

Physical Condition Contribution to The Drag Flick Performance

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ABSTRACT

Abstract: The purpose of this study was to test the relation and to test how much contribution of single or multiple between grip strength, arm muscle power, back flexibility, and eye-hand coordination to the shooting result with *drag flick* technique. This research used correlational method. Population in this study is 40 men's hockey player in Central Java. Data analysis technique used goodness of fit test. The results that each variable has a positive relationship and the contribution is 17.9% grip strength, 34.6% arm muscle power, 20.5% back flexibility, hand-eye coordination 14.3% and all variable is 39,6 %.

Abstrak: Penelitian ini bertujuan untuk menguji hubungan dan kontribusi secara parsial dan simultan antara kekuatan menggenggam, power otot lengan, fleksibilitas togok, dan koordinasi mata-tangan terhadap hasil menembak dengan teknik *drag flick*. penelitian ini menggunakan metode korelasional dengan populasi sebanyak 40 pemain hoki putra di Jawa Tengah. Teknik analisis data menggunakan goodness of fit test. Hasil penelitian menunjukkan bahwa masing masing variabel memiliki hubungan dan kontribusinya adalah 17,9 % untuk kekuatan menggenggam, 34.6% power otot lengan, 20.5% fleksibilitas togok, dan 14.3% koordinasi mata-tangan dan semua variabel secara bersama sebesar 39,6 %.

Hockey is a well-developed sports, but its development is not as popular as the others (Primadi, 2002). In Indonesia, *hockey* are played in indoor and outdoor. The indoor hockey is another version of the field hockey that is usually played indoors (*Hockey Australia*, n.d.). Hockey indoor or mini hockey is a sport that is played indoors and has been played in Bandung since 1964 and since 1977 by Student Activity Unit Hockey ITB (Primadi, 2002). This type of indoor *hockey* is played in an indoor field by two teams, with six players and six substitutes in each team.

There are four basic techniques that must be mastered by indoor *hockey* player, according to Glencross (1984) that is dribbling, passing, receiving and shooting. The shot in the hockey is the result of a shot made by an attacking player inside a circle, if the entire ball has crossed the goal line between the goal posts and the crossbar, and the ball has been struck or hit by the attacker's stick it is considered a goal, except the rule specifically states an exception for the balls which are touched by one or more defenders (Departemen Pendidikan dan Kebudayaan, 1981).

A *hockey* player must be able to dribble, passing the ball to a teammate or receive the ball and shoot. The basic technique of shooting is very important to be mastered by *hockey* players, because to winning the game a team must score as many goals. Good game and good tactics cannot guarantee a team for victory if only the opportunity to shoot or score goals is not maximized properly. Here is the importance of a shot in *hockey*. Of the various shooting techniques, *drag flick* shot is one of the most commonly used in the game to score goals. Research conducted by Rajinikumar (2015) said that The 59% of goals were scored through field goals, 38.5% of goals scored in penalty corner and 2.5% of goals scored through penalty stroke. Of the three, 34.5% of the techniques used in scoring are *drag flick* techniques.

Drag flick is powerful push (Elizabeth, 1951). It was first seen in the early 90's in the Netherlands. It is used as an attacking technique, especially in the penalty corner involving two main components known as the scoop and flick. *Drag flick* becomes more popular to goal scoring indeed penalty corner (Verma, 2014). A good *drag flick* comes from a advanced player who has already mastered it, to perform the technique of shooting must be supported with good physical ability. Growing techniques need to be supported by increased physical condition. This includes the ability of physical conditions such as biomotorik: strength, speed, endurance, and coordination (Bompa & Haff, 2009).

According to Elizabeth (1951) the success of the hockey player sin need of basic skills and speed of using intelligence and physical prowess, body balance, muscle strength, anaerobic endurance, flexibility, good coordination hand-eye, foot-ball relationships, quick movements, and agility. The physical components involved within this technique include the grip strength, arm muscle power, back flexibility, eye-hand coordination, foot-ball contact, agility, and quick movements.

Drag flick technique needs grip strength to hold the stick, in order to prevent stick detach. It is also needed to control the ball. Furthermore, the grip strength also affects to determine the ball direction, whereas within good grip, the stick will not be easy to detach on shot. The release of stick will switch over the position of face stick and target shot. In research Verma (2014) stated that the grip strength helps player in defending corner shot.

Muscle power is required to support strength and speed of the ball when performed push ball on *drag flick* technique. Arms moves, which are performing, by *hockey* player with *drag flick* technique affect ball releasing from the stick and sliding toward the target. Whereas arm muscle strength with bringing stick and pushing the ball will generate accurate shooting when using speed.

Back flexibility is needed when the ball released, the position of stick is on the body of stick that making the shot will be faster and more accurate. If the ball is on the lower ends the stick, the shot will be weak and wide. Nichol (2005) in Bari, Mohd Arshad & Ahmad, (2014) stated that after performing cross leg, a player should be positioning body as low as possible and swinging the stick as low as the ground. Besides that, releasing the ball from the stick of hip, chest, and shoulder involved rotation to produce shot on target.

Drag flick technique needs the coordination on ball positioning accuracy toward stick body, in order to push the ball maximally then gouged; in order positioning of shot to score a goal appropriate to the target. The eyes received first stimulus from the brain to perform movement and hand reflected through the movement.

Looking at the usefulness of *drag flick* is important for *hockey* player to get around this technique and can be applied during the competition. Increased exercises especially for body parts used to perform *drag flick* techniques need to be done by players and coaches to assist players for success in training and in competitions that will later impact on improving hockey achievement in Central Java. The purpose of this research is to test the relation of grip strength, arm muscle power, back flexibility, and eye-hand coordination to the shooting result with *drag flick* technique and their contributions for either partially or simultaneously.

METHOD

The method of this research is correlational research. It is a type of research purposing to determine the relation of two or more variables and to detect how far the variables of one factor relates with the variants of one or more other factors based on the correlation coefficient (Siswanto, 2013). This correlational study will analyze the correlation of free and bound variables in which the free variables consist of the grip strength (X1), arm muscle power (X2), back flexibility (X3), and eye-hand coordination factors (X4) while bound variable comprises of the shooting result with *drag flick* technique (Y).

The researcher used sample collection technique with cluster random sampling in which the population is divided into several groups or clusters. The significance clusters are chosen randomly and every different member of them becomes the sample (Sudjana, 2002). There are 40 *hockey* players from Central Java as the sample. The instruments used for measuring the grip strength is handgrip dynamometer (Haryono, 2009). for arm muscle power is a 2 kg of medicine ball with 0,77 validity and 0,84 reliability (Johnson & Nelson, 1986). For back flexibility is sit and reach test (Verducci, 1980). For the eye-hand coordination is the ball catching test (Maskum Ali, 2007). For examining the shooting result with *drag flick* technique is by doing shooting test with 0,89 validity and 0,94 reliability (Elisda Fatulika Diliiani, 2007 in Rahmawati Puji, 2013).

RESULT

Based on the results of measurements of grip strength, arm muscle power, flexibility togok, hand eye coordination, and shoot results by *drag flick* technique in Central Java in June 2017 through a survey with test techniques. In this research get 40 respondent sample, with characteristic for first variable that is grip strength, biggest result is 52 kg, smallest result is 26 kg and result of power average equal to 37,38. The second variable is arm muscle power, the largest result is 560 cm, the smallest result is 250 cm, and the average 389 cm. The third variable is the back flexibility, the biggest result is 23 cm, the smallest result is 0 cm, and the average value is 10.97. The fourth variable is hand eye coordination, the largest result is 18 times, the smallest result is 7 times, and the average value is 12 times the average value of throw is 12 times throw. The fifth variable is the result of shooting with *drag flick*, the biggest result is 19 points, the smallest result is 6 points, and the average value is 12 points.

F test analysis

The F Test is mainly used to determine the effect of independent variable on the dependent variable by stimulant

Table 1. F Test Result

Equation	F Count	F Table	Sig
Grip Strength	8,259	2,64	.007
Arm Muscle Power	20,147	2,64	.000
Back Flexibility	9.789	2,64	.003
Eye-hand Coordination	6,324	2,64	.016
All Free Variables	5,730	2,64	.001

The equation has a value of $F_{count} > F_{table}$ which is $5,730 > 2,64$ with the significance value = $0,000 < \alpha = 0,001$. Here, H_0 is rejected and H_a is accepted, which appear as “there is a significant relation between all free variables, which are the grip strength, arm muscle power, back flexibility, and eye-hand coordination to the shooting result with *drag flick* technique simultaneously”.

t test analysis

This test is conducted to examine the relation between independent and dependent variables partially.

Table 2. The Correlational Results of the Grip Strength, Arm Muscle Power, Back Flexibility, Eye-hand Coordination and the Shooting Result with *Drag Flick* Technique

Variable	r	Sig. p	Conclusion
Grip Strength	,423	0.007	Significant Positive Correlation
Arm Muscle Power	,589	0.000	Significant Positive Correlation
Back Flexibility	,453	0.003	Significant Positive Correlation
Eye-hand Coordination	,378	0.016	Significant Positive Correlation

Strength correlation analysis of grip has $p = 0,007$ ($p < 0,05$), arm muscle power has $p = 0,000$ ($p < 0,05$), flexibility = $0,003$ ($p < 0,05$), eye-hand coordination has $p = 0,016$ ($p < 0,05$). Correlation analysis showed that there is positive significant correlation between X toward Y variable. So, X value is bigger then Y value is getting bigger.

Coefficient of Determination Test (R^2)

This test describes the contribution of variation from the free variables to the bound variable.

Table 3. R^2 Test Result

Equation	R^2	R Squared
Grip Strength	,423	,179
Arm Muscle Power	,589	,346
Back Flexibility	,453	,205
Eye-hand Coordination	,378	,143
All Free Variables	,629	,396

Grip Strength

The correlation coefficient (R) is 0,179. The effect of grip strength to the shooting result with *drag flick* technique has the amount of R^2 , which are 0,423. It indicates that the proportion of variable contribution of grip strength to the variable of shooting result with *drag flick* technique is 17,9%. It means that the contribution is 17,9%.

Arm Muscle Power

The correlation coefficient (R) is 0,346. The effect of arm muscle power to the shooting result with *drag flick* technique has the amount of R^2 , which are 0,589. It indicates that the proportion of variable contribution of arm muscle power to the variable of shooting result with *drag flick* technique is 34,6%. It means that the contribution is 34,6%.

Back Flexibility

The correlation coefficient (R) is 0,205. The effect of back flexibility to the shooting result with *drag flick* technique has the amount of R^2 , which are 0,453. It indicates that the proportion of variable contribution of back flexibility to the variable of shooting result with *drag flick* technique is 20,5%. It means that the contribution is 20,5%.

Eye-hand Coordination

The correlation coefficient (R) is 0,143. The effect of eye-hand coordination to the shooting result with *drag flick* technique has the amount of R^2 , which is 0,378. It indicates that the proportion of variable contribution of eye-hand coordination to the variable of shooting result with *drag flick* technique is 14,3%. It means that the contribution is 14,3%.

Grip Strength, Arm Muscle Power, Back Flexibility, and Eye-hand Coordination

The correlation coefficient (R) is 0,396. The effect of grip strength, arm muscle power, back flexibility, and eye-hand coordination to the shooting result with *drag flick* technique has the amount of R^2 , which are 0,629. It indicates that the proportion of variable contribution of grip strength, arm muscle power, back flexibility, and eye-hand coordination to the variable of shooting result with *drag flick* technique is 39,6%. It means that the contribution of grip strength, arm muscle power, back flexibility, and eye-hand coordination is 39,6%.

DISCUSSION

Based on the analysis toward grip strength to the shot outcome of *drag flick* technique gain (R) 17,9%. It means the contribution grip strength on *drag flick* technique is 17,9%. Grip strength is using for stick handle. By strong gripping will generate speed push, besides that it affects to determine ball direction. The stick will be detached, if the grip is low and miss to the ball direction target. As pointed out by Mildred Barnes, (1979) stated that grip strength produced speed push and led to the goal.

The analysis had been done on the data of arm muscle power with *drag flick* technique gain (R) 34,6%. It means the contribution of arm muscle power on *drag flick* technique is 34,6%. Arm power is coming from muscles group in the upper and lower arms, to the palm. Arm power is needed to push and to take up the ball. The stronger arm made faster and more accurate shot. In performing *drag flick*, arm power is essential to give power and speed ball appropriate to the target.

The analysis had been done on the back flexibility with *drag flick* technique gain (R) 20,5%. It means the contribution of back flexibility on *drag flick* technique is 20,5%. The players who have good back flexibility can be positioning their body as low as possible that make stick equal closer to the ground. Ball position, which is on the body stick, generates strong push, so the shot could be fast, and accurate. In addition, the hip, chest and shoulders rotate and faces towards the goal when releasing the ball from the stick.

The analysis had been done on the eye-hand coordination with *drag flick* technique gain (R) 14,3%. It means the contribution of eye-hand coordination on *drag flick* technique is 14,3%. The eye-hand coordination result showed that all four variables have been giving the lowest on *drag flick* technique. The main dominant component on shot using *drag flick* technique is hand. Because of the eye-hand, coordination has been giving the contribution on *drag flick* technique. The eyes saw the shot angle and forwarded to hand toward the ball accurately. The precise time is determining the accurate shot. Whereas the poorly coordination also affected to inaccurate shot. Variables eye-hand coordination are affected by several factors, such as psychological learners who feel nervous, less calm, unconfident, and focus less during the test.

The analysis data of grip strength, arm muscle power, back flexibility, eye-hand coordination on shot using *drag flick* technique have got (R) 39,6%. It means contribution of the grip strength, arm muscle power, back flexibility, eye-hand coordination is 39,6%. The variables of grip strength, arm muscle power, back flexibility, eye-hand coordination have sufficient significant role on outcome of *drag flick* technique that affected to shooting accuracy. By correlating, those variables in performing *drag flick* technique could be generating shot accuracy.

CONCLUSION

The conclusion of this research as follow (1) There is positive relation between grip strength to the *drag flick* performance, that means the stronger the stick, the more accurate the shot. The contribution is 17,9%. (2) There is positive relation between arm muscle powers to the *drag flick* performance that means the bigger arm muscle power, the more accurate shot. The contribution is 34,6%. (3) There is positive relation between back flexibility to the *drag flick* performance that means the better back flexibility, the more accurate shot. The contribution is 20,5%. (4) There is positive relation between eye-hand coordination to the *drag flick* performance that means the better eye-hand coordination, the more accurate shot.

The variable outcome of eye-hand contribution toward to the *drag flick* technique is 14,3%. (5) There is positive relation between grip strength, back flexibility, and eye-hand coordination to the *drag flick* performance. The contribution is 39,6%.

The researcher would like to suggest for the coaches and *hockey* player in improving shot outcome of using *drag flick* technique. The suggest as follow (1) for the coaches should be selecting the good candidate athlete to improve *hockey* achievement, especially for shot using *drag flick* technique which consisted of grip strength, arm muscle power, back flexibility, eye-hand coordination. Those contributions should be adapted to make effective and efficiency training. (2) For *hockey* players should understand how much contribution and improve the ability of grip strength, arm muscle power, back flexibility, and eye-hand coordination to be able to shot using *drag flick* technique for improving *hockey* achievement.

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