



## Footwork and grip strength: is it related to smash accuracy

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### ABSTRACT

The accuracy of the badminton specialization students' smash is still far from what is expected, this is evident from when the students doing a smash they only smash the shuttlecock into the opponent's area so they do not pay attention to the accuracy of the smash done. The weakness of the students is that they are not aware of the footwork function. This research is a type of correlational research that aims to determine the degree of relationship between footwork and grip strength with smash accuracy in badminton. The population of this study were students of specialization badminton courses. The sample in this study were students specializing in badminton, totaling 35 people with a total sampling technique. Data was collected by measuring the footwork through a footwork ability test, and grip strength was measured using the hand grip dynamometer. While the smash ability is measured through the smash test. Data analysis and hypothesis testing one and two used a simple correlation analysis technique, while hypothesis three used a multiple correlation analysis technique with a significant level = 0.05. From the data analysis, the following results were obtained: 1) *Footwork* has a significant relationship with the ability to smash in badminton, 2) Grip strength has a significant relationship with smash ability in badminton, 3) Footwork and grip strength together have a relationship with the accuracy of smash in the badminton game.



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## Introduction

Badminton is one of the most popular sports and can be played both indoors and outdoors and can also be played by a beginner or by those who have practiced for a relatively long time. This sport can be played using several equipment such as shuttlecock, net, and racket. The shuttlecock hitting technique can be done with various variations from slow to very fast accompanied by deceptive movements that are usually only able to be done by trained people. (Bankosz et al., 2013; Muthiarani et al., 2021). Badminton has been played by the community for more than 130 years and of course it has also experienced a lot of significant development, both in terms of technique and technology used. (Lees, 2003). There are many badminton championships that have been held in various parts of the world so we don't realize that badminton has become more popular than we thought (Li et al., 2016). The idea of a badminton game is how to prevent the ball from dying/falling on our own field so that victory can be obtained (Fitra et al., 2020)

There are many techniques in this badminton sport, one of which is the smash. Smash becomes a deadly blow because the speed of the ball produced in this punch is very powerful. according to (Setiawan et al., 2020) The smash can be a scary technique for the opponent because the ball's speed is hard and dives sharply into the area so that it is difficult for the opponent to return. The accuracy of a smash owned by a player will certainly be very beneficial for the player, because he will be able to direct his smash to areas that are difficult to reach by the opponent. In order to win a match, of course, it is not enough just to have a strong smash, but it must be accompanied by good accuracy (Manurizal, 2016)

There have been several studies conducted related to efforts to improve the accuracy of athletes in smashing, (Kristiyanti et al., 2021). In this correlational study, he explained that in order for a smash to be accurate, it requires good coordination and grip strength. In other research (Gustaman, 2019) revealed that a good smash ability is based on the player's high jump when doing a smash, he also explained that footwork and leg muscle strength also have a close relationship with the player's ability to smash. other than that (Pardiman & Hendriawan, 2020) in his research revealed that to improve the accuracy of the smash, it can also be done by providing various forms of training, because with lots of exercises, the consistency of smash accuracy will be obtained. Prayadi & Rachman (2013) revealed that the ability to smash can be improved by drill practice and practice using the playing method. From several previous studies, the researchers wanted to know how big the relationship between footwork and grip strength with smash accuracy in badminton because there is still little literature that has discussed this.

## Method

This study uses a quantitative approach with the correlational method. The researcher wanted to see how strong the relationship between footwork and grip strength was on smash accuracy in badminton. The population in this study were all 35 students who were taking specialization badminton courses. Samples were taken using a total sampling technique, meaning that the entire population was used as a sample. Data was collected by measuring the footwork through a footwork ability test, and grip strength was measured using the Hand grip Dynamometer. While the smash ability is measured through the smash test. Data analysis and hypothesis testing 1 and 2 using a simple correlation analysis technique

## Results and Discussions

### Footwork (X1)

The maximum score of footwork = 17 and minimum score = 11. Then it produces mean (mean) = 13.37, and standard deviation = 1.71

Table 1 <Footwork Frequency Distribution (X1)>

No	Interval Class	Frequency		Category
		Absolute (Fi)	Relative (%)	
1	18 – 20	0	0%	Very well
2	15 – 19	9	25.71%	Well
3	12 – 14	18	51.42%	Currently
4	9 – 11	8	22.85%	Not enough
5	6 – 8	0	0%	Less once
Amount		35	100	

In this study, there are 9 people (25.71%) had footwork 15-19 belonging to the good category, 18 people (51.42%) had footwork 12-14 belonging to the moderate category, 8 people (22.85%) ) has footwork 9 – 11 classified as poor category, very good category and not at all. From the footwork ability data obtained from 35 samples, the average footwork ability is 13.37 which is included in the medium category. So it can be concluded that the footwork ability of the sample is moderate.

### Grip Strength (X2)

The maximum score of grip strength = 65 and a minimum score = 30. Then the mean (mean) = 44.83, and standard deviation = 7.29.

Table 2 &lt;Frequency Distribution of Grip Strength (X2) &gt;

No	Interval Class	Frequency		Category
		Absolute (Fi)	Relative (%)	
1	>56	2	5.71%	Very well
2	51-56	3	8.57%	Well
3	45-50	12	34.28%	Enough
4	39-44	14	40%	Not enough
5	<39	4	11.42%	Not much
Amount				

In this study, there are 35 samples, 2 people (5.71%) had grip strength >56 classified as very good category, 3 people (8.57%) had 51-56, 12 people (34.28%) had 45 -50 were classified as sufficient category, 14 people (40%) had 39-44 classified as less category and 4 people (11.42%) had <39 classified as very poor category. From the grip strength data obtained from 35 samples, the average grip strength ability is 44.83 which is included in the sufficient category. So it can be concluded that the grip strength of the sample is sufficient

### Smash accuracy (Y)

Table 3 &lt;Frequency distribution of smash accuracy (Y)&gt;

No	Interval Class	Frequency		Category
		Absolute (Fi)	Relative (%)	
1	10.4 – 12.0	1	2.86%	Very well
2	8.7 – 10.3	7	20.00%	Well
3	7.0 – 8.6	9	25.71%	Enough
4	5.3 – 6.9	8	22.86%	Not enough
5	3.6 – 5.2	10	28.57%	Not much
Amount		35	100	

Based on the table above, the smash ability is obtained with a maximum score = 12 and a minimum score = 4. Then it produces a mean (average) = 6.74, and a standard deviation = 2.08. In this study, there are 35 samples, 1 person (2.86%) had a smash ability of 10.4 – 12.0 in the very good category, 7 people (20.00%) had 8.7 – 10.3 in the category good, 9 people (25.71%) had 7.0 – 8.6 belonging to the sufficient category, 8 people (22.86%) had 5.3 – 6.9 belonging to the poor category and 10 people (28.57%) has 3.6 – 5.2 classified as very poor category. From the smash accuracy data obtained from 35 samples, the average smash accuracy ability is 6.74 which is included in the poor category. So it can be concluded that the smash accuracy of the sample is lacking.

### Hypothesis testing

The results of the analysis of the relationship between footwork (X1) and grip strength (X2) on smash ability in badminton (Y) can be described as follows:

#### Hypothesis Test One

The hypothesis proposed is that there is a significant relationship between footwork and the accuracy of the results of a smash in badminton. Therefore, the hypothesis is tested by using the Pearson product moment correlation formula. Based on the results of the correlation analysis from the table above, it is obtained that  $r_{count} (0.610) > r_{tab} (0.334)$  at the significant test level = 0.05, meaning that there is a significant relationship between footwork ability and smash ability in badminton games. This is because the analysis conducted on the two variables shows a significant relationship, this is indicated by the calculated correlation coefficient is greater than the table correlation coefficient.

#### Test hypothesis two

The hypothesis proposed is that there is a significant relationship between grip strength and smash accuracy in badminton. Based on the results of the correlation analysis from the table above, it is obtained that  $r_{count} (0.614) > r_{tab} (0.334)$  at the significant test level = 0.05, meaning that there is a significant relationship between grip strength and smash ability in badminton games. Because the analysis conducted on the two variables shows a significant relationship, this is indicated by the calculated correlation coefficient is greater than the table correlation coefficient.

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**Test hypothesis three**

The third hypothesis proposed is that there is a significant relationship between footwork and grip strength along with smash accuracy in badminton games. Based on the results of the correlation analysis from the table above, it is obtained that  $R_{count} (0.710) > r_{tab} (0.334)$  at the significant test level = 0.05, meaning that there is a significant relationship between footwork and grip strength together with smash ability in badminton.

The research results confirm that there is a significant relationship between footwork and smash skills in badminton. This means that the footwork variable has a relationship with the smash in badminton. Based on the results of this research, the success of the smash movement is influenced by good footwork. So that excellent footwork skills are needed so that the ability of badminton smash accuracy is optimal. With excellent footwork skills, the accuracy of the badminton smash will get maximum results (Lin et al., 2015). In the badminton game, the agile function of the feet plays a very important role because the speed of the ball in a match will take place very quickly, players must be able to move after movement to keep the ball from falling in its own area. To improve footwork performance, one of them can be done by shadow training, shadow exercises that are continuously trained will improve the athlete's footwork performance so it is hoped that the player's foot movement will support the accuracy of the smash launched by the player (Kusuma & Jamaludin, 2020)

In badminton, footwork is very much needed, this is because of the characteristics of this game which demands a lot of repetition of fast movements towards the ball and getting ready to do the next thing so that the ball doesn't die in our area. (Manrique & González-Badillo, 2003). The player moves to a corner and then has to return to the middle of the field so that the next shot can be done quickly (Sravan Kr Singh Yadav, 2017; McGinnis et al., 2017), so that agile footwork will indeed support the implementation of a good smash and of course a good game too (Kuntze et al., 2010; Singh et al., 2011)

Footwork is a movement activity that involves a lot of work from the leg muscles that continue to move during the game. If someone can maintain the ability of footwork during the game then the player has the opportunity to be able to continue to follow the game. The same goes for smashes that require a strong base of footwork (Chen, 2014)

The significance of the relationship between grip strength and smash ability is revealed in this study, meaning that the grip strength variable has a relationship with smash in badminton. This is the same as the results of the study Manurizal (2016), grip strength and the ability to serve slice in tennis have a significant relationship, so that the element of grip strength must be trained by badminton players. Because based on the results of previous research, it was explained that the success of the badminton smash movement carried out by a player was supported by the condition of the player's grip strength.

According to (Kristiyanti et al., 2021) said people who have strong muscles will be difficult to get injured, the ability to perform movements will also become more agile and strong and the joints will become more stable. The condition of the strength of a strong muscle or group of muscles will provide many advantages for a person in carrying out various movement activities, for example the smash movement in badminton. The strength and accuracy of the smash launched by a badminton player will be dominated by the muscular ability of a good player. A strong grip and strong swing are able to produce sharp and accurate smashes so that it will be very dangerous for the opponent who receives the smash.

Badminton is a type of game sport that has several basic techniques, one of which is the basic smash technique. according to (Fitra et al., 2020) said that the smash is a blow that is done when the shuttlecock is in a relatively high position and then hit with full force towards the bottom, this blow is a blow to attack and the purpose of this blow is to kill the ball in the opponent's area. Based on this opinion, it can be concluded that the smash technique is a blow that aims to get points, because the smash is a hard hit that is difficult for the opponent to return.

In badminton, both footwork and grip strength play a role in the implementation of the smash stroke. So, in order to maximize the smash ability, coaches and players must pay attention to the condition of their footwork and grip strength. The results of this study can be concluded if the footwork ability and grip strength are good then the smash ability possessed by someone is also good. according to (Sakurai & Ohtsuki, 2000) Strong muscles when doing a smash will greatly affect the quality of a good smash. Therefore, muscle ability must also be considered so that the footwork and grip strength are strong, so that in the end it will have an impact on the accuracy of the smash produced by the player. The ability to do smash must continue to be developed in various ways, in addition to increasing the physical element, smash ability can also be improved by using shadow training, with regular practice, the smash ability will increase (Prayadi & Rachman, 2013)

## Conclusions

Based on the data obtained in this study, it proves that there is a relationship between footwork and grip strength with smash ability in badminton. The role of the smash which is quite significant during the match to get points from the opponent requires the coach to consider the two variables in this study, footwork and grip strength must be trained with the creativity and variation of each coach so that the smash hit becomes stronger. The small number of samples studied is a weakness in this study, so it is recommended that further research be conducted with a larger sample. Psychological factors may affect the smash strength of the players so that researchers recommend studies related to these variables to be investigated more deeply.

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