



The Relationship between Eye-Hand Coordination and Agility to the Dribble Ability of the U12 Basketball Player

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ABSTRACTS

Purpose: This study examines the correlation between eye-hand coordination, agility, and dribbling skills in U12 Jaguar Panther children.

Materials and Methods: The study was a correlational investigation that included ten male participants under 12 and belonged to the Jaguar Panther group. The eye-hand coordination test (ball throw and catch test), agility test (T-run), and basketball dribbling test (Aahperd Basketball Control Dribble Test) were utilized to conduct the measurements.

Result: The statistical analysis revealed that the relationship between eye-hand coordination and dribbling ability is significant at 0.063. Similarly, the relationship between agility and dribbling ability has a significance value of 0.173. Additionally, the relationship between eye-hand coordination, agility, and dribbling ability has a significance value of 0.057.

Conclusion: All three significance values were greater than 0.05, indicating a lack of significant relationship between eye-hand coordination, agility, and dribbling ability in U12 Jaguar Panther children.

Keywords: Mini basketball, Eye-hand coordination, Agility, Dribbling ability.

INTRODUCTION

Basketball has experienced tremendous popularity over the years, and Indonesia is still catching up. Basketball as a game has been able to attract attention from young children to adults. In his words, Hal Wissel (2000) stated that basketball is now being strongly propagated and is starting to mushroom in various regions not only as a professional sport but also as an activity for relaxation. In the case of Indonesia, the level of popularity of basketball has grown thanks to the Indonesian Basketball Association (PERBASI), which is responsible for marketing and managing all basketball activities in the region. PERBASI (2014) states that basketball games in Indonesia are activities in which the ball is advanced by pushing, touching or hitting it, throwing, catching, and bouncing it. This action must be done with the palm so the player can control the ball in whichever direction the player wants to move the ball on the field.

However, there is good news related to young athletes under 12. Moreover, the good news comes in the form of mini-basketball. Suitable for children under 12, mini basketball was developed based on a more straightforward set of concepts and items related to child development. This allows children to participate in this sport at a young age and creates a

sustainable interest that grows as they age. In Indonesia, mini-basketball is increasing among children and adolescents participating in this sport in schools and other activities. This development program is essential because it helps to foster interest in the new sport among younger children, with many joining the Jaguar Basketball Academy in Semarang, which specializes in basketball training and development.

Basketball, like many other sports, requires basic skills. In short, basic skills are the foundation of basketball performance. Dribbling, passing, and shooting each have important rankings for players to succeed in basketball because the sport is dynamic and fast-paced. Among these skills, dribbling is one of the most important because it allows players to carry the ball across the court while still controlling it while trying to "set up" attacks and maneuver around opposing players. This skill remains very important, especially at a young age, because there is a misconception that it will not be necessary. Oliver (2009) supports this by saying that "dribbling requires a highly developed motor pattern and should not be considered a basic skill." In short, dribbling is the beginning of the game. For dribbling skills and vision loss goals in their game, almost every player will be affected if they do not have good dribbling skills.

Core basic skills are essential for young athletes to develop. The Long-Term Athlete Development Model (LTAD) supports the process by which age-appropriate training, which focuses on skill acquisition rather than direct performance outcomes, is delivered to athletes. It has been mentioned in the LTAD model that when young athletes are exposed to the type of training intended for adults, it can result in fatigue, injury, or loss of interest in the sport. In contrast, LTAD emphasizes stimulating other core abilities, especially those appropriate for age and maturity. In U12, children should be guided to concentrate on basic skills such as dribbling, allowing them to learn more advanced skills later. Dribbling is very important at this age because it requires coordination, motor control, and agility, which is still 'in the process of development' in young players.

In addition, dribbling can be used to measure a basketball player's overall skill. A common practice for coaches is to use a child's ability to dribble to measure how prepared he or she is to engage in more complex routines and competitive games. It goes without saying that for U12 players, directional accuracy is not just a skill that needs to be mastered but is also essential in developing their confidence on the pitch. Programs like those at Jaguar Basketball Academy are intended to build on these crucial building blocks so that players retain the basics before they follow more advanced modules.

Interestingly, although dribbling and its performance and other fundamental skills have been in the spotlight of practitioners and academics, relatively little attention has been paid to the role of some other physical traits, such as eye-hand coordination and agility, in particular, related to its influence on the dribbling performance of young and less experienced athletes. Eye-hand coordination is essential in sports involving the ball, as this ability is necessary for catching, throwing, and dribbling. Coordination involves the eyes, hands, and limbs, which are often manipulated quickly during the fast game of basketball.

Several studies have been conducted on these physical characteristics and activities related to basketball, especially among older or experienced players. For example, research by Hartadi (2007) and Salim et al. (2008) investigated the influence of eye-hand coordination and agility on basketball performance, and they found a relationship between those physical attributes and

successful participation in the game. However, this contradicts this study, which targets a younger player population because it is aimed more at adults and high school players.

A directly related issue is the work of Winarno (2013), which investigated high school players and reported a strong relationship between eye-hand coordination and the ability to dribble the basketball and concluded that a player with strong visual and motor coordination had good ball possession skills. Similarly, Saputra et al. (2003) investigated the role of eye-hand coordination in regulating wrist mobility. They determined that the physical factors of flexibility and coordination of various body parts greatly influence the dribbling performance of skilled players.

This contrasts the younger sub-category of basketball players, particularly children aged 12 and under, who have yet to be the focus of much research. Today's literature pays more attention to older players with specific skills or experience. This is where the current study contributes, aiming to explore how eye-hand coordination and agility relate to dribbling ability in younger, less experienced players. More specifically, the study targeted players from the Jaguar Panther U12 basketball team who were new to training and may have yet to reach the same level of balance and speed as their older counterparts.

However, this is relevant because it is essential to consider groups previously overlooked in previous studies when measuring the impact of various physical features. There is a relationship between physical features and dribbling that younger players have yet to experience. It can also help coaches and caregivers know when to introduce players to the necessary training. Focusing on U12 players, the study explores the relevance of the literature and emphasizes the need for age-sensitive advice for young players' basketball training and practice. The uniqueness of this research is that it will help in the development and understanding of the skills of young athletes and address gaps that will improve dribbling skills in basketball structures.

METHODS

Study Participants: The study included ten males from the Jaguar Panther U12 basketball team, aged 11-12 years. The participants were selected from the Jaguar Basketball Academy in Semarang, Central Java, Indonesia. The sampling technique used was total sampling, involving all U12 Jaguar Panther team members.

Study Organization: This study utilized a correlational research design to examine the relationship between eye-hand coordination (X1), agility (X2), and dribbling ability (Y) among the U12 Jaguar Panther players, as illustrated in Table 1. The study aimed to determine the extent to which these variables are related.

Measurement:

Eye-Hand Coordination Test

The Throwing and Catching Test is one of the tests conducted to assess participants' eye-hand coordination because it is often used in various sports studies. Each subject performed two test experiments, and the best score was used for the analysis. The validity coefficient for this test was set at 0.513, while the reliability coefficient for the same test was calculated and reported at 0.543, indicating moderate validity and reliability.

Agility Test

Agility evaluation is carried out using the T-Run Test, a standard sports performance assessment tool. Participants took the test twice, and the fastest recorded time was used for analysis. The

validity coefficient of this test was 0.566, and the reliability coefficient was equal to 0.682, indicating the good reliability of this method in assessing participants' agility.

Dribbling

The AAHPERD Basketball Control Dribble Test is used with other methods to assess a player's dribbling ability. Each player makes two tries, and the best time recorded is considered the player's final score. There was a wide range of validity (0.37-0.91) and substantial reliability (0.88-0.95). The test was explicitly modified to use young male participants to assess their dribbling controls.

Procedure: The research was conducted at the Jaguar Basketball Academy, located on Jalan Ariloka, Tawang Sari, West Semarang, Semarang, Central Java. Data collection was carried out over a specific period, during which each participant underwent the test twice, and the best results were recorded for analysis.

Statistical Analysis: This study used Pearson's correlation coefficient to analyze the links between eye-hand coordination, agility, and dribbling skills. The alpha level for statistical significance was set at $p < 0.05$. This was done with SPSS version 25, a standard statistical analysis software. However, before conducting the correlation analysis, the data was assessed for normality with the Shapiro-Wilk test to meet the prerequisites of Pearson's correlation, which requires a normal distribution of continuous variables. On the other hand, descriptive statistics (mean: standard deviation) were computed for all the variables to enable the readers to understand the level of performance amongst the participants. The reliability of the measurement tools was established through internal consistency testing, as noted above. The last analysis was meant to analyze the interaction between the variables and state the importance of these interactions about basketball performance within the U12 category.

Training Program: Based on the research findings, a training program was developed to improve the Jaguar Panther team's dribbling ability. This program included specific drills targeting eye-hand coordination and agility, structured over eight weeks to enhance the players' overall basketball performance.

RESULT

This study's results are the relationship between eye-hand coordination and dribble ability and the relationship between agility and dribble ability.

Table 1. Jaguar Panther Turnover Statistics

Player	Turnover	
	Game 1	Game 2
1	2	1
2	4	2
3	1	3
4	0	1
5	3	2
6	2	2
7	0	0
8	1	2
9	4	5
10	4	1
Total	21	19

Dribble ability is one of the references in assessing children's ability to play basketball. Two teams in Jaguar U12 have different average dribble skills. The children of the Jaguar Panther team have dribble abilities that are still below average, as evidenced by the dribble turnover recorded in the Jaguar Panther game scrimmage statistics.

Table 2. Eye-Hand Coordination Test (Ball Catch)

No	Participants	Total Catches	Z Skor
1	Player 1	15	0.721522
2	Player 2	14	0.545541
3	Player 3	2	-1.56623
4	Player 4	11	0.017598
5	Player 5	17	1.073485
6	Player 6	7	-0.68633
7	Player 7	19	1.425447
8	Player 8	4	-1.21427
9	Player 9	5	-1.03829
10	Player 10	15	0.721522

Table 3. Agility Test (T-Test)

No	Participants	Time (Seconds)	Z Skor
1	Player 1	13	-0.125
2	Player 2	11	-1.375
3	Player 3	14	0.5
4	Player 4	11	-1.375
5	Player 5	13	-0.125
6	Player 6	13	-0.125
7	Player 7	13	-0.125
8	Player 8	13	-0.125
9	Player 9	14	0.5
10	Player 10	17	2.375

Table 4. Dribble Ability Test AAHPERD Basketball Control Test)

No	Participants	Time (Seconds)	Z Skor
1	Player 1	13	-0.26726
2	Player 2	11	-1.60357
3	Player 3	15	1.069045
4	Player 4	12	-0.93541
5	Player 5	12	-0.93541
6	Player 6	16	1.737198
7	Player 7	13	-0.26726
8	Player 8	15	1.069045
9	Player 9	13	-0.26726
10	Player 10	14	0.400892

Table 5. Correlation of eye-hand coordination to dribble ability

	Eye and Hand Coordination	Dribble Ability
Pearson Correlation	1	-.607
Sig. (2-Tailed		0.063
N	10	10

The table above shows that the significance value is 0.063, meaning more than 0.05. Therefore, eye-hand coordination and dribble ability are not correlated. It can be concluded that dribble ability is not affected by eye and hand coordination ability. This can be seen in the data above, which shows that 0.063 is more than 0.05, a reference for determining the correlation value between the objects studied. In this study, there was no correlation between eye-hand coordination and dribble ability; it should be noted that many things influence eye-hand coordination; based on a blog compiled by BPK Penabur on Getting to Know Coordination Exercises for Preschool Children, it is stated that eye-hand coordination forms the basis for visual-motor integration, children will have eye-hand coordination skills if in the growth period Between the ages of 2-5 years get activities related to motor skills and coordination, examples are rolling the ball, throwing and catching the ball, and writing. Then you will see the difference between children who are used to throwing and catching the ball and will be much better in their eye-hand coordination skills than those who have never been trained to throw and catch the ball.

The difference in the results of this study is due to the coordination ability of children's eyes and hands; the age difference significantly affects motor sensors in U12 years and U18 (SMA) children. It is explained in LTAD (Long Term Athlete Development) that the child's athletic development and biological influence are divided into several stages based on age. The Jaguar Panther (U12) child is still in the fourth stage, which is to train to train. The goal is to take advantage of this sensitive period for essential physical qualities such as strength and endurance. In contrast to the U18 age children in the children studied by Risdi Winarno who have entered the sixth stage, namely training to win, where athletes focus on training, competition, and recovery, and have suitable motor sensors, this is what affects the difference in the level of eye-hand coordination in U12 children (Jaguar Panther) and U18 children (SMA N 2 Wates Kulon Progo Yogyakarta).

Table 6. Correlation of Agility to dribble ability

	Agility	Dribble Ability
Pearson Correlation	1	0.468
Sig. (2-Tailed		0.173
N	10	10

Why is no relationship between agility and dribbling ability in Jaguar Panther children? This is because Jaguar Panther consists of U12 basketball children who are just learning the basics of basketball, meaning that Jaguar Panther children do not have sound fundamentals and neither have agility and dribble ability well; when a correlation test was carried out on the two variables, it was proven that there was no relationship between agility and dribbling ability in Jaguar Panther children.

Table 7. Correlation of Eye-Hand Coordination and Agility to Dribble Ability

	Eye-Hand Coordination and Agility	Dribble Ability
R Square	0.558	
Sig. F Change		0.057
N	10	10

The table above shows that the significance value is 0.057, meaning more than 0.05. It can then be decided that eye-hand coordination and agility with dribble ability are not correlated. In the results of this study, it can be concluded that hand-eye coordination and agility do not affect dribble ability in Jaguar Panther children; as seen in the data above, the number shows more than 0.05, which means that there is no relationship between children's hand-eye coordination and agility and their dribble ability. There is also a study conducted at SMK N 7 Makassar, which Sahabuddin compiled about the relationship between eye-hand coordination and agility on the dribble ability of SMK N 7 Makassar students. It is proven by a significance value of 0.000, which means less than 0.05; this means that the greater the level of eye-hand coordination ability and agility of students, the better the dribble ability of SMK N 7 Makassar students, and the two have significant relationship and influence.

DISCUSSION

This study examined the correlations between eye-hand coordination, agility, and dribbling skills in the U12 Jaguar Panther basketball players. Since such physical characteristics are crucial for the successful performance of athletes, particularly basketball players, there was expected to be a strong enough positive correlation between dribbling skill and eye-hand coordination and agility. Dribbling, one of the fundamental aspects of basketball, requires technical proficiency, the effective integration of visual and motor skills, and swift and accurate actions on the court. It was expected that those better at synchronizing their eye-hand movements and those with better total body mobility would demonstrate good dribbling.

The findings of this investigation, however, challenged our initial expectations. According to the Pearson correlation, the relationship between eye-hand coordination and dribbling skill was revealed to be -0.607 ($p=0.063$), indicating an unexpected negative correlation. Similarly, at the significance of 0.173, the relationship between agility and dribbling skill was estimated at 0.468. Both significance values were above the accepted 0.05 threshold, indicating that dribbling ability did not correlate significantly with eye-hand accuracy or agility among these individuals. These results suggest that the observed patterns are not strikingly essential for dribbling performance in this sample of young athletes, at least at this developmental stage.

This lack of meaningful relationships, particularly the negative correlation between eye-hand coordination and dribbling ability, can be understood in terms of many factors characteristic of the developmental level of U12 players. At this age, players are still developing fundamental movement skills and may need to fully integrate their physical attributes into sport-specific tasks like dribbling (Malina et al., 2015). Factors such as cognitive development, motor control, and individual differences in maturation play crucial roles in skill acquisition at this stage (Lloyd & Oliver, 2012). The negative correlation could be explained by younger players with better eye-hand coordination being more cautious or deliberate in their movements, leading to slower dribbling times.

The difference, particularly in this case, is evident when considering results from other studies, more how these results relate to Winarno's research, which noted these variables have strong relations among older athletes. A previous study involving high school towing basketball players has established dribbling as one of the most essential skills in the game. Good on-the-ball skills, mainly dribbling, depend on eye-hand coordination and agility (Winarno, 2013). This

systemic challenge outlines the development of the young and the older players, where the importance of these physical attributes is enhanced as the players grow older.

The findings of this research indicate that in the case of dribbling at the U12 level, general motor abilities and practice may be more relevant to performance than specific physical factors such as coordination and agility. This is consistent with the "windows of trainability" concept within the Long-Term Athlete Development model (Balyi et al., 2013). According to this framework, there are optimal periods for developing specific physical and physiological capacities. For U12 players, the focus is primarily on developing fundamental movement skills and sport-specific techniques, while integrating advanced physical attributes becomes more critical in later stages of development.

This age-specific pattern is further supported by longitudinal research. For instance, a study by Vandorpe et al. (2012) found that motor coordination became an increasingly significant predictor of sports performance as children progressed from 6 to 11. Similarly, Deprez et al. (2015) observed that the relationship between physical fitness and soccer-specific skills strengthened as players moved from U13 to U15 age categories. These studies support our finding that the relevance of physical attributes to sport-specific skills may increase with age and experience.

The findings of this research indicate that in the case of dribbling at the U12 level, general motor abilities and practice may be more relevant to the performance than specific physical factors, such as coordination and agility. Alfaro by made similar observations in their clinical study, where they noted that while dribbling was highly influenced by agility, eye-foot coordination, and leg muscle power, such findings may depend on the age of the subjects and the level of skills acquired (Alfaro by, 2022). In this way, one can appreciate the need for age-specific training programs to build basic movement patterns before unmasking advanced training that might not be age-appropriate for the developing athlete.

CONCLUSION

Based on the analysis of data, descriptions, testing of research results and discussions that have been carried out, it can be concluded that the researcher did not find a relationship between eye-hand coordination and the level of dribble ability, and also the relationship between agility and dribble ability in Jaguar Panther players, because Jaguar Panther children are children who are just learning basketball, and do not have the basis and fundamentals Good, which means that when the player has good eye-hand coordination skills, he does not necessarily have good dribble skills. When the player has a good agility score, he does not necessarily have good dribble skills.

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CONFLICT OF INTEREST

The authors assure us that there are no conflicts of interest.

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