



AN EXPLORATORY COMPARISON OF DOMINANT AND NON-DOMINANT FOOT PASSING ABILITY IN JUNIOR HIGH SCHOOL FUTSAL STUDENTS

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ABSTRACT

Introduction. Differences in passing ability between the dominant and non-dominant foot are frequently observed in school-based futsal learning; however, empirical evidence at the junior high school level using exploratory designs remains limited. **Objective.** This study aimed to exploratorily compare dominant and non-dominant foot passing ability among junior high school futsal students. **Methods.** A quantitative comparative design was employed involving five male students selected through purposive sampling to ensure comparable futsal experience among participants. Passing accuracy was measured using a standardized target-based test consisting of ten trials per foot. Data were analyzed using descriptive statistics and a paired-sample t-test. **Results.** The dominant foot demonstrated a higher mean score ($M = 5.0, SD = 1.00$) than the non-dominant foot ($M = 3.6, SD = 1.14$), indicating a descriptive performance trend. However, the paired-sample t-test indicated no statistically significant difference between conditions ($p = 0.206$). This non-significant result should be interpreted cautiously due to the small sample size, which limits statistical power. **Conclusion.** Within the limitations of this exploratory study, no statistically significant difference was observed between dominant and non-dominant foot passing ability. Nonetheless, greater variability in non-dominant foot performance highlights the need for targeted bilateral practice within school-based futsal learning contexts.

1. Introduction

An imbalance in the ability between the dominant and non-dominant legs is one of the most common basic technique problems found in school-age futsal players. Previous studies have shown that young players tend to be more skilled and confident when using their dominant foot, whereas limited training of the non-dominant foot often results in lower coordination and accuracy (Çakir, 2019), (Silva, B., & Rodrigues, 2020), and (Lopes & Ribeiro, 2019). This imbalance directly impacts passing quality, movement stability, and decision-making effectiveness during play, as also demonstrated by (Firmansyah, 2021) and (Pratiwi, 2021). Accordingly, comparative analysis of passing ability between both feet is important for understanding how such imbalance manifests within school-based futsal learning contexts.

Biomechanically, good passing is influenced by several factors, such as leg muscle strength, eye-foot coordination, body balance, and the ability to position the body during contact with the ball.

In addition to these factors, movement dominance, particularly foot dominance, is an important but often overlooked aspect of learning basic techniques (Pradana, 2021). Foot dominance refers to the tendency of individuals to use one foot more frequently and skillfully than the other.

In futsal, over-reliance on the dominant foot can be a problem, especially when players are in tight situations, under intense pressure, or when the ideal passing direction can only be executed with the non-dominant foot. Players who rely too heavily on one foot tend to be less flexible in making decisions and have slower reaction times when they have to use the non-dominant foot (Widodo & Ananta, 2021). At the school level, this can hinder the development of basic skills and make students less confident when having to use both feet.

This imbalance was observed among students at SMP Negeri 8 Makassar based on preliminary passing assessments. Results of the passing ability test showed that the performance of the dominant foot is more stable with small variations, as seen from the standard deviation (SD) value = 1.00. Conversely, the passing ability using the non-dominant foot has a greater level of variation with (SD) = 1.14. The higher SD value reflects greater inconsistency in non-dominant foot passing performance. This pattern suggests that bilateral motor coordination may not yet be consistently developed in school-aged players. This condition reflects common challenges in school-based futsal learning, where structured bilateral skill development is often limited due to time constraints and instructional priorities.

In the context of school-based futsal learning, bilateral training is primarily intended to support students' basic technical consistency rather than high-level performance enhancement. Previous studies indicate that structured practice involving both feet can support improvements in coordination and movement balance during adolescence (Rahman et al., 2022). (Hidayat, 2023). However, within school settings, these benefits are generally viewed as short-term instructional outcomes rather than long-term neuromuscular adaptation.

Although numerous studies have examined dominant and non-dominant foot performance in futsal players, most investigations have involved competitive athletes or larger samples. Empirical evidence derived from school-based futsal learning contexts, particularly exploratory studies with small samples that reflect authentic extracurricular conditions, remains limited. Consequently, it is still unclear whether observed performance differences represent meaningful technical disparities or natural variability among junior high school students.

Therefore, this study aims to exploratorily compare the passing ability of the dominant and non-dominant foot among students participating in futsal extracurricular activities at SMP Negeri 8 Makassar.

2. Method

This study employed a quantitative method with a comparative approach to examine differences in passing ability between the dominant and non-dominant foot among students at SMP Negeri 8 Makassar. The quantitative method was chosen because the data obtained are in the form of passing accuracy test results, so statistical analysis can be used to measure differences in performance objectively. The study was conducted at the outdoor field of SMP Negeri 8 Makassar on October 15, 2025. The study population consisted of all male students participating in futsal extracurricular activities (approximately 32 students), from which a sample of five students was selected using purposive sampling. Purposive sampling was applied to include students who met specific criteria: active participation in futsal training, aged 12–15 years, at least one year of basic futsal experience, and absence of lower-limb injury. This sampling approach was intended to ensure comparable technical exposure among participants, as the primary aim of this exploratory study was diagnostic comparison rather than population generalization.

The primary instrument was a futsal passing accuracy test adapted from a soccer passing assessment and modified to reflect futsal-specific characteristics. The test measured the accuracy of ground passes directed toward a designated target. A square target measuring 80x80 cm was placed 10 meters from the kicking point. Each student attempted ten passes using their dominant foot, followed by ten attempts using their non-dominant foot. Passes that successfully entered the target area were scored one, while passes that did not enter the target area were scored zero. The sum of the ten successful attempts became the final passing ability score for each foot. Prior to the main test, the instrument was pilot tested on students outside the study sample to ensure procedural clarity, reliability, and consistency of the test implementation.

Data collection was conducted in three stages: initial observation to determine foot dominance and assess physical readiness; passing tests using the dominant and non-dominant foot with a 2–3 minute rest interval between trials; and recording of all test results using a structured observation sheet. The data obtained were then analyzed using descriptive and inferential statistics. Descriptive statistics were used to calculate mean scores, range, and standard deviation for each condition. Next, the data were analyzed using a paired sample t-test to determine whether there was a significant difference between passing ability using the dominant and non-dominant foot.

The small sample size ($n = 5$) reflects the exploratory nature of this study and substantially limits statistical power. With such a limited number of participants, the paired-sample t-test may not be sufficiently sensitive to detect moderate differences between dominant and non-dominant foot performance. Therefore, non-significant results should not be interpreted as evidence of equivalence between limbs, but rather as preliminary findings.

3. Results

Descriptive analysis showed that the mean passing score using the dominant foot was 5.0 (SD = 1.00). Scores for the dominant foot ranged from 4 to 6, indicating relatively stable performance. Passing performance using the non-dominant foot showed a mean score of 3.6 (SD = 1.14). Scores for the non-dominant foot ranged from 2 to 5, reflecting greater dispersion among participants.

Differences in standard deviation values between the dominant and non-dominant foot reflect differing levels of score variability. The dominant foot exhibits a more homogeneous distribution of scores, while the non-dominant foot exhibits a more dispersed distribution.

A paired-sample t-test was conducted to examine differences between dominant and non-dominant foot passing scores. The analysis yielded a p-value of 0.206, exceeding the significance threshold of 0.05. Accordingly, no statistically significant difference was identified between conditions.

Table 1. Descriptive statistics of dominant and non-dominant foot passing ability

Variable	Mean	Standard Deviation	Minimum	Maximum	<i>p-value</i>
Dominant leg	5,0	1,00	4	6	0.206
Non-Dominant leg	3,6	1,14	2	5	0.206

**Paired sample t-test*

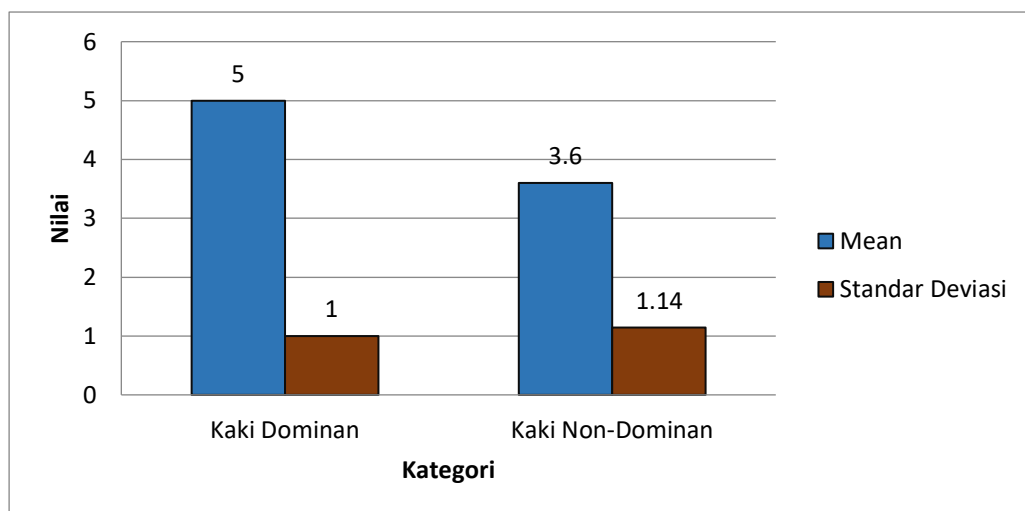


Figure 1. Comparison of Mean and Standard Deviation of Passing Ability

Figure 1 illustrates the mean passing scores and standard deviations for dominant and non-dominant foot performance. Although the dominant foot shows a higher mean score, the difference between conditions did not reach statistical significance ($p = 0.206$). The larger standard deviation observed in the non-dominant foot indicates greater variability in performance across participants. This finding highlights inter-individual differences rather than definitive performance superiority.

4. Discussion

The absence of statistical significance may be largely attributed to insufficient statistical power resulting from the very small sample size. Previous methodological studies emphasize that small samples increase the risk of Type II error, particularly in within-subject comparative designs.

The results of this study indicate no statistically significant difference between dominant and non-dominant foot passing ability among students at SMP Negeri 8 Makassar ($p = 0.206$). This pattern aligns with lateral dominance theory, which suggests that repeated unilateral use contributes to more established coordination on the dominant side (Firmansyah, 2021); (Santoso & Firmansayah, 2022). Previous studies have reported a tendency for young futsal players to rely more heavily on the dominant foot, which may contribute to more consistent execution of basic techniques (Lopes & Ribeiro, 2019) and (Silva, B., & Rodrigues, 2020)

The difference in standard deviation between the dominant and non-dominant legs provides important insights into movement stability. The results show that the standard deviation for the dominant foot ($SD = 1.00$) was smaller than that of the non-dominant foot ($SD = 1.14$). A smaller SD reflects more consistent performance, whereas a larger SD indicates greater variability among participants. This pattern is consistent with previous studies reporting greater variability in coordination and precision when tasks are performed using the non-dominant foot (Pratiwi, 2021), (Khotib & Arifin, 2022), and (Fernandes & de Sousa, 2020). International studies suggest that improvements in non-dominant limb stability typically require prolonged and structured practice, rather than emerging from short-term school-based exposure (García-López et al., 2021).

When linked to the context of futsal learning in schools, bilateral skills are a crucial aspect for developing students' basic technical skills. In futsal, players are often under pressure in confined spaces and in situation that require the flexible use of both feet (Hadi & Prasetya, 2022). Previous research indicates that bilateral practice can support improvements in coordination and technical consistency during learning phases (Rahman et al., 2022). Furthermore, a study (Permana & Yusuf, 2021) showed that junior high school students who received bilateral training for six weeks experienced significant improvements in balance, coordination, and passing accuracy. This aligns with developmental literature indicating that adolescence is a key period for establishing bilateral movement patterns (Park, 2021).

Consistent with previous findings, improvements in non-dominant foot performance among young players often remain variable in the absence of structured bilateral practice (Çakir, 2019). Other studies have noted that unresolved lateral asymmetry may reduce adaptability during match situations, particularly under pressure (Nunes & Silva, 2022), particularly when they are under pressure from opponents or are required to pass with their non-dominant foot. Accordingly, although statistical significance was not achieved, observed variability patterns may still hold practical relevance in educational settings.

From an inferential perspective, the non-significant p-value should be interpreted cautiously. In small exploratory samples, statistical non-significance does not necessarily indicate the absence of a meaningful difference, but may reflect limited sensitivity of the test. Differences in variability across conditions suggest patterns that warrant further investigation using larger samples. (Widiyanto & Septian, 2021); (Lopes & Ribeiro, 2019). 1

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In term of accuracy and stability of performance. Although statistical significance was not achieved, descriptive variability patterns highlight areas requiring attention within school-based futsal learning. The absence of a statistically significant difference may be partly attributed to the very small sample size, which substantially limits statistical power. With only five participants, the study may not have been sufficiently sensitive to detect moderate performance differences between dominant and non-dominant foot passing ability. Therefore, non-significant findings should not be interpreted as evidence of equivalence between limbs.

5. Conclusion

This exploratory study found no statistically significant difference between dominant and non-dominant foot passing ability among junior high school futsal students. However, descriptive analysis indicated greater variability in non-dominant foot performance, reflecting inconsistent execution rather than confirmed equivalence between limbs. Given the small sample size and exploratory design, these findings should be interpreted cautiously. Future research employing larger samples and more robust designs is warranted to further examine bilateral passing development within school-based futsal learning contexts

6. Author's contribution

F.K.L., A.F.I., M.A., M.M.T., O., Conducted data collection and observation Comparison of dominant and non-dominant foot passing ability in futsal game of SMP Negeri 8 Makassar students in the field. F.K.L. as the main author who compiled the proposal and article structure, conducted data analysis and compiled the research results, A.F.I. conducted data collection in the field, M.A. and M.M.T. conducted passing test using dominant and non-dominant feet in the field, and O. Conducted documentation during data collection.

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