

## THE INFLUENCE OF LEG MUSCLE STRENGTH, FLEXIBILITY AND ANKLE-FOOT COORDINATION ON THE PASSING ABILITY

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**Abstract** This study aims to reveal the direct and indirect effects, as well as the simultaneous influence of exogenous variables on endogenous variables. This type of research is quantitative with a path analysis approach. Data were analyzed by path analysis through structural model testing at  $\alpha = 0.05$ . The results showed that: 1) there was a direct effect of leg muscle strength on the passing ability of 9.61%, 2) there was a direct effect of flexibility on the passing ability of 8.41%, 3) there was a direct effect of ankle coordination on the passing ability amounted to 15.28%, 4) there is an indirect effect of leg muscle strength through ankle coordination on passing ability is 48.16%, 5) there is an indirect effect of flexibility through ankle coordination on passing ability is 44.35% , and 6) there is an effect of leg muscle strength, flexibility and ankle coordination on the passing ability of 67.50%. From the analysis of the direct and indirect effects, it is concluded that the big influence is the indirect variable of leg muscle strength through ankle coordination, which is 48.16%.

**Keywords:** leg muscle strength; flexibility; eye-foot coordination; passing soccer



## **INTRODUCTION**

Achievement in sports is one way for Indonesia to raise its flag in other countries. So that sports achievements must receive special attention in Indonesia. Among the various types of sports that are developed, the one that receives special attention and training at this time is football. Football is a very famous sport in the world as well as in Indonesia, both lower and upper class people are familiar with football.

Football is a game played by two teams, each consisting of eleven (11) players, which are usually called liberties. Each team or liberties tries to put the ball into the opponent's goal as much as possible and defend their own goal from conceding (Ofroki, Marheni, and Afrizal 2020). The time for a football match is 2 halves with each half lasting 45 minutes and the longest break time in a football game is 15 minutes. (Agustina 2020). Football is a sport that requires good teamwork and requires players to master good basic individual techniques (Sin and Aprinanda 2020). To be able to play the game of football well, every football player must be able to master basic techniques such as passing, shooting, dribbling, control, heading. Technical skills in football are passing, shooting, dribbling, control, heading (Bozkurt and Kucuk 2018).

Good passing is absolutely essential to playing good Football. About 80% of the game involves giving and receiving the ball (Bryson et al., 2012). Passing and Control is one of the basic techniques that an athlete must do in a soccer match (Irawan, Arwandi, and Atradinal 2020). Therefore, accurate and good passing quality will make it easier for players to build attacks and provide bait to score goals. Passing is a basic soccer technique that is often done by every soccer player in the game because by passing the ball it will be easy to control the course of the match (Doewes et al. 2020). Good passing builds team confidence and momentum. Bad passing destroys a team (Bryson et al. 2012). The basic technique of good passing is a pass that is right on target, meaning the power and direction of the ball passing is in accordance with the intended target so that players can build attacks easily. To be able to display good passing, all soccer players must have supporting abilities such as leg muscle strength, flexibility and eye-foot coordination.

Furthermore Hidayat et al., (2019) stated that "football is a dynamic sport and requires excellent physical readiness with the support of good technique, tactics and mentality". The physical conditions needed in football include strength, endurance, agility, power, and flexibility (Ofroki, Marheni, and Afrizal 2020). Fahrizqi (2018) in

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Trastiawan, Sugiharto & Fakhrudin (2020) Accuracy in passing or passing the ball well, carefully and on target will make it easier for athletes to build attacks to score goals against opponents (Trastiawan, Sugiharto, and Fakhrudin 2020). The basic technique of good passing is a pass that is right on target, meaning the power and direction of the ball passing is in accordance with the intended target so that players can build attacks easily. To be able to display good passing, all soccer players must have supporting abilities such as leg muscle strength, flexibility and eye-foot coordination.

Strength is the ability to overcome resistance (Pandey and Chaubey 2015). Strength can be defined as the maximum force or torque (rotational force) that can be produced by a muscle group or muscle (Bompa and Buzzichelli 2019). Strength is the ability of muscles to use or exert power in overcoming a certain resistance or obstacle (Bafirman and Wahyuri 2019). Passing cannot be done without strength. Because the technique can be done perfectly if muscle strength is very good. In passing, the strength that plays a very important role is leg muscle strength.

Flexibility is the body's ability to perform exercises with large or wide amplitudes of movement. Flexibility is the ability to have a variety of movements around the joints in the body (Pandey and Chaubey 2015). Flexibility is an undeniable component of fitness, defined as the ability to move a joint through its normal range of motion without producing stress to the musculotendinous unit (Zakas 2005). Muscle flexibility should be part of a soccer player's specific training starting at an early age (García-Pinillos et al. 2015). An appropriate level of flexibility has been shown to be necessary to ensure optimal performance in soccer including reducing the likelihood of muscle injuries (Milanović et al. 2014). To develop passing in soccer, a soccer player must have a large amplitude of leg movement to be able to produce good steps when passing. In other words, without flexibility, passing in soccer does not develop optimally.

Coordination is a very complex biomotor ability. The level of a person's motor coordination is reflected in their ability to perform movements smoothly, precisely, quickly, and efficiently (Ulfiansyah, Rustiadi, and Hartono 2018). Ankle-foot coordination is the integration between the eyes as the main function holder, in this case, seeing the ball and the game situation faced when kicking the ball and the feet as the function holder that performs the movement, touching or kicking the ball so that it can move from its original place (Vembiarto and Lismadiana 2018). To be able to perform

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the ball passing movement, a movement coordination component is needed to connect the movement elements that involve two or more series of movement elements in an integrated manner.

The results of observations and interviews with the SSB Nuansa FC coach, Mr. Anton Surya, during training and matches, SSB Nuansa FC players often make mistakes when performing techniques in football, especially in passing techniques. In fact, the basic passing technique is an important technique in the game of football that will affect the results of a football match. When the Passing and Control skills are good, the chances of winning the game will be greater (Irawan, Arwandi, and Atradinal 2020). Passing technique is a football technique that affects the success of players in playing football. Football players who have good passing skills will have a greater chance of winning the match. Of course this will have an impact on the achievements of the club.

These data and interviews provide an overview that basic passing techniques are a problem that must be solved. The less than optimal ability of basic passing techniques of SSB Nuansa FC causes low achievements of SSB Nuansa FC athletes. Based on this problem, the author is interested in conducting research and discussing in more depth the direct or indirect influence of Leg Muscle Strength, Flexibility and Ankle Coordination on the Passing Ability of SSB Nuansa FC Padang City Players".

## **METHODS**

### **Research Design**

This type of research is quantitative research with a causal associative correlation approach, the purpose of this study is to determine the direct effect of leg muscle strength, flexibility and ankle coordination on the passing ability of SSB Nuansa FC Padang City Players. This research is classified as a type of quantitative research that uses multiple regression data analysis techniques, after which it is continued with path analysis. This research was conducted in January 2021. The place of this research was carried out on the Taman Lubuk Kilangan football field, Padang City.

### **Population and Sample**

In this study, the population was all SSB Nuansa FC Padang City players, totaling 73 people. The sampling technique in this research is purposive sampling. In Barlian (2016) said "purposive sampling is a technique for determining samples based on

consideration of the objectives set by the researcher". Based on this, the sample in this study was 25 people aged 14-17 years.

### **Research instrument**

The research instrument used in this study was 1) Leg muscle strength test using a tool called a back and leg dynamometer (Arsil, 2015). 2) The flexibility test uses the sit and reach flexibility test instrument (Widiastuti, 2015). 3) Eye-foot coordination test using the soccer wall volleyball test instrument by Ismaryati (2018). 4) Passing test uses the short pass test from Arsil (2015).

### **Data analysis**

The data obtained were analyzed using statistical formulas in the form of data descriptions, normality tests, linearity tests and regression significance tests. After the normality test, regression linearity test, and regression significance tests were carried out, then continued with path analysis to test the research hypothesis. The data analyzed in this study consisted of four units of analysis, namely: 1) Leg muscle strength test results (X1). 2) Flexibility test results (X2). 3) Eye-foot coordination test results (X3). 4) Passing ability test results (Y).

## **RESULTS AND DISCUSSION**

### **1. Structural model testing 1**

Testing on structural model 1 to see the influence of the leg muscle strength variable (X1) on the flexibility (X2) of SSB Nuansa FC Kota Padang players.

**Table 1. Path Coefficients of Structural Model 1**

Variable	R <sup>2</sup>	Koef Beta	Sig.	P-Value	Description
X <sub>1</sub> , X <sub>2</sub> (p <sub>21</sub> )	0,509	0,713	0,000	0,05	Significant

Based on table 17, it appears that R<sup>2</sup> of 0.509 means that 50.9% of the variability of the flexibility variable (X2) can be explained by the leg muscle strength variable (X1). So that the error ( $\epsilon_1$ ) =  $1 - R^2 = 1 - 0.509 = 0.491$ . The path coefficient of leg muscle strength (X1) and flexibility (X2) or (p<sub>21</sub>) = 0.713 obtained a Sig. value = 0.000 <  $\alpha$  = 0.05. From the results of testing structural model 1 is significant.

### **2. Structural Model Testing 2**

Testing on structural model 2, namely the variables of leg muscle strength (X1), flexibility (X2) and foot-ankle coordination (X3) of SSB Nuansa FC Kota Padang players.

**Tabel 2. Path Coefficients of Structural Model 2**

Variable	R <sup>2</sup>	Koef Beta	Sig.	P-Value	Description
X <sub>1</sub> , X <sub>3</sub> (p <sub>31</sub> )	0,593	0,983	0,001	0,05	Significant
X <sub>2</sub> , X <sub>3</sub> (p <sub>32</sub> )	0,556	0,961	0,002		Significant

Berdasarkan tabel 18, tampak bahwa R<sup>2</sup> sebesar 0,556 berarti bahwa 55,6% variabilitas variabel koordinasi mata kaki (X<sub>3</sub>) dapat dijelaskan oleh variabel kekuatan otot tungkai (X<sub>1</sub>) dan kelentukan (X<sub>2</sub>). Sehingga error ( $\epsilon_2$ ) = 1 - R<sup>2</sup> = 1 - 0,556 = 0,444. Koefisien jalur (X<sub>1</sub>) terhadap (X<sub>3</sub>) atau (p<sub>31</sub>) = 0,983 dan (X<sub>2</sub>) terhadap (X<sub>3</sub>) atau (p<sub>32</sub>) = 0,961 diperoleh nilai Sig. = 0,001 <  $\alpha$  = 0,05 dan Sig. = 0,002 <  $\alpha$  = 0,05. Dari hasil pengujian model struktural 2 adalah signifikan

### 3. Structural Model Testing 3

Testing on structural model 3, namely the variables of leg muscle strength (X<sub>1</sub>), flexibility (X<sub>2</sub>), ankle-foot coordination (X<sub>3</sub>) on the passing ability (Y) of SSB Nuansa FC Kota Padang players.

**Table 3. Path Coefficients of Structural Model 3**

Variable	R <sup>2</sup>	Koef Beta	Sig.	P-Value	Description
X <sub>1</sub> Y (p <sub>y1</sub> )	0,675	0,310	0,001	0,05	Significant
X <sub>2</sub> Y (p <sub>y2</sub> )	0,675	0,290	0,002		Significant
X <sub>3</sub> Y (p <sub>y3</sub> )	0,644	0,391	0,000		Significant

Based on table 19, it appears that R<sup>2</sup> of 0.675 means that 67.5% of the variability of the Passing ability variable (Y) can be explained by the variables of leg muscle strength (X<sub>1</sub>), flexibility (X<sub>2</sub>) and ankle-foot coordination (X<sub>3</sub>). So that the error ( $\epsilon_3$ ) = 1 - R<sup>2</sup> = 1 - 0.675 = 0.325. The path coefficient (X<sub>1</sub>) to (Y) or (p<sub>y1</sub>) = 0.310, (X<sub>2</sub>) to (Y) or (p<sub>y2</sub>) = 0.290 and (X<sub>3</sub>) to (Y) or (p<sub>y3</sub>) = 0.391 obtained Sig. = 0.001 <  $\alpha$  = 0.05 for (p<sub>y1</sub>), Sig. = 0.002 <  $\alpha$  = 0.05 for (p<sub>y2</sub>) and Sig. = 0.000 <  $\alpha$  = 0.05 for (p<sub>y3</sub>). From the results of testing structural model 3 it is significant.

The influence of leg muscle strength on the passing ability of SSB Nuansa FC Kota Padang is 9.61%. While the remaining 90.39% is influenced by other factors. Other factors that can affect football passing ability could be explosive power, flexibility, coordination, speed, concentration, self-confidence and so on.

The results of this study are also strengthened by research from (Ginanjari 2018) who has studied the Relationship Between Leg Muscle Strength and Eye-Foot

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Coordination Against Long Passes in Extracurricular Football Games at MTS Yasti Cisaat, Sukabumi Regency in 2018. This study aims to determine leg muscle strength, eye-foot coordination, and determine the contribution of both to long passes.

Based on these findings, the hypothesis proposed in this study is empirically accepted. It can be interpreted that good flexibility has a relationship and influence in passing. The influence of flexibility on the passing ability of SSB Nuansa FC Kota Padang is 8.41%. While the remaining 91.59% is influenced by other factors. Other factors that influence this passing ability could be influenced by speed, eye-foot coordination, explosive power, concentration and so on.

The results of this study are also supported by research from (Agustiardi, Atradinal, and Ridho 2019) who have studied the Contribution of Leg Muscle Extension Strength and Hip Flexibility to Long Passing Ability.

Based on these findings, the hypothesis proposed in this study is empirically accepted. It can be interpreted that good foot-eye coordination has a relationship and influence in making football passes. The influence of foot-eye coordination on the passing ability of SSB Nuansa FC players is 15.28%. While the remaining 84.72% is influenced by other factors. Other factors that influence this passing ability could be influenced by explosive power, speed, flexibility, concentration and so on.

The results of this study are also strengthened by research from (Prasetyo, Soegiyanto, and Irawan 2020) researched The Effect of Exercise Methods and Eye-Foot Coordination on Football Passing Accuracy (Prasetyo, Soegiyanto, and Irawan 2020). The aim of this study was to compare the fixed target passing and moving target passing training methods in terms of high eye-foot coordination and low eye-foot coordination on football passing accuracy.

In the results of the path analysis calculation, it was found that there was a simultaneous influence of leg muscle strength (X1), flexibility (X2) and ankle-foot coordination (X3) on passing ability (Y) obtained Rsquare = 0.675 or 67.50% so that Ho was rejected and Ha was accepted, where there was a simultaneous and significant influence between leg muscle strength, flexibility and ankle-foot coordination on passing ability in SSB Nuansa FC Kota Padang players. This means that all exogenous variables have an influence on endogenous variables. Where the resulting effects are different but both provide influence and contribution to passing ability.

Ahmad Abrar and Sayuti Syahara (2019) have studied the relationship between eye-foot coordination and passing accuracy of football players at Padang 15 State High School. This study aims to determine the relationship between eye-foot coordination and passing accuracy. The results of the study prove that eye-foot coordination (X) has a significant relationship with passing accuracy (Y). This result is indicated by the acquisition of r count of 0.579 and r table in the  $\alpha$  level = 0.05 of 0.444, thus  $r \text{ count} > r \text{ table}$ , meaning that the eye-foot coordination possessed by football players has a significant relationship with passing accuracy skills (Abrar and Syahara 2019).

## CONCLUSIONS

Based on the results of hypothesis testing and discussion, the following conclusions were obtained:

1. Leg muscle strength has a direct and significant effect on the passing ability of SSB Nuansa FC Kota Padang players by 9.61%.
2. Flexibility has a direct and significant effect on the passing ability of SSB Nuansa FC Kota Padang players by 8.41%.
3. Foot-ankle coordination has a direct and significant effect on the passing ability of SSB Nuansa FC Kota Padang players by 15.28%.
4. Leg muscle strength has an indirect effect on passing ability through the foot-ankle coordination of SSB Nuansa FC Kota Padang players by 48.16%. This means that the better the leg muscle strength of the player, when then juxtaposed with the foot-ankle coordination variable, it will be able to improve the passing ability of each SSB Nuansa FC Kota Padang player.
5. Flexibility has an indirect effect on passing ability through the foot-ankle coordination of SSB Nuansa FC Kota Padang players by 44.35%. This means that the better the player's flexibility, when then combined with the coordination of the ankles, it will be able to improve the passing ability of each SSB Nuansa FC Kota Padang player.
6. Leg muscle strength, flexibility and ankle coordination have a simultaneous and significant effect on the passing ability of SSB Nuansa FC Kota Padang players by 67.50%. This means that if the leg muscle strength, flexibility and ankle coordination of the player are good, it will have a simultaneous effect on the passing ability of SSB Nuansa FC Kota Padang players.

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