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THE EFFECT OF HANDGRIP TRAINING AND RACKET MODIFICATION TRAINING ON SHORT SERVICE ABILITY IN BADMINTON GAMES ON PANRITA CLUB AND SAMUDRA CLUB ATHLETES

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ABSTRACT

Badminton is one of the popular sports and is loved by many people. Badminton also consists of several techniques including racket grip, hitting technique, standing posture, and position and footwork. Therefore, physiotherapy techniques are needed to improve and maximize the grip strength of badminton players which is commonly called Handgrip. This study aims to determine the effect of handgrip training and racket modification training on short serves. The type of research used is quantitative research with experimental research methods. The sample in this study amounted to 30 people who were divided into two groups with each group consisting of 15 people. The research sample was selected using the Random Sampling technique. The data analysis technique used is the dependent t-test analysis technique. The results obtained in this study with a p-value of 0.109 > 0.05 which shows that there is no significant difference between handgrip training and racket modification on short serve ability but handgrip training is more effective than racket modification training with handgrip training, namely mean difference 9.067 and p-value 0.000 < 0.005 while racket modification training means difference 5.867 and p-value 0.000 < 0.005.This shows that both exercises are equally good for improving short serve skills in badminton. Thus, it is hoped that athletes can improve their short serve skills in badminton by routinely performing physiotherapy movements such as handgrip or other exercises such as racket modification exercises.

Keywords: *Badminton; Handgrip; Service; Racket Modification.*

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INTRODUCTION

Badminton has a long history and its introduction was relatively quick as a sport included in the Olympics. Badminton was discovered a long time ago, at least 2000 years in the games of battledore and shuttlecock which have been played in India, Greece and China. Badminton or badminton takes its name from Badminton House in Gloucestershire, home of the Duke of Beaufort, where the sport is played. Coincidentally, Gloucestershire is now the base for the International Badminton Federation (Yuliawan et al., 2022). Badminton developed in Indonesia starting with the holding of the Thomas Cup in 1958 and at that time Indonesia won. This moment became a milestone in Indonesian badminton's achievements towards winning the world badminton championship (Rifai et al., 2020).

Badminton is a sport that is popular and loved by Indonesian people today, from children to the elderly. Badminton is the sport that most often contributes gold on the Olympic stage, because of this the sport of badminton has spread to all corners of Indonesia. (ALIYUSALAM, 2023). The aim of this sport is to try to drop the shuttlecock in the opponent's playing area and try so that the opponent cannot hit the shuttlecock in the opponent's playing area and try to ensure that the opponent cannot hit the shuttlecock and drop it in his own playing area (Muaflah & Indarto, 2023). This is also in line with the opinion of (Mylsidayu & Kurniawan, 2021) which states that the aim of badminton is to try to drop the shuttlecock in the opponent's area and try to ensure that the opponent cannot hit the shuttlecock and drop it in his own area. During the game, each player tries to ensure that the shuttlecock does not touch the floor in their own playing area. Badminton is a competitive sport that requires explosive movements, lots of running, jumping, reflexes,speed in changing direction and also requires good eye, hand and foot coordination (Bompa & Buzzichelli, 2019)

In Indonesia, the game of badminton has experienced rapid development because it cannot be separated from the hard work of coaches, athletes and administrators in badminton development (Muaflah & Indarto, 2023) This can be proven by the achievements achieved in championships participated in by Indonesian badminton athletes, such as the Thomas Cup, Uber Cup, All England and even the Olympics. The achievements achieved are not quick and easy, they all go through a long process and take a long time(Harsono, 2018). Starting from problems, breeding, to coaching in an integrated, focused and sustainable manner. Becoming a skilled badminton athlete requires various conditions, one of which is mastery of basic techniques (Pan et al., 2024).

In badminton there are various basic techniques, including racket grip, hitting techniques, standing posture, and position and footwork (Prajongjai et al., 2023). Various badminton hitting techniques that must be mastered are the serve, lob or clear, dropshot, smash, drive or horizontal and return serve (Mahulkar, 2016).The hitting technique referred to here is a way to make a hitting movement by directing the shuttlecock towards the opponent's area. Badminton hitting techniques really have to be studied first, in order to develop the quality of badminton performance. This is due to whether an athlete wins or loses in a match(Tangkudung & Wahyuningtyas, 2012) .

Revealed that the development of badminton sports achievements is no different from other sports. There are several aspects that need to be considered, namely biological, psychological, environmental and supporting aspects. In big badminton clubs such as Jaya Raya, Djarum, and Mutiara Bandung, performance coaching has been going well, but there is still a lot that needs to be improved in the club concept and the correct implementation of performance coaching. To become an outstanding athlete in the future, athletes must have disciplined character, high ability, strong will, responsibility, honesty, resilience, good attitude, and talent in their field. Apart from that, nutritional support, adequate training facilities, expert trainers, and other factors are very important. (Carrasco et al., 2010). Revealed that the logical consequence of a high-quality training system is high performance. Apart from coaches, other factors that support and determine the quality of training include the results of research on training facilities and equipment, competition evaluations, athletes' abilities, and so on. He also stated other factors that determine the success of athletes' achievements, namely the application of management, although this is an indirect factor. . One of which is management in the form of financial management, management composition and also performance. Having management at the club is useful so that the activities carried out are more focused (Darminto et al., 2024) .

The formulation of management in sports can be described through planning, organizing, leadership, implementation, supervision and evaluation. Currently, the sports management system in the region has not been fully implemented as expected, however, having a good and correct sports management system will guarantee the realization of increased achievement at the club. In a badminton club, there is a management structure which will make it easier to develop achievements, where the administrators have their respective responsibilities to improve the club's standards so that it is more advanced. Each club has a planned program as a starting point for the formation of a goal that will be achieved, especially to improve the performance of its athletes.

For example, PBSI South Sulawesi provides coaching at badminton clubs in South Sulawesi, with a

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coaching center located in Gowa, Central South Sulawesi under the name Regional Student Sports Education and Training (PPLPD). Through this coaching, it is hoped that we will be able to produce reliable badminton athletes at national and even international levels(https://upeks.co.id/2021/11/gowa-jadi-pusat-pembinaan-atlet-bulutangkis-disulsel). After being inaugurated, the South Sulawesi Indonesian Badminton Association (PBSI) Management for the 2017-2021 period has prepared a number of work programs. Devo Khaddafi, Chairman of PBSI South Sulawesi said that he had prepared a work program, which was oriented towards improving the achievements of young athletes. First, make South Sulawesi a center for developing early and young athletes, second, make Badminton a sport of pride, and promote this sport so that it is a favorite sport. And in the future South Sulawesi wants to become a center for badminton competitions in the eastern region of Indonesia.

Two badminton athletes from South Sulawesi Province succeeded in making brilliant achievements by qualifying for the Indonesian badminton national training. The success of two athletes from South Sulawesi, Muh Reza Al Fajri, who comes from a school in Takalar, and Sofy Al Mushira, who comes from Sungguminasa, after defeating their opponents in the final round of the 2022 National Selection (Seleknas) over five days from January 10-15 in Cipayung National Training Center, East Jakarta. The national selection held by the PBSI Central Management aims to find new seeds to become professional badminton athletes whose training will be centered at the Indonesian Badminton National Training Center. It is known that Reza (Exist club) managed to emerge as champion in the men's cadet singles category after defeating his opponent Pradiska Bagas in the final match with a score of 18-21, 21-13, 21-12. Thus, two athletes from South Sulawesi succeeded in breaking through and will join the Central PBSI National Training Center. Chairman of PBSI South Sulawsi Provincial Government, Devo Khaddafi is proud of the achievements made by Reza and Sofy at the 2022 national selection event in the field of badminton and hopes that Reza and Sofy's success in getting through to National Training Center can be an example for young South Sulawesi badminton athletes in the future.

Serving is the most important technical part in the game of badminton, because serving is the first form of blow which is used as the first weapon in an attack pattern. short serve is a serve by directing the shuttlecock with the aim of the two targets, namely to the corner of the intersection between the service line in front and the center line and the service line and the side line, while the shuttlecock runs thinly across the net while the long serve is to direct the ball high and far and the ball must turn around. and fall as close as possible to the back line of the opponent's area (Subarkah & Marani, 2020)

The components that influence the short serve are wrist flexibility and racket modifications. Someone who has flexible wrists will easily perform short serves with efficient movements and more effective stroke results because a flexible wrist will produce a whipping service movement when the cock touches or impacts the racket. One of the training that can be given to badminton players to maximize grip strength is handgrip exercise using a handgrip (Razan & Wahyuni, 2020).

Handgrip is a physiotherapy tool to improve and maximize grip strength in badminton players. Handgrips are used by pulling a spring that has a certain strength according to the ability of a badminton player which is done repeatedly so that the maximum strength of a badminton player is achieved (Bompa & Buzzichelli, 2019). Racket modifications can affect the ability of the short serve in badminton. For example, changes to the strings or weight of the racket can affect ball control and the hitting power of short serves. Appropriate modifications according to a player's playing style and preferences can improve their short serve abilities.

Based on the results of observations made by researchers on site in February, there were problems with the athlete's ability to perform short serves (Gazali & Cendra, 2019), namely PB Panrita effective when making a short serve so that the shuttlecock gets caught in the net and Athlete PB Samudra has problems with body balance or certain muscle strength because of this, the short serve is not optimal so the shuttlecock does not go in the opponent's direction and goes out. This study aims to determine the effect of handgrip training and racket modification training on short serves in badminton among PB athletes Panrita and PB Samudra.

METODH

The type of research used is quantitative research with experimental research methods. In this research, the treatment given was handgrip training and racket modification training to see the effect on the short serve ability in badminton for athletes PB Panrita and PB Samudra. This research was carried out at the PB Panrita Badminton Court, Kec. Tanete Riattang and PB Samudra badminton court, Kec. East Tanete Riattang, Kab. Bone in June-July 2024. The population in this study was 40 people from all PB Panrita and PB Samudra athletes. The sample selection technique used was Random Sampling with a sample size of 30 people obtained from the Taro Yamane formula calculation. The samples obtained were divided into two groups, each group consisting of 15 people.

The data collection technique used was observation to see players' activities during badminton sports activities. Observations were carried out personally by researchers at PB Panrita and PB Samudra. And the short serve ability

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test is carried out to measure the extent of a player's skills in performing short serve techniques in badminton.

In this research, the data analysis technique used is the dependent t-test analysis technique. The significant value of α is 0.05, meaning that the variable handgrip training and racket modification training have an influence on increasing short serves. Normality test uses data analysis with the SPSS 22 application.

RESULTS AND DISCUSSION

Results

The subjects in this research were athletes PB Panrita and PB Samudra Bone with a sample of 30 people. PB Panrita carried out pre-test data collection in July and post-test in July, while PB Samudra collected pre-test data in June and post-test in August. After collecting pre-test data on badminton short serve ability, training was carried out in 8 meetings, namely at PB Panrita, 2 meetings a week on Mondays and Wednesdays, and 1 meeting a week at PB Samudra on Sundays. The training was given in accordance with The groupings determined by the researcher were group A handgrip training and group B practicing racket modifications. Before training, athletes first warm up. This study aims to determine the effect of training, the results of the influence of handgrip training and racket modifications on the short serve ability in the badminton game of athletes PB Panrita and PB Samudra. The research is described as follows:

Tabel 1. *Pre-Test and Post-Test* Short serve ability of PB Panrita athlete's handgrip experimental group.

Statistik	***Pre-Test***	***Post-Test***
N	15	15
Mean	11,20	10,27
Median	11,00	20,00
Modus	12	20 dan 21
Std Deviation	2,178	3,615
Min	8	15
Max	16	28
Sum	168	304

The research results were described using descriptive statistical analysis, where for the pre-test results the minimum value = 8, maximum value = 16, average (mean) = 11.20, middle value (median) = 11.00, frequently occurring value (mode) = , with standard deviation (std. Deviation) = 2.178, while for the post test minimum value = 15, maximum value = 28, average (mean) = 10.27, middle value (median) = 20.00, value often appears (mode) = , with standard deviation (std. Deviation) = 3.615.

Tabel 2. *Pre-Test dan Post-Test* Short service ability of the experimental group modifications racket atlet PB Samudra

Statistik	***Pre-Test***	***Post-Test***
N	15	15
Mean	12,20	18,07
Median	12,00	18,00
Modus	12	16
Std Deviation	2,369	3,674
Min	7	12
Max	17	25
Sum	183	271

The results of the research were described using descriptive statistical analysis for athletes at PB Samudra, where for pre-test results minimum value = 7, maximum value = 17, average (mean) = 12.20, middle value (median) = 12.00, value often appears (mode) = , with standard deviation (std. Deviation) = 2.369, while for the post test minimum value = 12, maximum value = 25, average (mean) = 18.07, middle value (median) = 18.00 , frequently occurring values (mode) = , with standard deviation (std. Deviation) = 3.674.

Next, a data analysis test was carried out to answer the hypothesis that had been proposed by first carrying out a data normality test. The normality test results of the data obtained for each variable are p-value > 0.05, which means the data is normally distributed. Next, a homogeneity test was carried out to test the similarity of the samples and a p

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value > 0.05 was obtained. This result could be concluded that the data in the study were homogeneous or had the same variance. And the data can be continued for dependent t-test analysis.

Tabel 3. Result Uji Paired T-Test Handgrip training

Group	Mean	Mean difference	p-Value
Pre-Test	11,20	9,067	0,000
Post-Test	20,27		

Based on table 3, it shows that the average score of PB Panrita athletes before being given handgrip training was 11.20 and after being given handgrip training for 8 meetings, the average increase was 9.067 to 20.27 with a p-value obtained of 0.000 < 0. 05, it can be concluded that there is a significant influence between handgrip training on the short serve ability of PB Panrita athletes.

Tabel 4. Result Uji Paired T-Test Racket Modification Practice

Group	Mean	Mean difference	p-Value
Pre-Test	12,20	5,867	0,000
Post-Test	18,07		

Based on table 4, it shows that the average score of PB Samudra athletes before being given racket modification training was 12.20 and after being given racket modification training for 8 meetings, the average increase was 5.867 to 18.07 with a p-value obtained of 0.000 < 0.05, it can be concluded that there is a significant influence between racket modification training on the short serve ability of PB Samudra athletes.

Tabel 5. Handgrip t test analysis and racket modifications

Group	Mean	Mean difference	p-Value
Handgrip	20,27	2,200	0,109
Modifications Racket	18,07		

From the results of the data analysis above, p-value = 0.109 > 0.05 which shows that there is no significant difference between handgrip training and racket modifications on short serve ability. This shows that both exercises are equally good for improving badminton short serve ability.

DISCUSSION

The research that has been carried out is a quantitative type of research with an experimental method using a Two Groups Pretest-Posttest research design using 30 PB Panrita and PB Samudra athletes as samples. The purpose of this research is to find out whether there is an effect of handgrip training on the short serve ability in the badminton game of PB athlete Panrita Bone, to find out whether there is an effect of racket modification training on the short serve ability in the badminton game of PB Samudra athlete, to find out which of the two effects is more effective. This method affects short service capabilities. There are two instruments in this research, namely Pretest-Posttest. The implementation of the handgrip training program and racket modifications had the same effect on improving the short serve ability of athletes at PB Panrita and PB Samudra.

Based on the research results, there is a significant influence between handgrip training on the short serve ability of PB Panrita athletes with a p-value of 0.000 < 0.05. If the research results are linked to the underlying theory and framework, then basically the results of this research support and strengthen existing theories and previous research results. This proves that the short serve ability in badminton is greatly influenced by the handgrip. This is in line with research with research results showing that long serve ability is supported by arm muscle strength by 7% with a significant value = 0.000, which means that the better a person's arm muscle strength, the better the badminton long serve ability with the results that there was an effect of handgrip exercise on grip strength in badminton players at Gor Pratama. It can be understood that the handgrip is a test tool to measure the muscle strength of a person's fingers. Handgrip exercises are designed to strengthen the hand muscles, especially the grip muscles. Better grip strength can help a player control the racket more effectively, which is important when playing short serves. Handgrip training affects players' grip strength because handgrip training functions to activate the forearm muscles by

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contracting the flexor and extensor muscles so that an increase in grip strength can occur.

Apart from handgrip training, racket modifications also have an influence on improving short serve ability in badminton. Based on the results of the research, the average score of PB Samudra athletes before being given racket modification training was 12.20 and after being given racket modification training for 8 meetings, the average increase was 5.867 to 18.07 with a p-value obtained of 0.000 < 0.05, it can be concluded that there is a significant influence between racket modification training on the short serve ability of PB Samudra athletes.

Racquet modifications can affect the improvement of short serves because changes to the racket, such as adding weight or changing the balance, affect how the player controls and hits the shuttlecock. Proper modifications can help players develop better power and precision when executing short serves. For example, by adding weight to the racket, players can strengthen the arm and wrist muscles, which are important for control and speed when executing short serves. This ultimately helps the shuttlecock cross the net with a more accurate and low distance, in accordance with the desired technique in short serves.

Based on the description above, it is known that the implementation of the actions that have been given can improve the short serve ability in badminton with a coaching process in sports that cannot be completed immediately, but must go through a long process. To achieve the best performance requires perseverance, sacrifice, determination and motivation based on the best results. Based on the research results, it was found that both handgrip training and racket modification had a significant effect on improving short serve ability and the results of the comparison test showed that there was no significant difference between these two methods in terms of their effectiveness. This means that both methods are equally effective in improving badminton players' short serve abilities.

These two training methods function to increase the strength or flexibility of the athletes' wrists. This is supported by research which states that wrist flexibility can influence short serves in playing badminton. A short serve is performed using wrist/joint movement, so someone who has good wrist flexibility will be able to perform a quality short serve. Good wrist flexibility does not appear suddenly but because of practice. The training carried out must be continuous, so that improvement can be achieved. The quality of good wrist flexibility can help and make it easier for someone to perform short serves in a game of badminton. The results of this study emphasize the importance of variation in training methods and provide evidence that both physical training (such as handgrips) and equipment modifications (such as racket modifications) can effectively improve badminton players' short serve performance.

CONCLUSION

Based on the research results obtained by data analysis and hypothesis testing, there is a significant influence on handgrip training on the short serve ability of PB Panrita athletes, indicated by a mean difference of 9.067 and a p-value of 0.000 < 0.05. There is also a significant effect of racket modification training on the short serve ability of PB Samudra athletes with a mean difference of 5.867 and a p-value of 0.000 <0.05. And both handgrip training and racket modification training effectively influence short serves with a mean difference of 2.200 and a p-value of 0.109 > 0.005. Both handgrip training and racket modification training are effective in influencing short serves with a mean difference of 2.200 and p-value 0.109 > 0.005 but handgrip training is more effective than racket modification training with handgrip training, namely mean difference 9.067 and p-value 0.000 < 0.005 while racket modification training mean difference 5.867 and p-value 0.000 < 0.005. We hereby declare that our article is the result of research we have conducted and has never been published in any journal. If there are similarities or results of other people's work, we are ready to accept sanctions from the journal management of the Islamic University of Kalimantan Muhammad Arsyad Al-Banjari Banjarmasin.

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