

Relationship of Balance And Leg Muscle Strength To Lower Passing Ability in Young Soccer Athletes

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Abstract

This study aims to analyse the relationship between dynamic balance and leg muscle strength and their impact on the accuracy of underhand passes in youth soccer players. The method used is a quantitative correlational design, with a sample of 21 SSB Garuda Lenggerong U-17 players selected randomly. Data were collected through the Y Balance Test (balance), Standing Broad Jump (lower limb muscle strength), and short pass test (accuracy of underhand passing), then analysed using the Shapiro-Wilk normality test, Pearson correlation, and linear regression. The results showed that lower limb muscle strength had a significant correlation with passing accuracy ($r = 0.459$; $p < 0.05$), while balance did not ($r = 0.333$; $p > 0.05$). Regression analysis revealed that both variables together contributed 35.87% to passing accuracy, with lower limb muscle strength as the dominant predictor (76.8% relative). These findings suggest that physical training for youth soccer players should emphasise the development of lower limb strength to improve passing accuracy. However, balance training remains relevant in the context of holistic soccer skills.

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INTRODUCTION

Football is one of the most popular sports in the world, including in Indonesia. The game is not only entertainment, but also a means of fostering achievement and character building. Football is one of the sports that requires players to master several techniques, including dribbling, passing, shooting, heading, and throw-ins (Dwi Saputro et al., 2019). Among these techniques, passing is the most basic and important, as the essence of the game of football is to pass the ball effectively to a teammate.

The basic technique that largely determines the course of the game is passing. Passing or passing the ball is a fundamental skill that is most often used for building attacks, maintaining possession of the ball, and identifying gaps in the opponent's defence (Popovych et al., 2021). Good passing accuracy will help control the course of the game and prevent the opponent from gaining control of the ball. Accurate Passing will make it easier for the team to set the tempo of the game, while improper passing can disrupt the attack pattern and even compromise their defence. Therefore, the ability to pass on target, the appropriate strength, as well as the right time, are fundamental skills that every player must master. To pass well, players are not only required to have the correct passing technique but also to be supported by Coordination of movements, correct technique, and a supportive physical condition

The physical condition of a football player is a fundamental component in addition to technique, tactics and mentality (Savrievich, 2021). Players with good physical condition, excellent skills, and a readiness to face the opponent will have a great opportunity to perform optimally on the field. In the game of football, both when defending and attacking, a player will always be faced with situations that demand high

physical ability, such as facing a hard collision with an opponent, then sprinting at full speed, making sudden changes of direction, or stopping suddenly while still in possession of the ball. All of these activities require good physical readiness to prevent performance from decreasing during the game.

According to Rofik et al., (2021), there are ten components of the ideal physical condition for soccer players, namely speed, strength, endurance, flexibility, accuracy, explosive muscle power, Coordination, reaction time, balance, and agility. Of the ten components, several elements of physical condition have a very close relationship with the ability to perform passing movements, namely balance, strength, and power. These three components are supporting factors for success in passing the ball on target and effectively. When passing, the strength of the limbs largely determines the speed and distance of the ball. Good leg Power allows players to kick with sufficient energy but in a directed manner (Irwan, Muhamad , Asmuddin, 2024).

In addition to the power of the leg muscles, the balance factor also plays an important role. Balance is a person's ability to maintain body position both statically and dynamically (Kristina, 2018). In the context of soccer, balance is required when players stand with one foot as a support while the other foot is used to kick the ball. A good balance allows players to coordinate their body movements so that they remain stable despite pressure or interference from opponents. Players with poor balance often make passes that are not on target, and they lose control of their bodies, making it easy to fall or lose the ball. Therefore, balance is one of the main aspects that must be systematically trained so that passing movements can be carried out more effectively, accurately, and efficiently amid match dynamics. Balance is a person's ability to control their body position so that it remains stable both when standing and

during movements (Mappaompo, 2024). In football, balance is needed to maintain the ideal position when passing. With good balance, players can aim the ball precisely even in dynamic situations, such as after dribbling or when under pressure from an opponent.

Based on a review of previous research, according to Pangesty, (2025) balance, power and leg muscle strength have a significant relationship with passing skills in football players. The three components support each other in producing stable, strong, and accurate movements. Unlike previous studies that combined three variables at once, this study focuses explicitly on dynamic balance and power, allowing it to reveal the specific contributions of these two factors to passing skills. The purpose of this study was to analyse how the relationship between balance and power affects the accuracy of passing under SSB Garuda Lenggerong U-17 students.

METHODS

This study employs quantitative methods with a descriptive, correlational analysis approach. The primary purpose of this study was to investigate the relationship between balance, limb muscle strength, and the accuracy of lower passing in football. This study employs a correlational design with the independent variables being balance (X_1) and leg muscle strength (X_2), and the dependent variable is the accuracy of passing down (Y). The study population consisted of all football players, with a sample of 21 players selected through random sampling. The study design employed is a regression correlation design, utilising SPSS 25.0 software to describe the relationship, estimate, and test based on existing theories. The research data collection method consisted of the Y Balance Test to measure balance, the Standing Broad Jump to measure leg muscle strength, and the short pass test (also known as the short pass) to

precisely and quickly measure the accuracy of passing under football conditions.

The Data obtained were analysed using a prerequisite test in the form of the Shapiro-Wilk normality test. After the data were declared standard, product-moment correlation analysis was performed to determine the partial relationship, as well as multiple regression analysis to determine the simultaneous relationship between balance, leg muscle strength, and accuracy of passing under football.

RESULTS AND DISCUSSION

RESULTS

Tabel 1. Data Description

Test	Balance	Muscle strength	Passing accuracy
Mean	93.16	244.57	10.24
Std. Deviation	8.317	22.031	2.143
Maximum	107	280	14
Minimum	81	210	7

Based on Table 1, the mean value for the balance variable is 93.16 with a standard deviation of 8.317, the minimum value is 81, and the maximum value is 107. For the muscle strength variable, the mean value is 244.57 with a standard deviation of 22.031, the minimum value is 210, and the maximum value is 280. Meanwhile, the passing accuracy variable has a mean of 10.24 with a standard deviation of 2.143, a minimum value of 7, and a maximum value of 14. In general, the data for the three variables showed a relatively normal distribution with a score range characteristic of this study.

Tabel 2. Normality Test

Variable	Shapiro-Wilk	
	Sig.	Description
Balance	0.210	Normal
Muscle Strength	0.180	Normal
Passing	0.190	Normal

Based on the results of the normality test using the Shapiro–Wilk test on 21 samples, the significance values (Sig.) for each variable were as follows: balance 0.210, muscle strength 0.180, passing accuracy 0.190. All significance values are greater than 0.05, indicating that the data for the three variables are normally distributed.

Tabel 3. Linearity Test

Variable	F-value	Sig.	Description
Balance-Passing Accuracy	2.315	0.152	Non-Linear
Leg Muscle Strength-Passing Accuracy	6.769	0.026	Linear

Based on the results of the linearity test, the following findings were obtained: balance and passing accuracy showed a significance value of 0.152 ($p > 0.05$) with F-value = 2.315. Therefore, the relationship between balance and passing accuracy is not linear. Leg muscle strength and passing accuracy show a significance value of 0.026 ($p < 0.05$) with F-value = 6.769, indicating a linear relationship between the two variables.

Tabel 4. Correlation Test

Relationship	r-value (Pearson Correlation)	r table	Description
Balance-Passing Accuracy	0.333	0.433	Not Significant
Leg Muscle Strength-Passing Accuracy	0.459	0.433	Significant

Based on the results of the product-moment correlation test with a sample size of 21 ($r_{table} = 0.433$ at a significance level of 5%), the following results were obtained: balance and passing accuracy showed a calculated r of 0.333, which is smaller than the r_{table} (0.433). Therefore, there is no significant relationship between balance and passing accuracy. Leg muscle strength and passing accuracy showed a calculated r of 0.459, which is greater than the table r (0.433). Thus, a significant relationship exists between leg muscle strength and passing accuracy.

Tabel 5. Effective And Relative Contributions

Variable	SE (%)	SR (%)
Balance	8.33	23.2
Strength	27.54	76.8
Total	35.87	100

Based on the calculations of effective contribution and relative contribution, it was found that balance contributes 8.33% to the variation in passing accuracy, or 23.2% of the total contribution of all independent variables. Leg muscle strength contributes 27.54% to the variation in Passing Accuracy, or 76.8% of the total contribution of all independent variables. Overall, the two independent variables contribute a total of

35.87% to Passing Accuracy, while factors outside the scope of this study influence the remaining 64.13%.

Discussion

The results of the study indicate that the correlation test results show that the calculated r value between balance and accuracy of underhand passing is 0.333, which is smaller than the table r value (0.433), indicating that there is no significant relationship between balance and accuracy of underhand passing. Additionally, the linearity test results show a significance value of 0.152 (>0.05), indicating that the relationship between the two is not linear. Thus, balance in this study has not been proven to be a direct determining factor for lower passing accuracy.

However, theoretically, balance remains an important component of movement ability in soccer. According to Ikhsan, (2019), balance is the body's ability to maintain position in various situations. Football players require both static and dynamic balance when performing kicks, dribbling, or passing to ensure stable and controlled movements. Without good balance, players are more likely to lose body position, slip, or make inaccurate passes (Zerf, 2017). Exercises such as standing on one foot or dynamic balance exercises should still be provided to support players' basic techniques, even though this study's results indicate that balance contributes only 8.33% or 23.2% relative to passing.

When performing a soccer pass, players must position their bodies properly, mainly when one foot serves as a support and the other foot is used to kick. In such situations, players require static balance to maintain body stability and ensure the kick is directed accurately. Meanwhile, when moving quickly to receive the ball or evade opponents, players need dynamic balance to avoid losing control and remain capable of

passing the ball effectively (Plisky et al., 2006). Without good balance, players are prone to losing their body position, slipping, or executing inefficient passing movements, which results in inaccurate passes and a loss of possession of the ball (Atap & Hendryanto, 2024). Although the results of this study indicate that the contribution of balance to passing accuracy is relatively small, at 8.33% or 23.2%, this does not mean that the aspect of balance can be ignored in soccer training. Good passing ability is not only determined by leg muscle strength but also by the body's ability to maintain a stable position under varying conditions.

Unlike balance, the leg muscle strength variable showed a calculated r -value of 0.459, which is greater than the table r -value (0.433), with a linearity test significance value of 0.026 (<0.05). This indicates a significant and linear relationship between leg muscle strength and lower passing accuracy. The better the lower limb muscle strength a player possesses, the better their lower passing ability. Lower limb muscle strength is one of the most important components of physical condition. According to, Tessa Sjahrian, (2017) strength is the ability of a muscle or group of muscles to perform work by resisting a particular load. In soccer, lower limb muscle strength plays a crucial role in activities such as kicking, running, and jumping (Suryadi, 2022). The results of this study also show that lower limb muscle strength contributes effectively by 27.54% or 76.8% relatively, meaning that this factor is more dominant than balance in determining the success of underhand passing.

This finding is consistent with previous research, as stated by Zirzis & Mubarak, (2021) that leg muscle strength has a significant relationship with passing ability in adolescent players. Thus, training programs that emphasise the development of leg muscle strength, such as squat jumps, sprinting, or weight training, are crucial for enhancing the quality of players' passing

skills. When a player performs a pass, especially an underhanded pass using the inside of the foot, it requires swinging the leg backwards and then pushing it forward with sufficient force to direct the ball toward the target. This process requires explosive power generated by the combination of muscle strength and movement speed. The greater the lower limb muscle strength a player possesses, the better their ability to generate the necessary force during passing, enabling the ball to travel faster, stronger, and more accurately. In other words, while mastering basic techniques is essential, without adequate physical strength, the quality will not be optimal.

The regression analysis results show that together, balance and leg muscle strength contribute effectively to 35.87% of the accuracy of underhand passing. In comparison, the remaining 64.13% is influenced by factors outside the scope of this study, such as the fundamental techniques mastered by the player, eye-foot coordination, training experience, concentration, or psychological aspects during competition.

CONCLUSION

The relationship between balance and the accuracy of underhand passes shows a calculated r value of 0.333, which is smaller than the table r value of 0.433, with a significance level of 0.152 ($p > 0.05$), indicating no significant relationship between balance and the accuracy of underhand passes. This suggests that while balance is essential in soccer, it is not the primary factor in successful underhand passing.

The relationship between lower limb muscle strength and lower passing accuracy yields a calculated r value of 0.459, which exceeds the table r value of 0.433, with a significance value of 0.026 ($p < 0.05$), indicating a statistically significant

relationship between lower limb muscle strength and lower passing accuracy. This suggests that the better the lower limb muscle strength a player possesses, the better their ability to perform underpasses.

In general, the results of this study indicate that of the two variables tested, only leg muscle strength has a significant relationship with the accuracy of underhand passing. At the same time, balance does not show a significant relationship. Further research is expected to analyse and identify other factors that may influence the accuracy of underhand passing, such as coordination, concentration, and training experience.

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