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HALAMAN OLAHRAGA NUSANTARA (HON)
Jurnal Ilmu Keolahragaan

Volume 5 No II
Tahun 2022

ISSN 2614-2775 (Print)
ISSN 2621-8143 (Online)

THE EFFECT OF BACK SWING AND FOREWARD SWING TOWARD FOREHAND DRIVE PERFORMANCE ON TENNIS LEARNING

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Abstract
The problem of the research was student's lack forehand drive ability that resulting less points obtained while playing or hitting the ball. This research aimed to identify factors that causally and positively effecting the student's forehand drive performance, namely back swing and forward swing phases. This study involved 31 male student's who learning tennis subject in Sport Science Faculty, Padang State University. The samples tested using Broer-Miller-Tennis Test, and observed by judge. The data was analyzed by using Regression Analysis utilizing IBM SPSS software. To find out the causal factors which independently and dependently influence each variable, it is used the significance level <0.05 The results shos that Backswing had significant and positive effect on the accuracy of the forehand drive (p <0.05) . The significance level was p <0.05 or H0 was rejected. Furthermore, Forwardswing had significant and positive effect on the accuracy of the forehand drive (p <0.05) or H0 is rejected. The results of the study show that there is a positive causal effect of backswing and forwardswing on athlete's forehand drive performance.

Keywords: *Back Swing; Foreward Swing, Tennis Learning*

Submitted : 23th of May 2022
Accepted : 07th of July 2022
Published : 19th of July 2022

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DOI http://dx.doi.org/10.31851/hon.v5i2.8032

INTRODUCTION

Tennis is one of mandatory subject in Sport Couching departement, Sport Science Faculty, which has to be learned for the students. In order to enhance the high level achievement on Tennis sports, mastering basic tennis is necessery. Forehand drive is the most important basic technic wich frequently using during playing tennis. Good forehand drive will be mastered by learning. There is a great change on tennic technic for decade. In recent year, many player use the drive preferences in construction to create points when playing. Therefore, the

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increasing speed of movement, while maintaining a great level of control, is one of the factors to perform tennis successfully. As a consequence, analysis of the phases of movement and strength training becomes important in modern games, because it contributes to increasing ball speed (Aune, Ingvaldsen, and Ettema 2008; Bui et al. 2019).

A successful performance in a tennis match is how to hit the ball accurately to areas that are strategically advantageous on the field. The purpose is to make it difficult for opponents to return the ball to the defense area. The angle of the racket and the speed of the racket at the time of the collision are 2 of the main component that determine the speed and direction of the ball (Elliott, Marsh, and Overheu 2016; Johnson and McHugh 2006). This relates to the movement phase, namely backswing and forwardswing.

Forehand drive is the main stroke in modern tennis, because this is the most commonly played groundstroke during a match (Kwon et al. 2017). Tennis forehand drive consists of three phases (Marshall and Elliott 2000), namely: backswing (bring the racket back side od the body), forwardswing to swing racket for an impact occurs, and followsthrough, the end of arm movement (Rogowski et al. 2014).

To be able to do a good tennis forehand drive, the arms should form an angle of 90% during the first two phases. At the end of the movement, the wings are lowered again with a horizontal plane at an angle of about 30%. In a ball collision, the upper arm roughly forms a 45% angle forward horizontally, that almost forms a 90% angle. That is, the elbow is raised above the shoulder without reaching the height of the humerus maximally, when the upper arm rotating internally, finishing the whole movement, when the hand and the racket are near the shoulder contralateral (Rogowski et al. 2015).

To perform a good forehand drive, it requires two main phases: first, back swing to move the body to an optimal position before drive the racket. Second, forward swing to accelerate the racket for impact (Rota et al. 2012). Even thoug,

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untul now, there is no data about the angular position untul the end of racket trajectory, we could make asssumption that the forehand drive needs a range of motion of the upper limb at high speed. So, for a more complete knowing of the effects of the tennis forehand drive movement phase, we conducted an analysis of the effect of backswing and forwardswing on the performance of tennis forehand drives.

METHOD

This study aimed to proof the effect of back swing and foreward swing toward forehand drive performance. This was a . This is a correlational research, applies the causal associative method. The data was taken from 31 students college of coaching departement of Sport Science Faculty Padang state University.

For getting the information about the effect of variables proposed, the data collected in this research are primary data taken from the Sample. The instruments used in data extractionis: (1) Back swing was tested by the backs wing motion grating format assessed by expert judgment. Forward swing was tested by foreward swing movement grating format assessed by expert judgment. (2) Forehand drive was by using the Broer-Miller-Tennis Test, and each participant hit the ball 14 times. The tools used are rackets, balls, tennis ball, tennis courts and formats. The data was analyzed by using Regression Analysis utilizing IBM SPSS software. First, descriptive statistics was examined to illustrate the general capabilities of backswing, forwardswing, and forehand drive tennis. Secondly, to assess the causal effect between the independent and dependent variables, using IBM SPSS software. The level of significance was determined at the level of $p < 0.05$.

RESULT AND DISCUSSION

The goals of this research was to find out the effect of backswing and forwardswing on forehand drive. Based on the analysis conducted from the previous results it can be reported that:

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Table 1. Normality Test

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Backswing	.139	31	.133	.973	31	.610
Forwardswing	.117	31	.200*	.953	31	.194
Forehand Drive	.100	31	.200*	.974	31	.636

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

a. Lilliefors Significance Correction

From the normality test using Statistical value for Kolmogorov-Smirnov, it got 0.131 and significant or p-value = 0.133> 0.5 for Backswing, 0.117 and significant or p-value = 0.200> 0.5 for Forwardswing, and 0.100 and significant or p-value = 0,200 > 0.5 for Forehand Drive. Thus mean H0 is accepted or not significant. It means that backswing, forward swing and forehand drive data are normally distributed. It could be checked, in the normal diagram of the Quantile and Quantil (Q-Q) plot below:

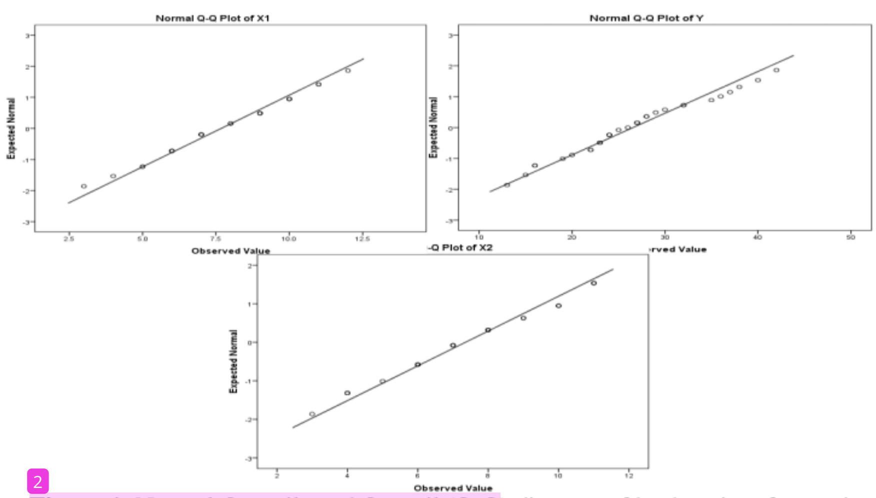

Figure 1. Normal Quantile and Quantil (Q-Q) diagram of back swing, forward swing and forehand drive plots

For the normal of Q-Q plot, backswing, forward swing and forehand drive normality data testing can also be seen from the Detrended Normal Q-Q plot. The

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indicator is that the data is stated to be normally distributed if the data distribution in the form of dots does not form a certain pattern and gather around a horizontal line through the zero point.

Table 2. Descriptive Statistics

	Mean	Std. Deviation	N
Back swing	26.55	7.402	31
Forward swing	7.68	2.166	31
Forehand Drive	7.35	2.214	31

Table 3. Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Data	Mean based	.002	1	60	.967
	Median based	.000	1	60	1.000
	Median and with adjusted df based	.000	1	59.922	1.000
	Trimmed mean based	.002	1	60	.964

Levene statistic test is based on all criteria with significance values, all above 0.05. Because the sig value > 0.05, it can be concluded that the variables X1, X2 and Y are from a homogeneous population. Multiple linear equations, and significance test for the coefficient of regression equation.

Table 4. Coefficients[a]

	Model	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.632	2.022		1.301	.204
	Backswing	1.079	.490	.316	2.202	.036
	Forwardswing	2.126	.479	.636	4.437	.000

a. Dependent Variable: Forehand Drive

From the data above, it is seen that in column B that the constant b0 = 2.632 coefficient b1 = 1.079 is obtained, and b2 = 2.126. So that the multiple linear regression equation is $\hat{Y} = 0.632 + 1.079 X1 + 2.126 X2$. Hypothesis: H0: ß1> 0 and H0: ß2 ≤ 0 vs H1: ß2> 0. From the results of the analysis of the table above, the statistical value for the variable coefficient X1, namely t calculated =

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2.20 and p-value = 0.036 / 2 = 0.018 < 0.05 , or H0 is rejected, which means Backswing has a positive effect on Forehand Drive. That statistical value for the coefficient variable X2 is t = 4.43 and p-value = 0,000 / 2 = 0,000 <0.05, or H0 is rejected, which means Forwardswing has a positive effect on Forehand Drive. Significant test for multiple regression equations

Table 5. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1395.128	2	697.564	78.583	.000[b]
	Residual	248.549	28	8.877		
	Total	1643.677	30			

a. Dependent Variable: Forehand Drive
b. Predictors: (Constant), Backswing, Forwardswing

From the analysis result conducted in the ANOVA table above, the statistical value of F, namely Fcalculated = 78,583, and p-value = 0,000 <0.05, which means H0 is rejected. Thus, it can be concluded that, there is a linear influence of the Backswing and Forwardswing variables towards Forehand Drive performance. This also has a joint (simultaneous) influence of Backswing and Forwardswing on Forehand Drive. Test for the significance of multiple correlation coefficients.

Table 6. Summary Model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.921[a]	.849	.838	2.979	.849	78.583	2	28	.000

a. Predictors: (Constant), X2, X1

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From the table, it is seen that the multiple correlation coefficient test is obtained from the Summary Model shown above, it appears that the multiple correlation coefficient (Ry.12) = 0.921 and Fcalculated = (Fchange) = 78.583, and p-value = 0.000 <0.05 or H0 is rejected. Thus, the multiple correlation coefficient between X1, X2 and Y is significant. While the coefficient of determination is shown by R Square = 0.843, which means that, 84.9% of the variability of the Forehand Drive (Y) variable can be explained by Backswing (X1) and Forwardswing (X2), so we could make conclusion that the influence of Backswing and Forwardswing together (simultaneous) toward Forehand Drive 84.9%.

DISCUSSION

The results of the research conducted showed a causal high effect of the backswing and forwardswing variables on the accuracy of the forehand drive. Two proposed variables have a positive (simultaneous) positive effect on the accuracy of the forehand drive (Table 6). This finding, similar to that previously done by other researchers that, the angle of movement of the scapula in the backswing and forwardswing phases contributes to the accuracy of the forehand drive (Takahashi, Elliott, and Noffal 1996).

The forehand drive phase movement, namely backswing and forwardswing, influences the accuracy of ball punches (Table 4). The forehand drive movement phase can be measured from the racket grip condition when the backswing swing and forwardswing swing in the form of rotational swing. Because of this, it can affect the physical response of the racket frame itself, at the time of a collision with the ball (Genevois et al. 2013; Williams et al. 2020).

For a good forehand drive movement phase, it is very important to consider the rotation of the longitudinal axis of the upper arm, which aims to develop an emphasis on an exercise program in injury prevention (Fiske, Cuddy, and Glick 2007; Zhan et al. 2012). It is also effective for improving player skills in forehand drive movements, forehand drive attacks, and receiving the ball prior to posttest. The movement consists of phases namely, backswing and

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forwardswing. The two main phases are the main analysis in determining the stability of the forehand drive in this study.

This finding also explains that, from each indicator of the forehand drive phase of the movement, it has a considerable contribution to the accuracy and stability of the forehand drive stroke carried out. Causally these factors can be seen in (Table 4), and the significance of the variable coefficient of factors that affect the accuracy of the forehand drive can be seen in (Table 5). Furthermore, other findings also support this idea that, in addition to being able to exercise the forehand drive phase well, expertise in increasing the potential to adjust motor coordination strategies, as a reaction to physical fatigue induced during a hit, is urgently needed for the smooth movements performed.

CONCLUSION

This study seeks to see the effect of backswing and forwardswing on forehand drive of competitive adult players. Forehand drive punches demand better backswing and forwardswing phases with more arm pronation during the forwardswing phase. This research provides evidence-based insight into the effect of the two major high phases on the accuracy of tennis drive forehands.

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