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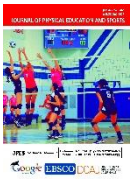

The Contribution of Hand-Eye Coordination, Muscle Arm Strength, and Concentration to Standing Throw Shoot Results

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Abstract

The purpose of this research is to: (1) Analyze the contribution of eye-hand coordination to the result of standing throw shoot; (2) Analyzing the contribution of arm muscle strength to the result of standing throw shoot; (3) Analyzing contribution of concentration to result of standing throw shoot; (4) Analyze the contribution of eye-hand coordination, arm muscle strength, and concentration to the result of standing throw shoot. This study uses correlation analysis. The research procedure is: (1) preliminary study, (2) determining the variable, (3) making the research instrument, (4) taking the data, (5) processing the data. The subjects of this study were students of SMP Negeri in Semarang City who followed extracurricular handball which amounted to 70 students. Instruments and techniques of data collection using tests. Data analysis used simple regression and multiple regression analysis. The results showed that hand-eye coordination contributed 23.4%, arm muscle strength contributed 15.8%, concentration contributed 19%, and hand-eye coordination, arm muscle strength, and concentration together contributed significantly by 54.2%. The conclusion of this research is the factor of hand-eye coordination, arm muscle strength, concentration has a contribution to the result of standing throw shoot either alone or together.

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INTRODUCTION

Currently, development in the field of sports is being vigorous in welcoming the Asian Games in terms of achievement. In line with that according to Maksum, Abdillah & Dewi (2017), Achievement in sports is one effort to raise the dignity and dignity of the nation. While the opinion of Mariyono, Rahayu & Rustiana (2017), good training is a systematically designed exercise by following the various characteristics of the sport is coached. In line with that according to Ghozali, Sulaiman & Pramono (2017), to achieve the optimal achievement does not come for granted but through the process of a training program, the type of exercise, the frequency of exercise and the method of exercise used. According to Yunida, Sugiharto & Soenyoto (2017), the estuary of the overall activity of the existing subsystems that is allowed athletes achievement as a reliable group elected. Achievement is a prestige for some who want it.

The movement in the handball game consists of running, jumping and throwing, catching, blocking, and pushing between players. In addition to the technical and tactical skills, that one of the key skills needed for success in the handball team is the ability to throw. (Gorostiaga, et al. 2006). Next according (Muhlisin & Adi, 2016), handball is a sport that uses the hand to reflect, throw and punch even put the ball into the goal. Closed by statement Wagner, Finkenzeller, Wurth & Duvillard (2014), handball is a complex game sport that is determined by the individual performance of each player as well as the tactical components and interaction of the team. The game of the handball has the characteristic of the intensity of change, the technique of the handball, the mental skill, and the social factors determining the determinants of coordination, endurance, strength, and cognition.

Shoot is an attempt to put the ball into the goal to earn points Rosmi (2017). Shooting is one of the basic techniques that must be mastered well by every handball player. Shooting serves to score or insert the ball as much as possible towards the opposing goal. The ability of a team in firing will determine the outcome achieved in a match. There are several shooting techniques in the handball game as presented by Mahendra (2000) as follows: (1) The Standing Throw Shot, (2) The Jump Shot, (3) The Dive Shot, (4) The Fall Shot, (5) The Side Shot, (6) The Flying Shot, (7) The Reverse Shot. The attacker can perform one of the seven techniques to shoot the ball into the goal in a penalty situation one of which shot shooting technique standing throw shot.

Eye-hand coordination is also a factor that affects the outcome of the standing throw shoot of a person. The ability of handball players to combine hand-eye coordination when making free throws will have an effect on the accuracy of throwing results. Eye-hand coordination plays a role in the handball game especially when the shooter sees the goal, to further release the ball towards the goal. A player who fires a shot, moves, swings his arms and time should be able to be combined in such a way into a good and harmonious unity, so the player must be able to do the move quickly and carefully to decide where the ball will be directed so difficult to reach by the opposing goalkeeper. Components other than eye-hand coordination, strength also affects the technique of standing throw shoot. If an athlete has good eye-hand coordination, then at the moment the ball will hit the ball will fall right on goal. On the contrary, poor eye-hand coordination will result in a rigid shooting movement so the ball will deviate from the goal. According to Ibrahim & Hassan (2017), in sports, players choose their actions based on the game situation. Handball players usually have steadily growing skills and tactics in various game situations. Reinforced statement from Wagner, et al. (2014), they need to get high-level movement coordination to run, jump, push, change direction, catch, shoot, and block. Thus, determining the factors that affect performance in a handball based on scientific studies will be a valuable contribution to improving the quality of training for trainers and practitioners.

Based on the result of the observation that has been done with an extracurricular trainer of handball, it is found that there has never been eye-hand coordination test to the students so that the students have not yet known their eye-hand

coordination ability. The ability of hand and eye coordination needs to be sharpened so that the result of throw shoot throwing is better. This is a concern for researchers to examine more deeply about eye-hand coordination factors.

The second factor that affects the standing throw shoot is the arm muscle strength. Arm muscle strength is also needed when shooting. Muscle strength is a force that can be produced by a muscle or group of muscles in a maximum contraction. (Eri Pratiknyo Dwikusworo, 2010). Muscle strength is an important component because it is the driving force of every physical activity (Harsono, 1988). The same thing according to Ismaryanti (2008), states that strength is a muscle contraction achieved in a maximum effort. So the muscles will achieve maximum strength when a muscle is repeatedly trained more than the usual trained on the muscle. Good muscle strength will contribute enormously to the body and the techniques required in performing The Standing throw shoot because with great arm muscle strength it will be a thrust so that the ball easily reaches the goal with maximum speed.

Concentration is one of the factors that influence doing the standing throw shoot. With a combination of good technique and concentration, the ball will easily enter the goal and the team will get points. While performing the standing throw shoot the successful free shooters generally do the preparation and concentration. According to Komarudin (2013), concentration is the very important role in sports because if disturbed it will arise a problem. Especially on sports activities that require accuracy of throws, punches, kicks, and shots on target. Because the concentration itself is a concentration of attention and thought to something that is done without being affected by anything else that is around. With the concentration of these activities will run smoothly and in accordance with the wishes. When concentrations are disrupted, the accuracy of throws, punches, and shots is reduced. This should be an opportunity to be a failure because of the lack of concentration levels owned by someone. Therefore, concentration is needed in the standing throw shoot on the handball game, because concentration is one of the factors that influence the success in shooting especially penalty.

The above mentioned junior high school is the junior high school that dominates the rankings in all the championships in central Java chosen to be the subject of research. The authors assume that players who often win the championship in the middle class are a player who has a better ability or technique than other players but based on observations in the field there are many players who find it difficult to insert the ball into the goal by using a standing throw shoot technique.

METHODS

The design of this research is correlation research. The athletes used by the samples are often champions and have good throwing techniques. Sample used ie SMP N 12, SMP N 16, SMP N 18, SMP N 20, SMP N 21, SMP N 23, SMP N 31, SMP N 34 and SMP N 35 so the sample in this study amounted 70 athletes.

RESULTS AND DISCUSSION

Description of Variations of Eye-Hand Coordination

The results of hand-eye coordination calculations on students following extracurricular handball in SMP N 12, SMP N 16, SMP N 18, SMP N 20, SMP N 21, SMP N 23, SMP N 31, SMP N 34 and SMP N 35 Semarang city resulting in a mean of 13 and a standard deviation of 2.4. The smallest value of 8 and largest 18. Table distribution of hand-eye coordination is as follows:

Table 1. Frequency Distribution of Hand-Eye Distribution

Criteria	Interval	Percentage (%)
Very high	16 – 20	12.86
High	11 – 15	62.85
Low	6 – 10	24.28
Very low	0 – 5	0
Total		100

Based on table 1, shows that most eye-hand coordination value of students who follow extracurricular handball in SMP N 12, SMP N 16, SMP N 18, SMP N 20, SMP N 21, SMP N 23, SMP N 31, SMP N 34 and SMP N 35 Semarang city are at intervals 11-15 with a percentage of 62.85%.

Description Variable Power of Muscle Sleeve

The calculation results of arm muscle strength in students who follow extracurricular handball in SMP N 12, SMP N 16, SMP N 18, SMP N 20, SMP N 21, SMP N 23, SMP N 31, SMP N 34 and SMP N 35 Semarang city resulting in an average of 8 and a standard deviation of 2.4. The smallest value of 3 and largest 14. Table of arm muscle strength distribution is as follows:

Table 2. Frequency Distribution of Arm Sleeve Strength

Criteria	Interval	Percentage (%)
Very high	> 10	17.14
High	8 – 10	51.42
Low	5 – 7	22.8
Very low	< 5	8.57
Total		100

Based on table 2, shows that most of the muscle strength value of students' arms following an extracurricular handball in SMP N 12, SMP N 16, SMP N 18, SMP N 20, SMP N 21, SMP N 23, SMP N 31, SMP N 34 and SMP N 35 Semarang City is at the interval of 8-10 with a percentage of 51.42%.

Description of Variable Concentrations

The results of calculation of concentration on students who follow extracurricular handball in SMP N 12, SMP N 16, SMP N 18, SMP N 20, SMP N 21, SMP N 23, SMP N 31, SMP N 34 and SMP N 35 Semarang city produces an average of 7 and a standard deviation of 2.2. The smallest value is 4 and the largest 12. The concentration distribution table is as follows:

Table 3. Frequency Distribution Concentration

Criteria	Interval	Percentage (%)
Very high	>16	0
High	11 – 15	7.1
Low	6 – 10	47.1
Very low	< 6	45.7
Total		100

Based on table 3, shows that most of the concentration value of students who follow extracurricular handball in SMP N 12, SMP N 16, SMP N 18, SMP N 20, SMP N 21, SMP N 23, SMP N 31, SMP N 34 and SMP N 35 Semarang City is at intervals 6-10 with a percentage of 47.1%.

Description Variable Standing Throw Shoot

The result of standing throw shoot calculation on students who follow extracurricular handball in SMP N 12, SMP N 16, SMP N 18, SMP N 20, SMP N 21, SMP N 23, SMP N 31, SMP N 34 and SMP N 35 The city of Semarang produces an average of 10 and a standard deviation of 1.6. The smallest value is 6 and the largest 12. The standing throw shoot distribution table is as follows:

Table 4. Frequency Distribution Standing Throw Shoot

Criteria	Interval	Percentage (%)
Very high	10 – 12	54.28
High	7 – 9	40
Low	4 – 6	5.71
Very low	0 – 3	0
Total		100

Based on table 4, shows that most of the value of standing throw shoot students who follow extracurricular handball in SMP N 12, SMP N 16, SMP N 18, SMP N 20, SMP N 21, SMP N 23, SMP N 31, SMP N 34 and SMP N 35 are at 10-12 intervals with a percentage of 54.28%.

This study aims to analyze how big the contribution of hand-eye coordination, arm muscle strength, and concentration to standing throw shoot on SMP handicrafts extracurricular in Semarang City completed in May 2018. The results are obtained as follows:

The Hand-Eye Coordination Contributes Significantly to The Result of Standing Throw Shoot on The Extracurricular Handmade of Junior High School in Semarang City

A handball game is one game that involves physical habits. In the handball game, eye-hand coordination is one of the important elements that can give positive results to improve the

ability to stand throw shoot, because to do standing throw shoot technique needed eye care in seeing and perceiving the target with body and hand skill in shooting the ball to the goal. A student with high eye-hand coordination can do a standing throw shoot well without spending much energy. Therefore, good eye-hand coordination will be easier to do a standing throw shoot. Coordination is the ability of the muscles to control the motion appropriately in order to achieve a specific physical task (Sukadiyanto, 2002). Coordination is necessary for almost all sports that involve physical habits (Rusli Lutan, 2000).

The findings in this study indicate that hand-eye coordination variables contribute significantly to the result of standing throw shoot on SMP handicrafts extracurricular in Semarang City. These results are supported by research conducted by Nowo Tri Purnomo (2015), which explains that there is a significant and positive linear relationship between eye-hand coordination and shooting ability. Dwi Hartanto (2014), in the study explains that students who have high hand-eye coordination ability have a higher percentage of shooting in the success. Resanto, Soegiyanto, K. S. & Setya Rahayu (2012), explains that the level of motion coordination is very influential in determining the learning outcomes of handball games. The results show that there is a difference in learning results of handball games. Students with high-motion coordination are better than those with low-level motion coordinates. High-coordinated learners are able to assemble and combine simple and complicated movements in the hand-ball technique. Galih Wisnu Murdhani, Sugiharto & Soekardi (2014), in his study explained that learners who have high eye-hand coordination will get better results compared with learners who have low eye-hand coordination.

Arm Muscle Strength Contributes Significantly to The Result of Standing Throw Shoot on The Extracurricular Handball Junior High School in Semarang City

Arm muscle strength is required when doing a standing throw shoot. With high arm muscle strength, it will allow a player to shoot at a relatively wide range of shots so that the possibility of ball entry into the wicket is greater. Unlike the case of a player who has relatively small arm muscle strength, most likely the resulting shot does not reach the goal.

The findings in this study indicate that arm muscle strength variables contribute significantly to the result of standing throw shoot on extracurricular SMP ball in Semarang City. This is in accordance with the review undertaken by Prayogi Setyo & Fitria Dwi (2016), which explains that students who have good arm strength will be able to jump shoot better.

Concentrations Contribute Significantly to The Result of Standing Throw Shoot on The Extracurricular Handmade of Junior High School in Semarang City

Concentration is the ability to focus attention on tasks uninterrupted and influenced by external and internal stimuli (Wilson, et al. 2006). In the handball game especially when doing a standing throw shoot needed the ability to focus on the target ie wicket.

The findings in this study indicate that the concentration contributes significantly to the result of standing throw shoot is not. Findings related to this study are the findings made by Alif, Dio H. (2016), which concluded that concentration contributed significantly to the results of traditional sporting blowpipe in Surabaya city. Aji K, Setyo., Sutardji & Junaidi, Said (2012) explains that the connection between the ability to concentrate by shooting on goal because the high concentration level of a player will be able to concentrate all the attention and ability to direct the ball into the target that will be in the end which will ultimately have an impact on the level of accuracy in doing the shot.

Hand-Eye Coordination and Arm Muscle Strength Together Contribute Significantly to The Result of Standing Throw Shoot on The Extracurricular Handmade of Junior High School In Semarang City

Shoot on sports handball included in the activity of motion. Bompa (1994), explain that all

motion activity in sports always invites physical elements such as strength, coordination, endurance, and speed. From this theory, it can be assumed that the mastery of good technique will always be related to physical capacity. This is consistent with what is stated by Sukadiyanto (2006), explains that the motion will occur when there is good energy stored in the muscle or obtained from outside the body through food.

Review was done by Yandika Fefrian Rosmi (2015), concluded that there are six components that contribute to the ability to stand throw shoot that is the power arm, leg power, muscle endurance, leg endurance, and coordination. Can not be denied again that the physical ability is a supporting factor in supporting the performance of students in doing a standing throw shoot. Based on the results of the study, the findings in this study show that eye-hand coordination and arm muscle strength together contribute significantly to the result of standing throw shoot.

Speech and Concentration Coordination Jointly Contribute Significantly to The Result of Standing Throw Shoot on The Extracurricular Handmade of Junior High School in Semarang City

Hall Wissel (2000), explained that in doing the technique of standing throw shoot one of them is to pay attention to the view. The point in question is that the player must focus on the meaning goal when performing a standing throw shoot technique that requires high concentration, but also requires a focused eye view of the target to be addressed, it is necessary to require the ability of coordination between the eyes with the hand so that with the combination of the ability to load attention with the ability to coordinate the hands of the hand will be able to add accuracy in the shooting.

Based on the results of hypothesis testing, the findings in this study indicate that eye-hand coordination and concentration together contribute significantly to the result of standing throw shoot.

Arm Muscle Strength and Concentration Together Contribute Significantly to The Result of Standing Throw Shoot on The Extracurricular Handmade of Junior High School in Semarang City

Hall Wissel (2000), explains that in addition to taking into account the view of the conduct of standing throw shoot also needs to pay attention to other things namely the rhythm of the shot. The rhythm of the shots in question is the ability of students in managing the energy given to the ball. From the theory can be explained that the ability to focus on the goal needs to be balanced with the ability to manage the power/impulse on the ball so that the level of accuracy of the ball entered high.

Based on the results of the hypothesis test, the findings in this study indicate that arm muscle strength and concentration together contribute significantly to the result of standing throw shoot.

Hand-Eye Coordination, Arm Sleeve, and Concentration Contribute Simultaneously and Significantly to Standing Throw Shoot on Extracurricular Handball of Junior High School in Semarang City

The ability of a team in firing will determine the outcome achieved in a match. Gorostiaga, et al. (2005), analysis of performances from the handball team of players at different levels can conclude that age and body weight contributed significantly to the difference in ball speed during thrown. In line with this according Wagner, et al. (2010), found a significant difference in the speed of the jump ball throwing, in addition to differences in height and weight. While according to Ibrahim & Hassan (2017), high jumps to throw can be considered one of the important parameters in a handball. In other sources according to Garcia, Calvo & Tilaar (2016), handball throwing is an important advantage such as increasing throwing distance and is considered a key element in long-range throws to score. It was concluded that the offensive line in handball play was a determinant in throwing capacity, regardless of the player's competitive level and had a negative effect on throwing speed. In sports handball, throwing is

one of the most important actions during the game (Andrade Mdos, Fleury, de Lira, Dubas & da Silva, 2010; Ziv & Lidor, 2009). The toss is used with each other and to score goals. Success depends on the accuracy and speed of the ball (Fleck, Smith, Craib, Denahan, Salju & Mitchell, 1992; van den Tillaar & Ettema, 2003a, 2003b, 2009) to overcome the goalkeeper.

The throw has an important advantage as an increase in throw distance and is considered a key element in long-distance throws (Wagner & Muller, 2008). As the ball speed increases, less time keeps the goalkeeper and the defender to block the throw (Vila, Manchado, Rodriguez, Abraldes, Alcaraz & Ferragut, 2012).

Therefore, it would seem obvious that the players are furthest away from the goal which is also called the offensive line of both players (back players), should the capacity of the toss is greater than those who throw in close, the first offensive line (wing and pivot players). However, although observed the difference between the specific positions of the offensive relates to anthropometric characteristics (Cavala, Rogulj, Srhoj, Shroj & Katic, 2008; Chaouachi, Brughelli, Levin, Boudhina, Cronin & Chamari, 2009; Rogulj, Srhoj, Nazor, Srhoj & Cavala, 2005; Srhoj, Marinovic & Rogulj, 2002), physical fitness and motor skills (Zapartidis, Toganidis, Vareltzis, Christodoulidis, Kororos & Skoufas, 2009; Zapartidis, Skoufas, Vareltzis, Christodoulidid, Toganidis & Kororos, 2009) and psychological characteristics (Rogulj, Nazor, Srhoj & Bozin, 2005), several studies have analyzed the difference between the first and second offensive lines at different levels in the capacity of the Pitch. Zapartidis, Skoufas, Vareltzis, Christodoulidid, Toganidis & Kororos (2009), found no difference in the speed of a throw between a young women's handball player with a playing position, except between substitute and goalkeeper. The same conclusion was found for junior and senior women's elite handball players, where there was a significant difference in the range of throws found between players according to the player's position with a throwing test ball (Rogulj, Nazor, Srhoj & Bozin, 2005).

The fact that there is a significant difference in the pitch rates found in this study can be based on several aspects. Women's handball players are evaluated by Zapartidis, Skoufas, Vareltzis, Christodoulidid, Toganidis & Kororos (2009) is very young (ie 14.1 ± years 1.0), they see the difference by the player's position and applied for only test support. Rogulj, Srhoj, Nazor, Srhoj & Cavala (2005) used only elite female handball players and applied throw tests and compared to goalkeepers, defenders, pivot and wing players with each other. None of these studies compared the throws shown in male handball players between first and second line players.

In previous studies on standing throw shoot or throwing with the first three steps used to evaluate the maximum throwing speed aimed at the target without the goalkeeper. (Fradet, et al., 2004; Marques, Van Den Tillaar, Vescovi & González-Badillo, 2007; Sibila & Pori, 2003; van den Tillaar & Ettema, 2006, 2009; Wagner & Muller, 2008). This can affect the maximum speed of the throw and may not be represented for their performance in a match. Only Gutierrez Davilla, Garcia, Parraga Montilla & Rojas Ruiz (2006), Rivilla-Garcia, Grande, Award, & van den Tillaar (2011) learn directly on throwing performance throws. While Gutierrez Gutierrez Davilla, Garcia, Parraga Montilla & Rojas Ruiz (2006) and Vila, Manchado, Rodriguez, Abraldes, Alcaraz & Ferragut (2012), did not find any opposition effect inexperienced handball players, Rivilla-Garcia, Grande & van den Tillaar (2011), found that by increasing the speed of the ball the position (goalkeeper and defender) decreased. However, in the study (Rivilla-Garcia, Grande, Award & van den Tillaar, 2011) there is a distinction made between the first line of throw differences during the game. Both of the players' throwing lines are no more than the longer distance the goal of the player's first line (Michalsik, Aagaard & Madsen, 2015; Michalsik, Madsen & Aagaard, 2015). Thus, maybe the pitch speed is more important for those who can score goals than the first line players. It can be concluded that the second line player will throw farther and faster than the first line player due to

the fact that the winger executes the largest number of throws and from a long distance during a competition game (Ohnjec, Vuleta, Milanovic & Gruic, 2008) and as far as the tallest player with the largest hand stretch (Chaouachi, Brughelli, Levin, Boudhina, Cronin & Chamari, 2009).

Hall Wissel (2000), explained that the important thing in doing the shooting is to consider the following factors: views, balance, hand position, the rhythm of fire, fire execution. The view in question is the ability to focus on the selected stimuli (one object) within a certain time (Sukadiyanto, 2006). This means that at the time of the shot, the eyes must be careful and focused on the goal.

The shooting rhythm in question is the ability to unify the various separate nervous systems of motion into an efficient motion pattern (Sajoto, 1995) and the ability of a muscle or group of muscles to cope with the load (Sukadiyanto, 2005). This means that in the shot need to coordinate the eye, foot position, movement of the torso, arm movement and the ability to regulate the power/thrust of the hand so that the ball can reach the target.

Based on the above description it can be concluded that coordination, strength, and concentration together contribute to the result of standing throw shoot. This is consistent with the findings in this study which show that eye-hand coordination, arm muscle strength, and concentration together contribute significantly and have the greatest contribution to the result of standing throw shoot.

CONCLUSION

Based on the results of data analysis, description, testing of research results, and discussion, it can be concluded and suggestions, that: (1) Eye-hand coordination contributes significantly to the result of standing throw shoot with a contribution value of 23%. (2) Arm muscle strength contributes significantly to the result of standing throw shoot with a contribution value of 15.8%. (3) Concentration contributes significantly to the result of standing throw shoot with a contribution value of 19%. (4) Hand-eye coordination and arm muscle strength together contribute significantly to the result of standing throw shoot with a contribution value of 40%. (5) Eye-hand and concentration coordination together contribute significantly to the result of standing throw shoot with a relative contribution value of 35.9%. (6) Arm muscle strength and concentration together contribute significantly to the result of standing throw shoot with a relative contribution value of 36.9%. (7) Eye-hand coordination, arm muscle strength, and Concentration together contribute significantly to the result of standing throw shoot with a relative contribution value of 42.2%.

Increased standing throw shoot ability of students following extracurricular needs to be pursued by improving hand-eye coordination, muscle strength, and concentration. It should be noted that there are other factors that contribute to the standing throw shoot as internal factors include: height, balance, mental and external factors including trainers, training methods, training media.

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