



## The Contribution of Leg Length, Leg Flexibility and Leg Speed to the Results of Kedeng Sepaktakraw's Smash Ability

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### Abstract

Smash kedeng sepaktakraw owned by players is not good, so the smash ball is often not directed and stuck in the net. This study aimed to analyze the leg length, leg flexibility, and foot speed contribution to the kedeng smash ability of extracurricular male students of SMPN 2 Mandiraja Banjarnegara. This study uses regression and correlational methods or the contribution of four variables. The sample used was 30 male extracurricular takraw students at SMPN 2 Mandiraja. The independent variables in this study were leg length, limb flexibility, and foot speed, while the dependent variable was smashed kedeng. The instruments used are tests and measurements. The data analysis technique used multiple regression analysis. The results showed: 1) the length of the legs contributed to the smash kedeng by 10.24%. 2) limb flexibility contributed to the kedeng smash by 28.84%. 3) foot speed contributed to the kedeng smash by 21.16%. 4) Leg length and limb flexibility contributed to the kedeng smash by 31.36%. 5) Leg length and foot speed contributed to the kedeng smash by 35. 6) leg flexibility and foot speed contributed to the kedeng smash by 44.49%. 7) Leg length, leg flexibility, and foot speed contributed to the kedeng smash by 47%. There is a contribution from each independent variable, namely leg length, flexibility, and speed, to the dependent variable, namely the kedeng smash in sepak takraw. Physical activity and regular and structured exercises also play an essential role in the ability to smash kedeng in the sepak takraw game.

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### INTRODUCTION

Activities to improve sports achievement need to be carried out through

coaching athletes as early as possible by searching and monitoring talent, breeding, education and training for sports achievements

through extracurricular activities at school. Achievement in sports requires maximum effort with planned, tiered and sustainable coaching and development (Mahandra, & Ridwan, 2019; Khairunnisa & Pitriani, 2019).

Sepaktakraw is one of the traditional game sports favoured by various levels of Indonesian society. According to Mikanda Rahmani (2014), the game of sepak takraw can be stated as a combination of soccer and volleyball, which builds agility and fitness for its players. The game of sepak takraw is a team sport using the net, ball, and field as well as other regulations (Semarayasa, 2010). The sport of sepak takraw is currently divided into four competitions: two against two, three against three, four against four, and hooptakraw (Hidayat. R. et al., 2020).

One of the basic techniques that must be mastered in the game of sepak takraw is the smash. Smash is the last attack that generates many numbers (Sardiman et al., 2017; Hamid et al., 2015). while in Semarayasa (2014), Smash is a tough, sharp and fastball blow over the net directed to the opponent's field to get points or points.

This sepak takraw sport has become one of the games used as extracurricular activities

at SMPN 2 Mandiraja. The takraw practice activities at SMPN 2 Mandiraja are carried out two times a week, on Fridays and Sundays in the afternoon from 15.00-17.00. The extracurriculars were attended by 30 students in grades 7, 8, and 9 between 13-15 years. We are at that age is an increase in movement ability that can be identified in the form: movement can be done with more efficient body melanics. Movement is getting smoother and more controlled, the form of movement is also more varied, the movement is getting more powerful, and the speed of development is influenced by the opportunity to do activities repeatedly. Apart from the sepak takraw practice in the afternoon conducted by the male students of SMPN 2 Mandiraja in extracurricular activities, they also participated in the exercises held at the sepak takraw clubs in the Banjarnegara area in order to further hone their skills in playing sepak takraw (Henderson et al., 2010).

The results of the sepak takraw sports championship at SMPN 2 Mandiraja which were obtained through the results of researcher observations were strengthened through interviews with Mr. Agus Setiawan as a sports teacher and extracurricular coach as follows:

Table 1. Championship Results

No	Championship	Years	Performance
1	POPDA sub-district level	2013	Runner up
2	POPDA district level	2014	3rd place
3	POPDA sub-district level	2015	3rd place
4	POPDA district level	2016	3rd place

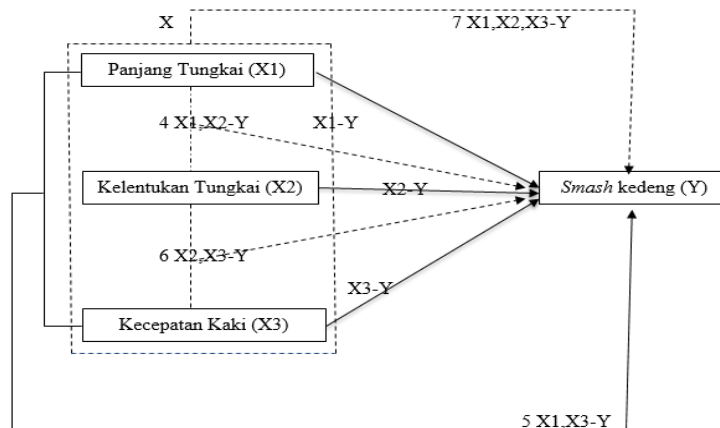
source: Data for SMP N 2 Mandiraja

Based on observations and observations reinforced through interviews with sports teachers and extracurricular coaches at SMPN 2 Mandiraja conducted by researchers on achievements in each championship, it is known that the sepak takraw ability of SMPN 2 Mandiraja already has quite good achievements. However, they have not been able to get first place in each championship. This is due to several factors, such as the lack of optimal attack settings when competing and mastery of smashes that are still not good. Therefore, players or students need to pay attention to anthropometry and continuous treatment of their physical condition (Sujae, & Koh, 2008). Hence, students or players

maximize their ability to control the ball while playing. This study aimed to analyze the leg length, leg flexibility, and foot speed contribution to the kedeng smash ability of extracurricular male students of SMPN 2 Mandiraja Banjarnegara.

## METHODS

This study uses regression and correlational methods (Ramadan, & Juniarti, 2020) or the contribution of four variables: limb length, limb flexibility, speed, and smash kedeng game of sepak takraw.



Gambar 3. 1 Desain Penelitian

This research was carried out in the Sepaktakraw field of SMPN 2 Mandiraja for one day on September 25, 2021. The steps of the data collection procedure included: 1) Leg Length Test, 2) Leg Flexibility Test, 3) Leg Speed Test, and Kedeng Smash Test.

The sample used in this study was 30 male students who took part in extracurricular

sepaktakraw SMPN 2 Mandiraja with a total sampling technique in taking the subject. Data collection techniques using tests and measurements include 1) Leg Length Test (anthropometric measuring instrument for leg length), 2) Leg Flexibility Test (Front Splits), 3) Leg Speed Test (30 M distance running), and the Kedeng Smash Test. The prerequisite

test uses the Kolmogorov-Smirnov normality test and the homogeneity of variance of the leavens or F test. The data analysis technique uses multiple regression analysis to determine whether there is a contribution using the coefficient of determination formula:  $Kd = r^2 \times 100\%$ .

**FINDINGS AND DISCUSSION**

**Findings**

Data retrieval using multiple regression test of the independent variable (X) to the dependent variable (Y). The results of the data can be seen in the table below:

Table 2 Data from multiple regression test of independent variables on the dependent variable through the SPSS application.

Variable	F count	F table	Sig.	R square
X1 / Y	13,183	0,296	0,001	0,320
X2 / Y	32,450	0,296	0,000	0,537
X3 / Y	23,884	0,296	0,000	0,460
X1,X2 / Y	0,296	0,000	0,560	17,160
X1,X3 / Y	19,597	0,296	0,000	0,592
X2,X3 / Y	26,988	0,296	0,000	0,667
X1,X2,X3 / Y	18,916	0,296	0,000	0,686

The results of the analysis of the leg length data (X1) contributed significantly to the kedeng smash (Y), with the calculated F value = 13,183 > F table = 0.296. This states that the data is linear, and then the coefficient of determination is obtained through the correlation coefficient (R Square) squared  $(0.320)^2 \times 100\%$  so that the contribution value is 10.24%.

$(0.537)^2 \times 100\%$  so that the contribution value is 28.84%.

The results of the data analysis of limb flexibility (X2) contributed significantly to the kedeng smash (Y), with a value of Fount = 32.450 > Ftable = 0.296. This states that the data is linear, and then the coefficient of determination is obtained through the correlation coefficient (R Square) squared

The results of data analysis Foot speed (X3) contributed significantly to the kedeng smash (Y), with a value of Fount 23.884 > Ftable = 0.296. This states that the data is linear, and then the coefficient of determination is obtained through the correlation coefficient (R Square) squared  $(0.460)^2 \times 100\%$  so that the contribution value is 21.16%.

The results of the data analysis of leg length (X1) and limb flexibility (X2) contributed significantly to the kedeng smash (Y), with Fount = 17.160 > Ftable = 0.296. This states that the data is linear, and then the

coefficient of determination is obtained through the correlation coefficient (R Square) squared  $(0.560)^2 \times 100\%$  so that the contribution value is 31.36%.

The results of the data analysis of leg length (X1) and foot speed (X3) contributed significantly to the kedeng smash (Y), with a value of  $F_{\text{ount}} = 13,183 > F_{\text{table}} = 0.296$ . This states that the data is linear, and then the coefficient of determination is obtained through the correlation coefficient (R Square) squared  $(0.592)^2 \times 100\%$  so that the contribution value is .35%.

The results of data analysis Leg flexibility (X2), and foot speed (X3), contributed significantly to the kedeng smash (Y), with  $F_{\text{ount}} = 26.988 > F_{\text{table}} = 0.296$ . This states that the data is linear, and then the coefficient of determination is obtained through the correlation coefficient (R Square) squared  $(0.667)^2 \times 100\%$  so that the contribution value is 44.49%.

The results of the data analysis of leg length (X1), limb flexibility (X2), and speed (X3) contributed significantly to the kedeng smash (Y), with a value of  $F_{\text{ount}} = 18.916 > F_{\text{table}} = 0.296$ . This states that the data is linear, and then the coefficient of determination is obtained through the correlation coefficient (R Square) squared  $(0.686)^2 \times 100\%$  so that the contribution value is 47 %.

## Discussion

The length of the legs serves as a support for the motion of the upper limbs; the

participants determine the motion, such as walking, running, jumping or kicking. Leg length is very much needed by sepak takraw players in doing the kedeng smash in sepak takraw, because by having long limbs, a player will find it easy to reach a high ball so that the target for smashes made by the player will be more comprehensive. On the other hand, a player will find it challenging to reach high balls during a kedeng smash because he does not have long legs. In this study, leg length increased the ability to smash kedeng. This increase shows that if students have longer limbs, students will have a better mastery of the kedeng smash. As Radioputro (1991) in the journal Fakhruzzaman, D. (2015) says, a subject moving at the end of a long radius will have a more incredible linear velocity than a subject moving at the end of a short radius. So it is more profitable to use long levers.

Leg flexibility is the ability to move in a vast joint space (Widiastuti in Azwan 2019). Good limb flexibility can help players develop the desired movements and prevent injuries when players are doing sepak takraw. This is to previous research (Apichat Deminoi, 2018), which said that the flexibility component is an essential factor in increasing smash efficiency. With the existence of good limb flexibility, of course, players can reach the ball that is bounced easily and freely and can smash accurately and over the net. Hence, the flexibility of the leg muscles plays an essential and dominant role in doing the kedeng smash in the sport of sepak takraw.

This is to previous research belonging to (Suhartiwi, 2017; Sartono, 2018), which concluded that limb flexibility contributed to the soccer skills of South Sulawesi sepak takraw athletes by 20.64%.

According to (Sinurat, 2018) in (Nirmala et al., 2020; Henjilito, 2019), speed is the ability to successfully perform similar movements in the shortest possible time or cover distances in the shortest possible time. About the kedeng smash technique, foot speed is essential so that when you want to do a smash, the player can move quickly towards the ball to be smashed. This is supported by previous research (Nirmala et al., 2020), which concluded that foot speed contributed to the kedeng smash on the Rambah Tengah Utara Sepaktakraw team by 27%.

A player with long legs will easily reach the ball above when doing a kedeng smash; besides that, it is also necessary to have limb flexibility before kicking the ball. To get a good kedeng smash movement, a combination of these two variables is needed so that when you do a smash, the ball can be hit perfectly. This is supported by previous research (Dahlan, 2020), which concluded that leg length and limb flexibility contributed to the smash ability in the sepak takraw game in UPT SMP Negeri 1 Masamba students by 66.0%.

In the game of sepak takraw, to be able to reach a high ball, it takes a long leg so that the high ball can be reached properly. Besides leg length, the role of foot speed is also vital when doing a smash. Because by having a

good foot speed, a player can move quickly towards the ball to be smashed. A player with long legs then supported by good foot speed will support success in doing a kedeng smash.

The results of this study are supported by previous research belonging to (Ikadarny, 2019), which concluded that leg muscle explosive power, leg length, and speed contributed to the long jump ability with a value of ( $r = 0.59$ ). When a player does a smash, it takes a suitable prefix; a good prefix is meant by sticking the leg to take the prefix before the foot kicks the ball so that when the ball is smashed, the ball will be hard and sharp as it enters the opponent's defence area. This combination of movements can only be done correctly and perfectly if supported by good foot speed. The results of this study are supported by previous research belonging to (Islamuddin, 2015), which concluded that there was a jointly significant correlation between foot reaction speed, explosive leg power, and limb flexibility on the smash skills of the sepak takraw athletes in Pidie Regency with a correlation value of 0.883.

Leg length, limb flexibility, and foot speed are biomotor and body anthropometry that is interrelated and to improve one of these abilities; other abilities are also needed. By practising biomotor skills and paying attention to the anthropometry of the players' bodies, athletes' physical abilities and movements will have better results. The results of this study are supported by previous research, namely (Azwan, 2019), which concluded that limb flexibility contributed to the kedeng smash in

Sepaktakraw athletes PPLP-D Athletes in Kepulauan Meranti Regency, Riau Province by 9.42%. (Nirmala et al., 2020) who concluded that foot speed contributed to the kedeng smash on the Rambah Tengah Utara sepak takraw team by 27%. (Dahlan, 2020) who concluded that leg length and limb flexibility contributed to the smash ability in the sepak takraw game in UPT SMP Negeri 1 Masamba students by 66.0%.

## CONCLUSION

There is a contribution from each independent variable, namely leg length, flexibility, and speed, to the dependent variable, namely the kedeng smash in the sepak takraw game. Physical activity and regular and structured training also play an essential role in the ability to smash kedeng in the sepak takraw game.

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