test)

Model		Coefficients ^a			t	Sig.
		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta		
1	(Constant)	1,810	,305		5,936	,000
	Motor	,354	,092	,356	3,849	,000

a. Dependent Variable: To Play Table Tennis Ability

The results of the analysis of the coefficients obtained t-count of 3.839 criteria for testing the hypothesis if t-count > t-table then H_a is accepted whereas if t-count < t-table then H_a is rejected and to determine t-table look for $\alpha = 5\% : 2 = 2.5\%$ (2-sided test) with degrees of freedom (df) = n-k or df = 104 - 2 = 102 (n is the number of samples and k is the number of independent variables). With a two-tailed test (significant = 0.025) the results are obtained for a t-table of 1.810. Based on the explanation above, namely t-count = 3.839 and t-table = 1.810, then t-count > t-table which means H₀ is rejected and H_a is accepted. Thus, it can be said that partially there is a motoric effect on the ability to play table tennis at SD Negeri 5 Rambang.

Table 4. Results of Analysis of the Coefficient of Determination Motor Influence to Play Table Tennis on Ability

Model	Model Summary			
	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,356 ^a	,127	,118	,19757

a. Predictors: (Constant), Motor

b. Dependent Variable: To Play Table Tennis Ability

Based on the second hypothesis test, the results of the analysis of the coefficient of determination using a simple linear regression equation of motor influence on the Ability to Play Table Tennis based on the output value of the Summary Model obtained an R number of 0.356. Thus, it can be said that the motor has a less strong influence on the ability to play table tennis with proven correlation values between 0.200 - 0.399. Standard Error of Estimated means measuring the variation from the predicted value. In this study the standard deviation was 0.19757. the smaller the standard deviation means the better the model. Analysis of the coefficient of determination was used to determine the percentage value of the motor relationship with the ability to play table tennis, which obtained the coefficient of determination R Square (R²) of 0.127, which means that the percentage of motor relationship with the ability to play table tennis at SD Negeri 5 Rambang is 12.7%.

The Third Hypothesis (The Simultaneous Hypothesis Effect of Handgrip and Motor Training to Play Table Tennis on Ability

Based on the third hypothesis test, the hypothesis is proposed that there is an effect of handgrip and motor training simultaneously on students' ability to play table tennis, with reference to the following analysis steps.

Table 5. Simultaneous Analysis Results (F-Test)

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	,967	2	,483	13,587	,000 ^b
	Residual	3,593	101	,036		
	Total	4,560	103			

a. Dependent Variable: To Play Table Tennis Ability

b. Predictors: (Constant), *Handgrip*, *Motor*

Based on the third hypothesis test using the F-test formula, the results of multiple linear regression analysis stated that there was an effect of handgrip and motor training simultaneously on the ability to play table tennis, as shown in Table 5 above, and based on the F-count it is known that the value obtained is 13.587. Criteria for testing the hypothesis if F-count > F-table then Ha is accepted, and if otherwise F-count < F-table then Ha is rejected. Based on the F table at the significance level (0.05) with the numerator db 2 (determined from the number of independent variables and the denominator db of 104 (determined from the number of samples minus the independent variable minus one) or can be determined through the Excel program application in an empty cell type the formula = FINV (0.05,13.587) obtained a number of 0.967.

Based on the explanation above, it is known that F-count = 13.587 and F-table 0.967 where F-count > F-table or 13.587 > 0.967 which means Ha is accepted or it can be said that there is an effect of handgrip and motor training simultaneously to play table tennis on the ability at SD Negeri 5 Rambang.

Table 6. Results of T-Test Analysis Effect of Handgrip and Motor Exercises Simultaneously Against Table Tennis Playing Skills

Coefficients ^a						
Model		Unstandardized		Standardized	T	Sig.
		Coefficients				
		B	Std. Error			
1	(Constant)	1,184	,347		3,409	,001
	<i>Handgrip</i>	,276	,084	,298	3,304	,001
	<i>Motor</i>	,292	,090	,294	3,250	,002

a. Dependent Variable: To Play Table Tennis Ability

Based on the value of the multiple regression coefficient, the value of T-count > T-table, the effect of handgrip and motor training simultaneously on the ability to play

table tennis is $3.409 > 1.184$. Thus, the analysis of the third hypothesis states that there is an effect of handgrip and motor training simultaneously to play table tennis on the ability at SD Negeri 5 Rambang.

**Table 7. Results of Analysis of the Coefficient of Determination (R-Test)
 Handgrip and Motor Exercises for Table Tennis Playing Skills**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,460 ^a	,212	,196	,18861

a. Predictors: (Constant), *Handgrip*, Motor

b. Dependent Variable: To Play Table Tennis Ability

Based on the third hypothesis test through analysis of the coefficient of determination using multiple linear regression equations the effect of handgrip and motor training simultaneously on the ability to play table tennis the results of multiple linear regression analysis based on the Summary Model output obtained an R number of 0.460. Thus, it can be said that the percentage of handgrip and motor training simultaneously has a less strong relationship with the ability to play table tennis. Because the multiple correlation value is between 0.200-0.399. Standard Error of Estimated means measuring the variation from the predicted value. In this study, the standard deviation was 0.18861, the smaller the standard deviation, the better the model. The results of the analysis of the coefficient of determination were used to determine the percentage contribution of handgrip and motor training simultaneously on the ability to play table tennis for students of SD Negeri 5 Rambang, the coefficient of determination R Square (R²) was 0.212 which means that the percentage contribution of handgrip and motor training simultaneously contributed to the influence of the ability to play table tennis for students of SD Negeri 5 Rambang is 21.2%, while the remaining 78.8% is influenced by other factors not mentioned in this study (Zhang et al., 2012).

D. Conclusion

Based on the research results, it can be concluded as follows. (1) There is a partial effect of handgrip training on the ability to play table tennis for students of SDN 5 Rambang. The results of the analysis of the coefficient of determination of the first hypothesis test partially obtained t-count $3.897 > t$ -table 1.987; (2) There is a partial motor effect on the ability to play table tennis for students of SD Negeri 5 Rambang. The results of the analysis of the coefficient of determination of the second hypothesis test obtained t-count $3.839 > t$ -table 1.810; (3) There is a simultaneous effect of handgrip and motor exercises simultaneously on the ability to play table tennis for students of SD Negeri 5 Rambang. The results of the analysis of the coefficient of determination of the third hypothesis test obtained F-count $> F$ -table or $13.587 > 0.967$.

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