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Effectiveness of Training Variations in Improving Forehand Smash Ability in Badminton Game

Nikmah Kuswanti[1], Yuskhil Mushofi[2], Rubbi Kurniawan[3*], Trinovandhi Setyawan[4], Shinta Masitho Windriyani[5]

[1,2,3,4,5]Department Physical Education, Health and Recreation, Universitas Insan Budi Utomo. Indonesia

*Corresponding Author: Rubbi, Kurniawan, e-mail: rubbikurniawan@budiutomomalang.ac.id

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Abstract

Study purpose. This study aims to investigate the effectiveness of variations of arm muscle strength training and body flexibility in improving the forehand smash hitting ability of badminton players.

Materials and methods. The research sample consisted of 14 badminton players who were members of PB Nusantara Malang. The research used a quasi-experimental method with the research design used in the form of a one group pretest-posttest design. The research instrument used a forehand smash test.

Results. The average result of forehand smash before treatment was 17.286 ± 6.787, and after treatment the average value was 19.571 ± 6.047. Data analysis using the Paired Sample T Test level of significance level of 0.00. This means that there is a significant difference between posttest and pretest.

Conclusion. Based on the results of the research that has been done, it can be concluded that training variations of arm muscle strength training and body flexibility training is an effective combination of exercises to improve the results of forehand smash shots in badminton games. This can be used as the basis for trainers in compiling badminton training programmes in order to get maximum results, especially in forehand smash training.

Keywords: Exercise Variations, Forehand Smash, Badminton

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Introduction

Badminton is a dynamic sport full of complex techniques (Ardyanto, 2018; Manurizal, Armade, & Jarniarli, 2020). Developed in England in the 19th century, badminton is one of the most popular sports in the world. The game involves two or four players competing on a court marked by a net. The aim is to hit the shuttlecock towards the opponent so that it cannot be returned properly (Rahman, Munandar, & Walinga, 2022).

Badminton is not only a sport but also an important part of culture in several countries, one of which is Indonesia (Putranto, 2019). World-class badminton tournaments such as the

World Championships and the Olympics attract millions of fans from all over the world (Widaningsih, Santoso, & Fahmi, 2021). In addition, the achievements of outstanding badminton players are often considered as national pride for their country (Budiharjo & Raharjo, 2023).

Speed, agility and strength are the keys to success in badminton (Himawan & Permadi, 2019; Rizky, Arifin, Warni, & Mashud, 2022). Players must show reaction speed and accuracy when hitting the shuttlecock as well as the intelligence to choose the right strategy to defeat their opponent (Cahyaningrum, Naheria, & Cahyono, 2023). In addition, badminton also requires good physical strength especially to maintain long distance shots and produce powerful shots (Aisyah, 2021).

The basic components that must be mastered by every badminton player are basic techniques (Ali & Iqroni, 2022). Basic badminton techniques provide an important foundation for players to master the game well (Suharto, 2019). One of the important basic techniques that must be mastered by badminton players is the forehand smash. When performing a forehand smash, the player uses his dominant arm to hit the shuttlecock from the front of his body. The movement consists of a circular motion that starts from below and ends above the head, with the shuttlecock being hit with the part of the racket called the 'sweet spot' for maximum power and accuracy (Gusrinaldi, Irawan, Kiram, & Edmizal, 2020).

The advantage of forehand smash lies in its ability to produce powerful and targeted shots relatively quickly (Ichsan, Indarto, & Purnama, 2022). The player can use his/her stroke to send the shuttlecock to various corners of the court, putting the opponent in a difficult position to defend. In addition, because the forehand smash movement is performed on the more open side of the body, the player has more room to use body strength and produce more powerful shots (Sholeh, 2022).

As one of the most important fundamental techniques in badminton, practice is necessary to develop more effective forehand smash skills. Players must pay attention to correct technique, including proper body position, grip and arm movement, to ensure consistency in their shots (Burhan, Herlina, & Nulhadi, 2022; Purnama & Mahfud, 2023; Syarifudin, Mulhim, & Erliana, 2023). In addition, improving physical abilities is also needed in improving the ability to hit forehand smash in badminton. One of the physical components in question is arm muscle strength. A strong forehand smash requires sufficient arm strength to move the racket with the appropriate speed and power (Digantara, Ngadiman, Festiawan, Kusuma, & Wahono, 2020; Koloway, Runtuwene, & Langi, 2021). Specialised exercises that strengthen the muscles in the arms, such as weight training or using resistance equipment, can help players develop the strength needed to produce more powerful and consistent shots (Munadi, Satrianingsih, & Bausad, 2018; Prayogo, 2023).

Body flexibility is another important physical component part in improving forehand smash strokes (Asnaldi, 2020; Wicaksono, 2021). *An effective forehand smash requires a good range of motion in joints such as the shoulders, hips and wrists* (Nofrizal, 2019). Regular flexibility training can help improve the body's flexibility, allowing players to achieve optimal positioning when hitting and increasing the range of motion to effectively hit wider and deeper shots (Hariadi, Samodra, Yosika, Wati, & Gandasari, 2023; Kurniawan, Kesoema, & Hendrianingtyas, 2019).

The research is based on the understanding that the importance of physical components in improving the ability of badminton players. The forehand smash in badminton requires good coordination between arm muscle strength and body flexibility in order to produce a strong and accurate shot. Most research only focuses on one aspect, either strength flexibility separately. Therefore, this study aims to investigate the effectiveness of variations in arm muscle strength training and body flexibility in improving the forehand smash hitting ability of badminton players.

This study combines aspects of strength and flexibility, so that the results obtained can provide a comprehensive picture of how these two components contribute synergistically in improving forehand smash hitting ability. By including flexibility as one of the focuses, this research contributes to badminton players. The results obtained will open up opportunities for innovation in badminton training programmes, which will ultimately improve athlete performance.

Materials and Methods

Study participants.

The research sample consisted of 14 badminton players who were members of PB Nusantara Malang. Sampling using purposive sampling technique, the sample was selected based on the age category between 17 to 20 years, including those who have mastered the forehand smash technique well. This sample group is considered to represent a diverse badminton population, so that the results of the study can have a broader generalisation.

Study organization.

The study used a quasi-experimental method using a quantitative approach. The research design used is a one group pretest-posttest design, which is a study conducted on one sample group by providing treatment in the form of variations in arm muscle strength training and flexibility training. The exercises were carried out for 2 months with details of 5 exercises a week. Arm muscle strength training uses 5 types of exercises, namely push-ups, tricep dips, hummer curls, skull crushers, and overhead tricep extensions, which are performed as many as 3 sets and 12-15 repetitions with a break between sets for 30 seconds. As for flexibility training using 6 types of exercises, namely cross-body shoulder stretch, triceps stretch, cat-cow stretch, child's pose, cow face pose, and eagle arms, which are done as many as 3 sets with the duration of each set of 30 seconds. The research instrument used a forehand smash test, where the test was carried out before treatment (pretest) and after treatment (posttest).

Statistical analysis.

The collected data will be tested for data distribution using the Kolmogorov-Smirnov Test, to test data normality, and Levene's Test, to test data homogeneity. Furthermore, the data is analysed using the paired sample t-test statistical method with the help of SPSS software version 25. The results of the analysis will be a reference in formulating conclusions in the study.

Results

The research data is in the form of numbers from the badminton forehand smash test results. The test was carried out in two stages, namely the pretest stage and the posttest stage presented in table 1.

Table 1. Results of pretest and posttest of forehand smash shots

Description	*Pretest*	*Posttest*
Average	17,286	19,571
Standard Deviation	6,787	6,047
Maximal Value	25	26
Minimum Value	7	10

Based on the data in table 1, it is known that the average value of the forehand smash test results before being given treatment (pretest) is 17.286 points with a standard deviation of 6.787. The average forehand smash test results after being given treatment (posttest) increased

to 19.571 points with a standard deviation of 6.047. When the pretest the maximum value that can be obtained is 25 points and the minimum value is 7 points. Whereas when the posttest the maximum value that can be obtained is 26 points and the minimum value is 10 points.

Table 2. Results of normality and homogeneity test data

Testing	Sig.		α
	Pretest	***Posttest***	
Normality	0,2	0,069	0,05
Homogeneity	0,646		

Table 2 in testing normality using the Kolmogorov-Smirnov Test, it was found that the significance value on the pretest was 0.2 and the significance value on the posttest was 0.069. Based on these results it can be said that the pretest and posttest data are normally distributed (ρ> 0.05). While testing the homogeneity of the data obtained a significance value of 0.646, so that the data variation used is homogeneous (ρ> 0.05).

Table 3. Data analysis results

Paired Sample T Test			
	t	**df**	**Sig.**
Posttest-Pretest	5,551	13	0,00

Table 3 data analysis using the Paired Sample T Test obtained a t value of 5.551 with a degree of freedom of 13 and a significance level of 0.00. This means that there is a significant difference between posttest and pretest. Therefore, it can be concluded that variations in arm muscle strength training and body flexibility can improve the ability to hit forehand smash badminton players.

Discussion

The results of the research that has been conducted show that variations in arm muscle strength training and body flexibility are effective for improving the forehand smash hitting ability of badminton players. This is in accordance with research which found that arm muscle strength and flexibility of long serve accuracy (Manullang & Ngatimin, 2023) and the accuracy of badminton smash shots (R. Putra, 2019). Arm muscle strength training can increase the strength needed to hit a strong forehand smash (Abizar & Fahrizqi, 2022; Ruskin & Liputo, 2021), while flexibility training helps to increase the range of motion and body coordination required during forehand smashes (Hariadi et al., 2023; Siregar, Budiningsih, & Novitasari, 2018).

Another study found that arm muscle training has a good effect on improving smash hitting ability in badminton games (Aulia, Munzir, & Is, 2022; Hasibuan & Hasibuan, 2021; Sudiadharma & Rahman, 2023). By doing arm muscle strength training consistently, the muscles that move the arm become stronger and can produce greater power when hitting forehand smashes. Arm muscle strength training also helps in improving coordination and stability during forehand smash shots (Pratomo, Pranata, & Rahmat, 2022; Yachsie, 2019), so that the resulting accuracy increases.

Arm muscle strength training can be done using resistance bands or using your own body weight. The exercises performed not only use the arm muscles, but also use other muscles and stabilisers that are important in maintaining body balance during forehand smash shots (Anjasmara, Widanti, & Mulyadi, 2021; Muladi & Kushartanti, 2018). With increased body balance, the badminton player's body position remains stable even though he hits the maximum shot so that the resulting shot is more accurate (Imam & Untung, 2022; Nando, 2018).

Another study also found that flexibility training is very important to improve forehand smash in badminton (S. S. P. Putra, Sobarna, & Rizal, 2021; Surahman, Yeni, & Sanusi, 2019). Good flexibility can increase the range of movement and better body position in performing forehand smash shots (Nofrizal, 2019). Good muscle flexibility can optimise batting positions resulting in more accurate shots (Arridho, Padli, Arwandi, & Yenes, 2021). In addition, body flexibility can help players to be more flexible in hitting forehand smashes and reduce the risk of injury caused by movements that are too rigid (Hariyanti, Astra, & Suwiwa, 2019; Yaumulhak, Darajat, Gumilar, & Nuryadi, 2024).

It is important to note that flexibility should be an integral part of a badminton player's training programme, along with strength and technique training. Training that involves strength, flexibility and good technique can improve a badminton player's performance during matches. By improving arm muscle strength and body flexibility, players can produce more effective forehand smashes with no loss of body balance.

Conclusions

Based on the results and discussion, it is concluded that arm muscle strength training and body flexibility training are an effective combination of exercises to improve the results of forehand smash shots in badminton games. This can be used as the basis for trainers in compiling badminton training programmes in order to get maximum results, especially in forehand smash training. Other factors such as diet, sleep patterns, and other physical activities were not fully controlled in this study, so future studies are expected to conduct tighter controls to ensure that the observed changes are caused by the exercise intervention.

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Conflict of interest

The authors do not have any conflicts of interest with any of the parties.

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Information about the authors:

Nikmah Kuswanti.: nikmahkuswanti151@gmail.com, Department Physical Education, Health and Recreation, Universitas Insan Budi Utomo. Indonesia

Yuskhil Mushofi, M.Pd.: yuskhilgalbina@gmail.com, Department Physical Education, Health and Recreation, Universitas Insan Budi Utomo. Indonesia

Rubbi Kurniawan, M.Pd.: rubbikurniawan@budiutomomalang.ac.id, https://orcid.org/0009-0001-6742-3222, Department Physical Education, Health and Recreation, Universitas Insan Budi Utomo. Indonesia

Trinovandhi Setyawan, **M.Pd.**: trinovandhisetyawan1986@gmail.com, Department Physical Education, Health and Recreation, Universitas Insan Budi Utomo. Indonesia

Shinta Masitho Windriyani, M.Kes.: masithosport@gmail.com, Department Physical Education, Health and Recreation, Universitas Insan Budi Utomo. Indonesia

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