

Contribution of Grip Strength, Arm Muscles and Back Muscles to Long Stroke Accuracy in Woodball

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Abstract

This study aims to analyze and examine how the contribution of grip strength, arm muscle strength and back muscle strength to the accuracy of long stroke on woodball. This study uses a correlational design with the variables of grip strength, arm muscle strength and back muscle strength to long stroke accuracy. The samples in this study were 25 Central Java woodball athletes using handgrip dynamometer, pull and push dynamometer, back dynamometer and long shot test. The result of this research is that the grip strength contributes 3.1%. Arm muscle strength contributed 13.9%. Back muscle strength contributed 1.5%. Grip strength and arm muscle strength together contributed 13.9%. Grip strength and back muscle strength contributed 48%. Arm muscle strength and back muscle strength together contributed 14%. Grip strength, arm muscle strength and back muscle strength together contributed to long stroke accuracy by 14%.

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INTRODUCTION

Woodball is an outdoor sports game that is played by hitting the ball from the starting point of the game using a ball made of wood hit by a stick resembling a hammer (mallet, a stick made of wood) directed to a gate until the ball passes / breaks through the goal at each end of the fairway / track by making as few strokes as possible. The game of woodball is almost similar to the game of golf, but the hole is replaced by a small gate and if the woodball is hit by a mallet, the ball will roll, while a golf ball when hit by the ball almost entirely will bounce (Dewi, I.S., 2019).

The basic technique of woodball is one of the foundations for someone to be able to play well. These basic techniques include techniques without tools and with tools. Tool-less techniques include swing, setup, and tool-free preswing routines. While the technique with tools is the routine of preswing with tools (mallet), long-range techniques, medium-distance punches, melee punches, and gating or punches towards the gate. Stroke techniques consist of long shot, short shot, medium shot, and finishing. (Kriswantoro, 2016: 49-62).

Woodball athletes are expected to have the right swing starting by the coordination of the body from the legs, hips and arms in a comfortable and precise position. Swinging technique is a key hitting the ball successfully, swinging technique is the main part of achieving the target in a woodball game (Kriswantoro, 2015: 17). The woodball training program needs to be improved to achieve maximum results in playing, as well as technical training.

Basic technique is one of the foundations for athletes to be able to play woodball, which includes techniques without tools and with tools (Sumariyanto, 2018). Tool-free techniques include swing movements, feeling development techniques, rhythm and tempo, pre-swing setups and routines. While techniques with tools are long, medium, close, parking strokes and gates (Kriswantoro, 2015: 9).

According to the International Woodball Federation (2020) a long stroke is a shot made on the fairway with a distance of 81 meters to 130

meters from the starting line. Long shot ball strikes do not have to be hit as hard as possible but must be hit optimally, namely right on the target. A medium stroke is a shot with a distance of 51 meters to 80 meters from the starting line. A short stroke is a shot with a distance of 10 meters to 50 meters and brings the ball closer to the gate area. While the finishing stroke is the final blow in one fairway with the goal of the goal or gate (Amin AK, Doewes, M., & Purnama SK (2017).

Long strokes require a longer swing than others. Long strokes start from the back swing movement with a clockwise rotation of the pelvis and upper body followed by a down swing and follow through the rotation of the pelvis in a reverse direction. (Meister et al., 2011). The back full swing movement requires grip strength to maintain the mallet in the correct back swing lane. Back full swing position, back muscle strength is needed so that the back full swing movement can achieve maximum rotation, namely the position where the mallet is above the back of the head. Then proceed by the down swing movement, there is an impact between the mallet and the ball. Dewi, P. C. P., (2015) The long swing requires the body, especially the shoulders and hips, to rotate because the swing motion in a woodball resembles a clock pendulum motion. Therefore the strength of the back muscles is very important in making long stroke. A good long stroke is greatly influenced by good physical condition. According to Kriswantoro (2016: 9) Physical conditions that are trained in the basic techniques of woodball games are strength, endurance, power, flexibility, balance, coordination. For this reason, a woodball player must have good physical condition components according to the physical condition criteria in woodball games (Nurafian, A.U., 2019).

Grip strength is the result of firm flexion of all joints, fingers and wrists with the maximum force that the subject is able to exert under normal biokinetic conditions. Angelica Castilho Alonso et al, (2018) Grip muscle strength is a method commonly used to estimate the muscle strength of the upper limb because grip muscle strength requires a

combination of action from a number of hand muscles and forearm muscles (Yemigoe, Syukri, & Hajar, 2017). So the strength of the grip muscles has a role in the performance of long strokes, namely as a driving force for the malet when making a swing.

Arm muscle strength is needed for long strokes. Arm muscle strength in woodball is the ability of strong arm muscles when doing mallet swings when backswing, downswing and follow through or impact does not change the swing and hits the mallet with the ball right on target. Amin A.K., Sutardji., Rahayu S., (2012) states that the strength of the muscles of the upper limb and the muscles of the back that is needed dominantly lies in the strength of the arm muscles, the strength of the hand grip assisted by the strength of the back muscles. This muscle strength is needed during the basic technique of swinging and following through. In these movements the muscles in the arms and back muscles must be able to withstand the weight of the mallet's weight. The arm muscles experience movement by the forearm which is produced by contractions of the muscles in the upper arm. A forearm flexor is a muscle in the upper arm, which contracts to produce flexio of the forearm. Romantier B. S. (2017).

The long stroke accuracy influenced by grip strength, arm muscle strength, back muscle strength, togok length, arm length, leg muscle flexibility (Aditama, 2019). From the observations and experiences that have been described above, the writer raises the idea that grip strength, arm muscle strength and back muscle strength need to be further studied so that the resulting punch is more efficient. From the description above, the researcher wants to research more deeply about " Contribution of Grip Strength, Arm Muscles and Back Muscles to Long Stroke Accuracy in Woodball".

METHOD

This research is a quantitative study using a correlational method. The method used is the triple correlational method (Sugiyono. 2012). The population in this study were 46 athletes in Central Java woodball who participated in the

Central Java Provincial Sports Week (Porprov) in 2018. The sample was selected using an acceptable sampling method and 25 subjects were considered the minimum acceptable sample size. Purposive sampling is a sampling technique with certain considerations.

(Independent), which consists of: a) Grip strength (X1), b) Arm muscle strength (X2), c) Back muscle strength (X3), 2) Dependent variable from woodball long stroke which is denoted by Y. Data collection techniques in this study will use instrument administration techniques. The instruments used in this study are a test to measure grip strength (handgrip dynamometer), a test to measure arm muscle strength (pull and push dynamometer), a test to measure back muscle strength (back dynamometer) (Haryono, Sri ., 2014) and a test to measure the results of long strokes (Nurafian, A.U., 2019).

The data analysis technique in this study was the t-test statistical test. The t statistical test is used to test the rejection or acceptance of the null hypothesis, provided that the sample is homogeneous and normally distributed. The data normality test is used to determine whether a random variable is normally distributed or not. Hypothesis testing can be based using two things, namely the level of significance or probability and the level of confidence or internal confidence.

RESULTS AND DISCUSSION

Description of the research data, the things to be studied are the maximum value, average, minimum value, average and standard deviation. The descriptions of the variables of grip strength, arm muscle strength and back muscle strength and long strike results are as follows:

Table 1. Descriptive of Research Variables

	N	Min	Max	Mean	Std. Deviation
Arm	25	38	56	46,66	6,422
Grip	25	26	45	36,96	4,8
Back	25	79	201	130,6	34.670
Stroke	25	18	34	26,32	4,616
Validity (listwise)	N 25				

Based on the research results, it is found that the average value of grip strength is 46.66 with a standard deviation of 6.42, a minimum score of 38.00 and a maximum score of 56. The average arm muscle strength is 36.96 with a standard deviation of 4.80 with a minimum score of 26.0 and a maximum score of 45.0. The average back muscle strength was 130.64 with a standard deviation of 34.67 with a minimum score of 79.0 and a maximum score of 201.00. The average accuracy of long stroke is 26.32 with a standard deviation of 4.61, a minimum score of 18.00 and a maximum score of 34.00.

The description of the research results is shown in the following table.

Table 2. Results Determination Test X1, X2, X3 against Y

Predictor	R	R Square
Grip	.175a	.31
Arm Muscles	.373a	.139
Back Muscles	.122a	.015
Grip, Arm	.373a	.139
Grip, Back	.218a	.048
Arm, Back	.374a	.140
Grip, Arm, Back	.374a	.140
Dependent Variable : Stroke Accuracy		

Based on the table, the grip strength has a significant effect on the long stroke accuracy. Arm muscle strength has a significant effect on the long stroke accuracy. The strength of the back muscles has a significant effect on the long strokes accuracy. Grip strength and arm muscle strength together have a significant effect on the long strokes accuracy. Grip strength and back muscle strength together have a significant effect on the long strokes accuracy. Arm muscle strength and back muscle strength together have a significant effect on the long strokes accuracy. The strength of the grip, arm muscles, and back muscle strength together have an influence on the long strokes accuracy.

The research results are as follows: 1. Grip strength has an effect on the long strokes accuracy, which is 3.1% categorized as small and there is a positive relationship between grip strength and long stroke results. 2. Arm muscle strength has an influence on long strokes accuracy, which is 13.9% categorized as small

and there is a positive relationship between arm muscle strength and long strike results. 3. The strength of the back muscles has an influence on the long strokes accuracy, namely 1.5% categorized as small and there is a positive relationship between back muscle strength and long strike results. 4. Grip strength and arm muscle strength together have an influence on the long strokes accuracy, namely 13, 9% is categorized as moderate and there is a positive relationship between grip strength and arm muscle strength on long stroke accuracy. 5. Grip strength and back muscle strength together have an influence on the long strokes accuracy, namely 48% categorized as moderate and there is a positive relationship between grip strength and back muscle strength on long strokes accuracy. 6. Arm muscle strength and back muscle strength together have an influence on the long strokes accuracy, which is 14% categorized as small and there is a positive relationship between arm muscle strength, back muscle strength and long stroke results. 7. Grip strength, arm muscle strength and back muscle strength together have an influence on the long strokes accuracy, which is 14% categorized as moderate and there is a positive relationship between grip muscle strength, arm muscle strength, back muscle strength and long strike results.

DISCUSSION

Based on the analysis results of the relationship between grip strength, arm muscle strength, and back muscle strength on long stroke accuracy in woodball, the following results are obtained: 1) The relationship between grip strength and long stroke accuracy. Based on the research results, the grip strength if it is studied carefully if in a stroke or the slow trajectory of the ball is determined by the strength of the stroke hitting the ball. The firmer and stronger the stroke is applied to the ball, the more stable it will travel. Based on the study results, showed that the grip strength contributed 3.1%. All activities require strength, although in the result of a long stroke, strength is not the dominant factor. Based on study

results, it shows that the strength of the arm muscles if examined carefully the arm muscles have a very important role in the implementation of the movement of the upper limbs. Arm muscle strength results from the contraction of the muscles in the arm to move the arm when doing the swing. The results showed that the arm muscle strength contributed 13.9%, it can be concluded that the arm muscle strength of each athlete needs to be increased by repetitive and structured exercises. 3) The relationship between back muscle strength and long stroke accuracy. Based on the research results, it was found that the strength of the back muscles had an effect of 1.5% on the long strokes accuracy. The strength of the back muscles is used as a counterweight to the main long stroke. Good back muscle strength helps keep your body from wobbling and keeps you balanced in long strokes. When making a stroke, the standing trunk must be able to be maximally deployed, so that the stroke result is harder and more accurate. Therefore, the back muscles strength needs to be considered by a coach and athlete so that they can add to the training program to increase flexibility so that the athlete is able to achieve maximum results and can make an achievement. 4) The relationship between arm muscle strength and grip strength on long strokes accuracy. Based on the study results, it shows that the arm muscle strength and grip strength when examined carefully the arm muscles have a very important role in the implementation of the movement of the upper limbs. Arm muscle strength results from the contraction of the muscles in the arm to move the arm when doing the swing. The results showed that the arm muscle strength and grip strength had an effect of 13.9%. It can be concluded that the arm muscle strength of each athlete needs to be increased by repetitive and structured exercises. 5) the relationship between arm muscle strength and back muscle strength on long strokes accuracy. Based on the study results, it was found that the arm muscle strength, back muscle strength, had an effect of 48% on the long strokes accuracy. The strength of the back muscles is used as a counterweight

to the main long stroke. 6). Relationship between grip strength and back muscle strength on long strokes accuracy. Based on the research results, the grip strength if assessed carefully whether in pass or slow passage is determined by the strength of no hits on the ball. The more assertive and stronger the hitting is against the ball, the more stable the ball will go. Grip strength is generated from the contraction of the muscles On the fingers to maintain the swing stability. The little wrist movement, the more stable further the ball leads to the field cross. Based on study results, it showed that the grip strength and back muscle strength had an effect of 14%. All activities require strength, although in the result, strength is not the dominant factor. 7) the relationship between arm muscle strength, grip strength and standing trunk flexibility on long stroke result. Based on the research results, it is known that: 1) grip strength has an effect of 3.1%. 2) arm muscle strength has an effect of 13.9%. 3) back muscle strength has an effect of 1.5%. 4) back muscle strength has an effect of 13.9%. 5) arm muscle strength and back muscle strength had an effect of 48%. 6) grip strength and back muscle strength have an effect of 14%. 7) as a whole it has an effect of 14% which means it has a low impact. So it can be concluded that the three independent variables are not yet dominant and have a small role in the results of long strokes in woodball, so it is necessary be cared for and studied in order to support the ability to perform a desired movement, such as making a hitting motion. When doing long strokes, all components of the physical condition will play an active role, especially grip strength, arm muscle strength and back muscle strength. Grip strength, arm muscle strength and back muscle strength used when doing the swing stages, namely backswing, downswing, impact and follow through. Grip strength is used to strengthen grip when mallet contact with the ball does not occur during backswing, downswing, impact and follow through. When pushing the impact with the ball, the arm muscles must also be maximally mobilized in order to turn the swing into an appropriate result when making a blow and the back

muscles as a support for the upper body to support the weight of the bat in carrying out a stroke to produce body position which remains stable so that the stroke result is good.

CONCLUSION

Based on the results of data analysis and discussion, the following conclusions can be drawn: 1) There is a significant relationship between grip strength and long strokes accuracy on woodball. 2) There is a significant relationship between arm muscle strength and the long strokes accuracy on woodball. 3) There is a significant relationship between back muscle strength and the long strokes accuracy on woodball. 4) There is a significant relationship between grip strength and arm muscle strength on long strokes accuracy on woodball. 5) There is a significant relationship between grip strength and back muscle strength on long strokes accuracy on woodball. 6) There is a significant relationship between arm muscle strength and back muscle strength on long strokes accuracy on woodball. 7) There is a significant relationship between grip strength, arm muscle strength and back muscle strength on long strokes accuracy on woodball.

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