

GROUNDSTROKE TRAINING MODEL BASED ON SITUATION GAME FOR FIELD TENNIS ATHLETES AGED 12-14 YEARS

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Abstract

This study aims to create a game situation-based groundstroke forehand and groundstroke backhand training model for tennis athletes aged 12-14 years and improve forehand and backhand skills using a game situation-based groundstroke training model for athletes aged 12-14 years. The research method used is the Research & Development Research & Development (R&D) Borg and Gall method. Subjects studied were 15 people and were athletes aged 12-14 years. The results of the pre-test test obtained an average of 31.73. Then, the post-test obtained an average of 40.00. The exercise correlation coefficient before and after the exercise model was given was 0.946 with a p-value of $0.00 < 0.05$, so the conclusion was significant. In the mean difference test with SPSS, the mean = 8.26667 shows the difference between the pre-test and post-test, the result of t-count = 26,183, df = 19 and p-value = $0.00 < 0.05$, which means there is a significant difference between before and after being given game situation based groundstroke training model treatment. Based on these results, it can be concluded that the game situation-based groundstroke training model for tennis athletes at the age of 12-14 years is effective and can improve the forehand groundstroke.

Keywords: groundstroke forehand; groundstroke backhand; tennis; game situation

INTRODUCTION

Tennis is a sport that can be played between two players (single) and 2 pairs (double). Each player uses a racket to hit the ball, the goal of this game is to find points by hitting the ball in all directions that have been determined in the rules, so that the opponent is unable to reach the ball and a point occurs. (Abdoellah Arma, 1981) Tennis is a sport that uses a small ball and each player uses a racket as a ball bat. The basic principle in playing tennis is to hit the ball over the net and into the opponent's court (Sukadiyanto, 2005).

In the game of tennis, mastering the correct basic technique is the main capital

for learning game techniques. These basic techniques must be possessed by every player, both beginner athletes and pro athletes through intensive training. (Robert Scharff, 1974) There are 4 types of basic strokes that must be mastered by tennis players, namely service, forehand drive, backhand drive and volleyball.

There are 2 basic skills to hit a tennis ball to make it easy to apply techniques in other tennis games, namely forehand groundstroke and backhand groundstroke. (Lucas Loman, 2008) Hitting the ball usually begins with groundstroke practice, the groundstroke consists of two strokes, namely forehand and backhand because this



stroke is the main stroke in the game of tennis. Groundstroke Forehand is a shot taken after the ball bounces on the right side of the field or the left side of the field if someone is more dominant using the left hand (left hand), where the ball is hit starting with an open stand or close stand position, followed by bringing the racket back (backswing) followed by forward swing of the racket with the contact point occurring in front of the body ending with a follow-through that brings the racket to the back of the head (finishing).

Groundstroke Backhand is a shot that is done after the ball bounces on the left side of the field or the right side of the field if someone is more dominant using the left hand (left hand), where the ball using the back of the hand starts with an open stand or close stand by swinging the racket behind the body forward until there is a follow-through with the contact point in front of the body and with the completion of the racket behind the right head if the player uses the right hand, then the back of the right hand holding the racket will face the ball.

Based on the observations and observations of researchers about athletes aged 12-14 years who were in Lampung in October 2020, the basic forehand groundstroke and backhand groundstroke techniques were still unstable and could not make a decision to hit the stroke correctly. So that in training sessions, athletes aged

12-14 years old, both forehand groundstroke and backhand groundstroke are still often out and net, if they enter, most of them lead to the middle of the field which makes the athlete's stroke an advantage for the opposing party to get points. In addition, athletes look bored and less enthusiastic when practicing tennis because they do repetitive techniques (drills) without playing on the sidelines of training. Even though it should be in the basic forehand and backhand groundstroke techniques if trained properly and correctly it will be easier to continue developing into more difficult techniques because athletes aged 12-14 years should have mastered the basic techniques. In addition, the lack of game-based training models to improve forehand backhand and backhand groundstroke skills in tennis.

Mastery of the basic techniques of playing tennis requires finding the right learning and game approach to improve basic technical skills in order to achieve maximum performance. Athletes must be prepared regularly, directed and programmed. Due to the many aspects that must be met, the skills to play tennis are usually not easy to master, especially for athletes aged 12-14 years.

For this reason, the researchers created a game situation model to add an element of fun to training while increasing the sense of competition from the athlete's

side. Games in the field of tennis, especially for athletes aged 12-14 years, must pay attention to training programs accompanied by something that can add elements of joy, happiness and the need for innovation and creativity in game situation-based groundstroke training models. The importance of good innovation and creativity in the groundstroke training process for athletes aged 12 to 14 years, so that coaches can give new nuances to athletes so that athletes do not get bored with existing groundstroke material. Thus, it does not make athletes bored during exercise. athletes do not feel bored when the exercise occurs.

Research on the forehand and backhand groundstroke training models with the Game Situation approach is a new research, considering that there is still no model that combines the game and the actual point together in tennis. The research priority is closely related to the basic techniques and games in tennis. This is used as a reference in the preparation of available tennis game developers.

Tennis

According to Arma Abdoellah and Soediarsono in (Fadhillah, 2019) stated that "tennis is a kind of sport that uses a small ball and each player uses a racket as a ball bat". *Tennis can be conceived of as having originally been a relative of medieval football, played with similar rules by the*

clergy in the cloisters of their monasteries. (Gillmeister, 2008). (Marison, 2018) states that tennis is a game that requires foot speed, controlled accuracy, stamina, anticipation, determination and ingenuity.

(Sawali, 2018) In principle, tennis is played by hitting the ball with a racket that passes over the net and enters the opponent's court. Syafruddin in (Zulvid, 2018) Supporting factors for achieving peak performance include: physical condition, technique, tactics, and mentality.

In a game that is competitive in nature, the main goal in the game is to hit the ball as far as possible and enter the opponent's field line so that it is difficult for the opponent to catch the ball or in other words the opponent cannot reach the ball or if the opponent can return the ball, the ball it catches at the net or goes off the court line. In tennis, many factors can affect the outcome of a match, such as physical, technical, tactical, mental, and strategy (Seff, Marison, & Setiakarnawijaya, 2017). The main requirement is to have the correct basic technique and have excellent physical condition in matches, so that athletes can play professionally.

The basic technique is a series of movements in a sport in playing the sport. In the sport of tennis, basic techniques are the initial foundation for playing tennis. There are some basic techniques according to Hariadi in (Sianipar, 2019): (1) basic

technique of holding a racket (2) basic technique *forehand drive*, (3) basic technique *backhand drive*, (4) basic technique *service*, (5) basic technique *volley*. In the game of tennis, there are four basic types of strokes that need to be mastered. The four basic techniques that need to be mastered in tennis are: *servis*, *forehand drive (groundstrokes)*, *backhand drive (groundstrokes)* dan *volley* (Robert Scharff, 2001). Basic techniques must be studied, understood, and known correctly so as to avoid mistakes in how to hit the ball in the game of tennis.

There are 5 basic hitting techniques in tennis according to (Seff et al., 2017) scilicet : 1. *Serve*, 2. *Smash*, 3. *Volley*, 4. *Lob*, 5. *Groundstroke (Forehand Backhand)*. Good hitting technique is based on hitting it at the right place and time. There are several different methods of hitting in playing tennis, but the most important thing is to be in good balance, move well towards the ball, and understand where the ball and racket will meet and make a point of contact (point of contact), so you can produce hard and targeted blow. In this case, technical interpretation plays an active role (Amarullah, 2015).

Groundstroke

Patrick McEnroe and Peter Bodo in (Siahaan, 2017) states that Groundstroke is the basic stroke in tennis that can be developed to gain points. This stroke can be

taken from all sides of the court and usually players do it from the back line of the field and are hit after the ball has bounced (Rolf Flichtbeil, 2006). According to (Siahaan, 2017) In singles matches, 80% of the techniques used in tennis, especially singles, are groundstrokes. In addition to maintaining a defensive position or to attack, tennis players can stroke from behind the back line to create opportunities to attack the opponent's defense by hitting the ball at a point that is difficult to reach, making it difficult for the opponent to return it. Because of the need for the groundstroke technique in tennis, every tennis player needs to master this technique properly and correctly with regular practice.

According to (Jaqfaruhdin Yusuf & Irawadi, 2019) *Groundstroke is divided into 2, namely: Forehand and backhand. Groundstroke Forehand is a type of stroke in the game of tennis that is hit after the ball has bounced first on the court, and is hit from the right side of the one holding the racket with the right hand, and from the left from the one holding the racket with the left hand. The forehand groundstroke is critical to tennis success because it is the most frequently played stroke in tennis and significantly influences match outcome. Within the competitive tennis community, it is common knowledge that points are often won or lost with strong and consistent forehand groundstrokes* (Kwon, Pfister,

Hager, Hunter, & Seeley, 2017). (NUGROHO, 2015) states that a stroke is made after the ball bounces off the field by placing the palm of the hand facing the direction of the ball to be hit (using the muscles of the forearm). Meanwhile, Groundstroke Backhand is a type of stroke in tennis that is hit after the ball has bounced first on the court and is hit from the left for those holding the racket with the right hand, and from the right for those holding the racket with the left hand. There are several things that must be considered in the implementation of backhand groundstrokes, including: a) ready position, b) backswing, c) forward swing, d) follow through (Purnomo, 2007).

The groundstroke is a frequently used stroke, although this form of movement is a naturally important stroke for some players, the backhand stroke is generally considered to be more difficult to learn and is a potential weakness of an opponent that can be exploited. (Andi Nurabadi, 2019).

Characteristics of children aged 12-14 years

All the World Health Organization (WHO) defines the period of adolescence as between 10-19 years. However, since onset and duration vary according to sex, individual and societal factors, the period has been subdivided into three parts: the early adolescent period (10-13 years), middle adolescent period (14-17 years) and

late adolescent period (18-21 years) (Demir et al 2016). The World Health Organization (WHO) defines adolescence between the ages of 10-19 years because of the onset and duration that varies according to gender, individual and social factors. The period is divided into 3 parts, namely: the early adolescence period 10-13 years, the middle adolescence period 14-17 years and the late adolescence period 18-21 years.

Harsono in (Langga & Supriyadi, 2016) Tennis has its own specializations and peak achievement groups, namely: 1) Beginning at the age of 6-10 years, 2) Specialization at the age of 12-14 years and 3) Peak achievement at the age of 22-25 years.

Long-term athlete development (LTAD) is a planned, systematic and progressive model of individual athlete development developed by Canada's Istvan Balyi and R. Way in 1995. LTAD is also known as long-term participant development or long-term player development (LTPD), which is a long-term participation development program or long-term player development. Istvan Balyi in (Qomarrullah, 2020) The LTAD model aims to overcome all deficiencies and obstacles in the process of gradually forming quality athletes, preventing early success and making all potential sources of achievement effective. The LTAD model has a seven-stage framework that guides the

pathways of participation, training, competition and recovery in sports physical activity.

Several factors that support achievement to reach the peak that must be formed from early childhood who are just starting to practice until the age that reaches peak achievement, namely: 1) Timing 2) Balance 3) Racket Face Control. These three supporting factors are very important for all tennis players. Because if one of the three supporting factors is not good, the resulting blow will not be optimal. The age criteria for athletes who must continue to be trained are for ages 6 -10 years = coordination, ages 10-12 years = train to train, ages 12 -14 years = train to complete to introduce, ages 14 - 16 years = train for complete to peaking , and age 16 - onwards= train to win (Primanata & Subagio, 2018).

Game Situation

(Dani Wardani, 2009) Games, playing in English are called "games" (noun), "to play" (verb), "toys" (noun) this comes from the word "main". Game situation based games are assumed to provide effective motion transfer to match the actual game (Aguiar, Botelho, Lago, Maças, & Sampaio, 2012). Where, training simulates the entire movement pattern that exists in official matches (Luteberget, Trollerud, & Spencer, 2018)

Game situations are adaptation stimuli that represent complex characters, which lead to increased effectiveness and game-like stability of situational solutions and which can also contribute to the development and maintenance of fitness. (Lehnert, Stejskal, Háp, & Miroslav, 2008). Game situation exercises provide different locations and concepts of movement, so that they have a direct influence on certain aspects such as mastery of technique (Irja & Rifki, 2019).

Other than that (Devi & Rifki, 2019) said that in practice, some trainers used a lot of game situation methods to improve performance. (Susilo, Boyke, & Sudrajat, n.d.) also said that this situation game method is one form of exercise that can improve the athlete's ability to play which has been proven by research that has been carried out so that this form of exercise is a real contribution to the development of athletes.

(Johnson, F. Christie, & Thomas D. Yawkey, 2001) states that playing provides four benefits, namely developing creativity, social skills, psychomotor skills, language skills, and as a means of therapy to overcome psychological problems. Play can reduce or reduce the anxiety and restlessness of Barnett and Strom's children, (Montolalu B. E. F, 2010). More over Moyles (1991) in (Simon & Saputra Yudha,

2007) emphasizes that play is a necessary process for both children and adults.

Exercises interspersed with games will add to the fun and enthusiasm of novice athletes. This game for novice athletes is a game like the real thing. Game Situation can provide effective movement transfer to match the real game, simulating the overall movement pattern that exists in official matches. Game situations drawn in this way are adaptation stimuli that represent complex characters, which lead to increased effectiveness and game-like stability of situational solutions and which can also contribute to the development and maintenance of fitness.

METHOD

The purpose of this study was to create a game situation based forehand and groundstroke backhand training model for tennis athletes aged 12-14 years and improve forehand and backhand skills using a game situation-based groundstroke training model for athletes aged 12-14 years.

The research approach and method of the Situation Game-Based Groundstroke Exercise Model for Tennis Athletes Age 12-14 Years uses a research and development model from (Gall & Borg, 2009) which consists of ten steps in research, including:

(1) *Research and information*, (2) *planning*, (3) *develop preliminary product*, (4) *preliminary field testing*,

(5) *main product revision*, (6) *main field testing*, (7) *product revision*, (8) *operational field testing*, (9) *final product revision*, and (10) *dissemination and implementation*.

The final product improvement results have a reliable generalization value by searching for data using the forehand and backhand skill test instrument, referring to the Hewitt test. The data analysis technique uses an effectiveness test using a T test with SPSS software. The effectiveness test was carried out by giving an exercise model to 15 athletes aged 12-15 years from Lampung City.

RESULTS AND DISCUSSION

Results

This model was developed using 10 stages in its implementation. Research and development of groundstroke training model based on tennis game situation conducted preliminary research (needs analysis) which was carried out by direct observation in the field. Based on the results of the needs analysis data that has been obtained by researchers through observations and observations in Lampung, then processed and described to obtain conclusions. Based on the results of the needs analysis obtained, it is known that: 1) There is still minimal application of groundstroke training for athletes, 2) Lack of training variations which basically only use drill techniques, 3) There is no game element during training.

After the researchers conducted an analysis and what findings were in the field, the researchers then carried out the stages of collecting and drafting a game situation-based groundstroke training model for tennis athletes at the age of 12-14 years. For the next stage, an expert judgment will be carried out.

The researcher conducted a feasibility test of the model through experts who then concluded from the draft model given that the variation of the game situation-based groundstroke training model for tennis athletes at the age of 12-14 years there were 16 training models that were declared feasible to continue and 2 training models were not feasible. So that the total model which was originally 18 training models became 16 groundstroke training models based on game situations for tennis athletes which can be implemented for tennis athletes aged 12-14 years.

Small group trials using research subjects as many as 15 athletes. The results of the recapitulation of small group trials with 15 athletes as subjects above concluded that the overall game situation-based groundstroke training model for field tennis athletes at the age of 12-14 years could be applied. The results of the small group trial show that the game situation-based groundstroke training model product

can be carried out at the large group test stage or the main field test.

The large group trial/main field test was conducted in the Bukit Kencana field, Bandar Lampung, Lampung with the number of subjects used as many as 30 subjects. Judging from the results of the main field trial/large group trial conducted by researchers on 16 items of game situation-based groundstroke training models for tennis athletes at the age of 12-14 years, the overall model in this development is feasible to be used as trainer material in providing variations. game situation-based groundstroke training model with clear directions given first.

Effectiveness Test

The data analysis technique used to test the effectiveness of the exercise model using the T test with SPSS software. The effectiveness test was carried out with 15 Lampung students. The data obtained from the assessment of 15 athletes on the effectiveness test of the game situation-based groundstroke training model for field tennis athletes aged 12-14 years, are shown in the following table:

Table 1 Groundstroke Forehand Results Before Pre-Test and Post-Test

Name	Pre-Tes	Post-Test	Different
Subject 1	26	32	6
Subject 2	27	34	7
Subject 3	28	36	8
Subject 4	29	38	9

Subject 5	30	38	8
Subject 6	31	39	8
Subject 7	31	41	10
Subject 8	32	41	9
Subject 9	32	42	10
Subject 10	33	42	9
Subject 11	33	42	9
Subject 12	35	43	8
Subject 13	35	44	9
Subject 14	36	44	8
Subject 15	38	44	6
Average	31,73	40	8,27

The table above shows the results of the athlete's pre-test and post-test when doing a forehand groundstroke. The pre-test was conducted before the small group test. The pre-test was carried out before the implementation of the implementation of 16 game situation-based groundstroke training models. The test was carried out to find out the results before and after being given treatment. The average test result of 15 athletes before being treated was 31.73. After being given a variation of the game situation-based groundstroke exercise model, 16 models have been evaluated and validated, then a post-test is carried out to find out whether there is an increase in the forehand groundstroke after being given a variation of the situational game-based groundstroke training model. After taking the post-test data, it was found that the groundstroke increased marked by the increase in the results of the notes with an average of 40. Based on the description above, there are differences in the results of

the tennis groundstroke between the pre-test and post-test that the groundstroke training model is based on the game situation for Field tennis athletes developed are effective and can improve the forehand groundstroke technique.

Table 2 Results of the Normality Table Distribution on the groundstroke forehand

One-Sample Kolmogorov-Smirnov Test			
		Pre-test	Post-test
N		15	15
Normal	Mean	31.73	40.00
Parameters ^a	Std. Deviation	3.411	3.742
.b			
Most	Absolute	.098	.205
Extreme	Positive	.089	.143
Differences	Negative	-.098	-.205
Test Statistic		.098	.205
Asymp. Sig. (2-tailed)		.200 ^{c,d}	.089 ^c

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Based on the table above which has been calculated using SPSS results from the Kolmogorov-Smirnov Test, the normality data in the pre-test is 0.200 and in the post-test group is 0.089, both of which are greater than alpha 0.05. Thus, it can be concluded that the two data come from a normally distributed population.

Tabel 3 Hasil *Paired Sample Statistic (Pre-Test)* dan Setelah diberikan Treatment (*Post-Test*) pada *groundstroke forehand*

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre	31.7333	15	3.41147	.88084
	Post	40.0000	15	3.74166	.96609

The average score of the athlete before being given the game situation-based groundstroke training model was 31.73 and the average value after being given the game situation-based groundstroke training model treatment, which means that there is an increase resulting from the pre-test and post-test tennis groundstroke.

Table 4 Results of Paired Sample Correlation (Pre-Test) and (Post-Test) on the forehand groundstroke

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Pre	15	.946	.000
	Post			

Based on the table above, it is found that the correlation coefficient of the groundstroke training model based on the tennis game situation before and after being given the game situation-based groundstroke training model is 0.946 p-value $0.00 < 0.05$. So, the conclusion is that there is a significant relationship.

Table 5 Results of Paired Sample Statistics (Pre-Test) and (Post-Test) on the forehand groundstroke

Paired Samples Test					
Paired Differences		t	df	Sig. (2-tailed)	
mean	Std. Error Mean				
8.26667	1.23316	6.699	14	.000	

Pre-test	8.27	1.23	.316	26.18	14	.000
Post-test						

In the mean difference test with SPSS, the mean = 8.26667 shows the difference between the pre-test and post-test, the result of t-count = 26,183, df = 19 and p-value = $0.00 < 0.05$, which means there is a significant difference between before and after being given game situation-based groundstroke training model treatment. Based on these results, it can be concluded that the game situation-based groundstroke training model for tennis athletes at the age of 12-14 years is effective and can improve forehand groundstroke. The game situation-based groundstroke training model that has been developed has significant effectiveness.

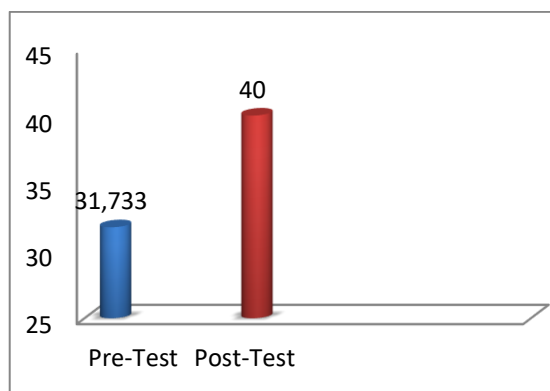


Figure 1 Test Diagram of the Forehand Grounstroke Product Effectiveness

The comparison chart above produces the average record data before and after being given the game situation-based groundstroke training model treatment for tennis athletes at the age of 12-14 years which has been obtained with an average

pre-test result of 31.733 and a post-test of 40.

Furthermore, the data obtained from the study of 15 athletes in the control group are shown in the following table:

Table 6 Hasil *Groundstroke Backhand* (Pre-Test) and (Post-Test)

Name	Pre-Test	Post-Test	Different
Subject 1	23	30	7
Subject 2	24	30	6
Subject 3	24	30	6
Subject 4	26	32	6
Subject 5	26	32	6
Subject 6	27	33	6
Subject 7	28	33	5
Subject 8	29	34	5
Subject 9	30	36	6
Subject 10	30	36	6
Subject 11	31	36	5
Subject 12	31	37	6
Subject 13	31	38	7
Subject 14	32	38	6
Subject 15	32	40	8
Average	28,27	34,33	6,07

The table shows the results of the athlete's pre-test and post-test when doing a backhand groundstroke. The pre-test was conducted before the small group test. The pre-test was carried out before the implementation of the implementation of 16 game situation-based groundstroke training models. The test was carried out to find out the results before and after being given treatment. The average test results of 15 athletes before being treated were 28,266. After being given a variation of the game situation-based groundstroke training model, 16 models have been evaluated and

validated, then a post-test is carried out to find out whether there is an increase in backhand groundstroke after being given a variation of the situational game-based groundstroke training model. After taking the post-test data, it was found that the backhand groundstroke increased, which was indicated by the increase in the results of the notes with an average of 34.33. Based on the description above, there are differences in the results of the tennis backhand groundstroke between the pre-test and post-test that the game situation-based groundstroke training model for tennis athletes developed is effective and can improve the backhand groundstroke technique.

Table 7 Distribution Results of the Normality Table on the groundstroke backhand

One-Sample Kolmogorov-Smirnov Test		Pre	Post
N		15	15
Normal	Mean	28.2667	34.3333
Parameters ^{a,b}	Std. Deviation	3.08143	3.22195
Most Extreme	Absolute	.180	.164
Differences	Positive	.117	.127
	Negative	-.180	-.164
Test Statistic		.180	.164
Asymp. Sig. (2-tailed)		.200 ^{c,d}	.200 ^{c,d}

- a. Test distribution is Normal.
- b. Calculated from data.
- c. Lilliefors Significance Correction.
- d. This is a lower bound of the true significance.

Based on table 7 which has been calculated using SPSS results from the

Kolmogorov-Smirnov Test, the normality data in the pre-test is 0.200 and in the post-test group is 0.200, both of which are greater than alpha 0.05. Thus, it can be concluded that the two data come from a normally distributed population.

Table 8 Results of Paired Sample Statistics (Pre-Test) and After Treatment (Post-Test) on Groundstroke backhand

Paired Samples Statistics				
	Mean	N	Std. Deviation	Std. Error Mean
Pre	28.27	15	3.08143	.79562
Post	34.33	15	3.22195	.83190

The average score of athletes before being given a game situation-based groundstroke training model was 28.2667 and the average value after being given a game situation-based groundstroke training model treatment was 34.33 which means that there was an increase resulting from the pre-test and post-test tennis groundstrokes.

Tabel 9 Hasil *Paired Sample Correlation (Pre-Test) dan (Post-Test)* pada *Groundstroke Backhand*

Paired Samples Correlations			
	N	Correlation	Sig.
Pre	15	.969	.000
Post			

Based on the table 9, it was found that the correlation coefficient of the groundstroke training model based on the tennis game situation before and after being given the game situation based groundstroke training model was 0.969 p-

value $0.00 < 0.05$. So, the conclusion is that there is a significant relationship.

Tabel 10 *Paired Sample Statistic (Pre-Test) dan (Post-Test)* pada *Groundstroke Backhand*

	Paired Differences				Sig. (2-tailed)
	mean	Std. Std.	Error Mean	t	
Pre-test	6.07	.79	.206	29.41	.000
Post-test					

In the mean difference test with SPSS, the mean = 6.0667 shows the difference between the pre-test and post-test, the results of t-count = 29.414, df = 14 and p-value = $0.00 < 0.05$ which means there is a significant difference between before and after being given game situation-based groundstroke training model treatment. Based on these results, it can be concluded that the game situation-based groundstroke training model for tennis athletes at the age of 12-14 years is effective and can improve backhand groundstrokes. The game situation-based groundstroke training model that has been developed has significant effectiveness.

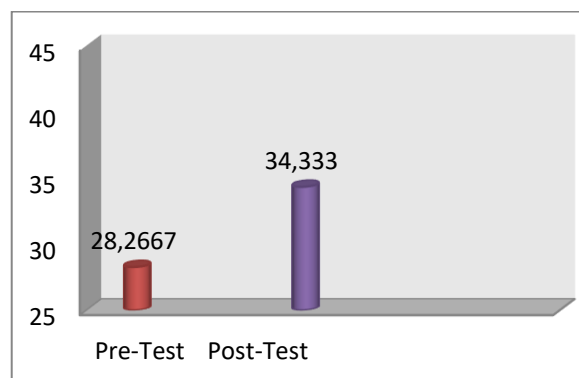


Figure 2 Test Diagram of Backhand Groundstroke Product Effectiveness

The comparison chart above produces the average record data before and after being given the game situation-based groundstroke training model treatment for tennis athletes at the age of 12-14 years which has been obtained with an average pre-test result of 28.2667 and an average post-test is 34,333.

Discussion

Based on the data obtained above, it can be concluded that the groundstroke training model based on the game situation is feasible and effective to improve groundstroke skills so that they can hit correctly.

The results of the model that the researcher has made, namely the game situation-based groundstroke exercise model for tennis athletes at the age of 12-14 years, has advantages and disadvantages. As input to researchers in order to achieve product refinement produced with several inputs as follows:

1. The selected game situation-based groundstroke training model items must be rearranged according to the stages during practice.
2. The drawings/ illustrations and instructions of the groundstroke training model must be clear so that it is easy for everyone to understand and apply.

CONCLUSION

Based on the data obtained by the researchers, the results of the study obtained 16 game situation based groundstroke training models for tennis athletes at the age of 12-14 years which in the small trial involved 15 research subjects and in the large trial involved 30 research subjects. Based on the results of the effectiveness test on 20 research subjects, the results of the pre-test Groundstroke Forehand were 31.73 and at the post-test 40, there was an increase in the groundstroke forehand technique for tennis athletes at the age of 12-14 years. The results of the pre-test groundstroke backhand were 28,267 and the post-test was 34,333, then there was an increase in the groundstroke backhand technique for tennis athletes at the age of 12-14 years.

Based on the results of the research above, the game situation-based groundstroke training model for tennis athletes at the age of 12-14 years can be applied to improve the ability and basic technical skills of forehand and backhand groundstroke athletes in tennis. The game situation-based groundstroke training model for tennis athletes can improve the ability of athletes aged 12-14 years, can create enthusiasm and prevent athlete burnout during training due to the training model that has real variations of the game. So that the training process can run smoothly without boredom for athletes. The final product is a game situation-based

groundstroke training model for tennis athletes at the age of 12-14 years which consists of 16 groundstroke training model items.

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