Musamus Journal of Physical Education and Sport (MJPES)
http://ejournal.unmus.ac.id/index.php/physical
Volume 8, No. 2, April 2026 , Pg. 1045-1051
DOI: 10.35724/mjpes.v8i2.8154

Effect of Leg Strength Training on Shooting Accuracy in the SMP Al Washliyah 30 Medan Futsal Club (2026)

Muhammad Fahrezi Harahap[1], Rudi Andika[2]*, Aidilla Pratiwi Siregar[3]
[1] Sekolah Tinggi Olahraga dan Kesehatan Bina Guna, Medan, Indonesia
[2] Sekolah Tinggi Olahraga dan Kesehatan Bina Guna, Medan, Indonesia
[3] Sekolah Tinggi Olahraga dan Kesehatan Bina Guna, Medan, Indonesia
Corresponding Author: rudiandika122@gmail.com

Abstract
Objectives: This study aimed to determine the effect of leg muscle strength training on shooting accuracy among students participating in the futsal extracurricular activity at SMP Al Washliyah 30 Medan in 2026.
Materials and Methods: This study employed a quantitative research approach using an experimental method with a One Group Pretest Posttest Design. The population consisted of 25 students participating in the futsal extracurricular activity at SMP Al Washliyah 30 Medan. The sampling technique used was purposive sampling, with a total sample of 20 students.
Results: The results showed an improvement in shooting accuracy after the implementation of leg muscle strength training. The mean pretest score of 28.45 increased to 34.65 in the posttest, resulting in a mean improvement of 6.20. The hypothesis testing using a paired sample t test showed a t count value of 12.056, while the t table value was 2.093 at a 5% significance level with 19 degrees of freedom. Since the t count was greater than the t table, H_0 was rejected and Ha was accepted.
Conclusions: Therefore, it can be concluded that leg muscle strength training had a significant effect on improving shooting accuracy among students participating in the futsal extracurricular activity at SMP Al Washliyah 30 Medan in 2026.
Keywords: Leg Muscle Strength Training; Shooting Accuracy; Futsal.

Introduction

Sports are activities performed to train the human body, not only physically but also mentally and spiritually. Sports also involve physical activities that are competitive in nature and performed within a game. There are various types of sports that can be played individually or in teams. One of the team sports that is widely popular today is futsal.

Futsal is a popular sport that is widely played by various groups of people in society, both in schools and sports communities (Hasan, 2024). Futsal has experienced rapid development in Indonesia and is played not only by men but also by women. The game is played by two teams, each consisting of five players, including a goalkeeper. The popularity of futsal is closely related to its accessibility and ease of play. It can be played in various facilities, both indoor and outdoor. Furthermore, the smaller number of players and the relatively smaller playing area make futsal more practical and easier to play.

Futsal is a sport characterized by high intensity, speed, and dynamic movements. The game can be played smoothly, systematically, and attractively when players are able to master and understand the various techniques involved. Futsal emphasizes the importance of mastering fundamental techniques. The fundamental techniques that futsal players must master include passing, dribbling, shooting, heading, and ball control. These techniques are essential in futsal. In addition to mastering technical skills, players must also possess good physical fitness because futsal requires speed and agility in both attacking and defending situations. One of the most important fundamental techniques in futsal is shooting. Shooting is the technique of kicking the ball toward the goal with the aim of scoring. Successful shooting is determined not only by proper technique but also by the player's physical condition.

Musamus Journal of Physical Education and Sport (MJPES)
http://ejournal.unmus.ac.id/index.php/physical
Volume 8, No. 2, April 2026 , Pg. 1045-1051
DOI: 10.35724/mjpes.v8i2.8154

Shooting accuracy is an important aspect of futsal because it determines a team's success in scoring goals. The ability to perform accurate shooting requires good technical mastery, high concentration, and adequate physical fitness. One physical component that contributes to shooting performance is leg muscle strength. Good leg muscle strength enables players to produce stronger and more accurate kicks, thereby increasing their chances of scoring goals. Conversely, insufficient leg muscle strength may result in inaccurate shots that can be easily anticipated by the opposing goalkeeper.

Leg muscle strength is one of the physical fitness components that plays an important role in performing various fundamental futsal techniques, particularly shooting. According to Bompa and Buzzichelli (2019), strength is the ability of a muscle or group of muscles to produce force in overcoming resistance. In futsal, leg muscle strength is required to produce effective kicks, maintain body balance, and control movement direction during shooting. Players with good leg muscle strength tend to perform shots more stably, accurately, and consistently. Recent research findings also indicate a relationship between lower limb physical fitness and shooting ability in futsal.

Research conducted by Faozi et al. (2024) demonstrated a significant relationship between leg muscle strength and shooting accuracy in futsal athletes. These findings indicate that players with greater leg muscle strength tend to have higher shooting accuracy. Consistent with these findings, Syafikri and Jatra (2023) stated that leg muscle strength contributes significantly to the shooting ability of students participating in extracurricular futsal activities. Furthermore, Ramdani et al. (2025) also found a significant relationship between leg muscle strength and shooting performance in futsal. Based on these research findings, it can be concluded that leg muscle strength is one of the physical fitness components that plays an important role in supporting shooting ability in futsal. Although shooting accuracy is essential in futsal, it remains a challenge for students participating in extracurricular futsal activities at SMP Al Washliyah 30 Medan.

Based on observations during training sessions and match simulations, many students still experience difficulties in shooting toward the goal. Their shots often miss the target, either going above the goal or wide of the intended target. This condition causes scoring opportunities to be frequently wasted. To determine the students' shooting accuracy, the researcher conducted a preliminary test involving 20 students participating in extracurricular futsal activities. The test results showed that only 3 students (15%) met the success criteria, while 17 students (85%) had not achieved the established criteria. These results indicate that the shooting accuracy of extracurricular futsal students at SMP Al Washliyah 30 Medan remains relatively low and therefore needs to be improved.

Low shooting accuracy may be influenced by several factors, one of which is leg muscle strength. Leg muscle strength is required during shooting because it is related to the player's ability to produce powerful and accurate kicks. Players with good leg muscle strength tend to perform kicks more effectively than those with insufficient leg muscle strength. One effort that can be undertaken to improve leg muscle strength is through a structured training program.

Materials and Methods

Study Design

This study employed a quantitative experimental approach to determine the effect of lower-limb muscle strength training on shooting accuracy among extracurricular futsal students at SMP Al-Washliyah 30 Medan. According to Sugiyono (2019), experimental research examines the effect of specific treatments on other variables under controlled conditions. The study used a One Group Pretest-Posttest Design, involving one group that underwent a pretest, received the training treatment, and completed a posttest. The

Musamus Journal of Physical Education and Sport (MJPES)
http://ejournal.unmus.ac.id/index.php/physical
Volume 8, No. 2, April 2026 , Pg. 1045-1051
DOI: 10.35724/mjpes.v8i2.8154

pretest and posttest results were compared to determine the effect of the training program on shooting accuracy.

Study Participants

The population for this study consists of all students participating in the futsal extracurricular activity at SMP Al-Washliyah 30 Medan, totaling 25 students. The final sample for this study comprises 20 students from the futsal extracurricular program at SMP Al-Washliyah 30 Medan in 2026.

Study Organization

This study used a futsal shooting accuracy test adopted from Maulana (2009). Participants performed 10 shots using their preferred foot from a distance of 10 meters toward a goal divided into nine scoring areas. Each target area had a score of 1–5, and the total score determined shooting accuracy. The results were classified into five categories: Very Good (41–50), Good (31–40), Fair (21–30), Poor (11–20), and Very Poor (0–10). The instrument was used for both pretest and posttest measurements and was supported by Alendra and Mahfud (2022), who applied the same test to measure futsal shooting accuracy.

Statistical Analysis

Data analysis involved normality and homogeneity tests using SPSS 23, with a significance level of 0.05. The Shapiro-Wilk test was used to assess normality, while the F-test examined homogeneity. Hypothesis testing was conducted using a paired-sample t-test to determine significant differences between pretest and posttest results. The percentage of improvement was calculated based on the difference between the posttest and pretest means (Arikunto, 2016; Budiwanto, 2017; Ananda & Fadhli, 2018).

Results

Based on the results of the initial test (pretest) conducted on 20 students participating in extracurricular activities at SMP Al-Washliyah 30 Medan, the highest total score obtained was 35, and the lowest total score was 23. The range of scores is 12.

To classify the students' level of shooting accuracy during the pretest, the data were evaluated according to the Futsal Shooting Accuracy Assessment Norms:

Table 1. Pretest and Posttest Data Results

No	Student's name	Pretest	Postest
1	Adda nuri Akmal	33	39
2	Putra	25	33
3	Giant raditya	30	37
4	Maulana ardiansyah	27	36
5	Muamar	28	37
6	Raju apriliansyah	29	35
7	Azmi al-fariz	34	40
8	Fikra	35	38
9	Fadhil	31	39
10	Naufal zaki dzakwan	28	36
11	Risky	24	28

Musamus Journal of Physical Education and Sport (MJPES)
http://ejournal.unmus.ac.id/index.php/physical
Volume 8, No. 2, April 2026 , Pg. 1045-1051
DOI: 10.35724/mjpes.v8i2.8154

12	Hilwa bagus Saputra	26	33
3	Rafka	27	34
14	Ibrahim nur Rahman	29	37
15	Ega reymandha	25	29
16	Raffa alfauzan	23	33
17	Dio	27	32
18	Keysha	26	32
19	M. Haikal permana	28	35
20	M. Diaz al fahri	27	34

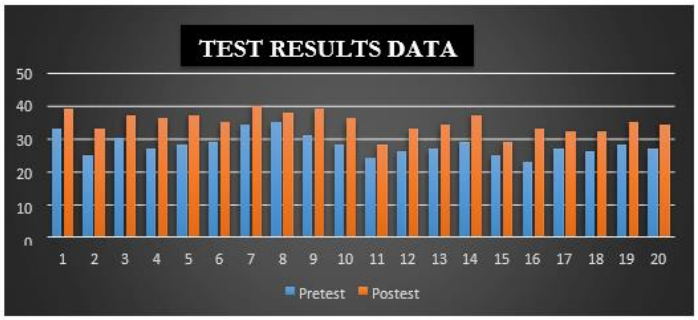


Figure 1. Pretest and Posttest Diagram

Table 2. Frequency Distribution of Pretest Score Categories

No	Assessment criteria	Points/Score	Frequency (f)	Percentage (%)
1	Very Good	41 – 50	0	0%
2	Good	31 – 40	4	20%
3	Fair	21 – 30	16	80%
4	Poor	11 – 20	0	0%
5	Very Poor	0 – 10	0	0%
Total			**20**	**100%**

Based on Table 1 above, it can be seen that the majority of students' abilities during the pretest fell into the Fair category, with 16 students (80%), while 4 students (20%) fell into the Good category. No students were classified as Very Good, Poor, or Very Poor.
Following a training program conducted over a specific period, a final test (posttest) was administered to reassess the students' shooting accuracy. The posttest results for the 20 students showed a highest total score of 40 and a lowest total score of 28, with a range of 12. The classification of students' shooting abilities during the posttest is presented in the following table:

Musamus Journal of Physical Education and Sport (MJPES)
http://ejournal.unmus.ac.id/index.php/physical
Volume 8, No. 2, April 2026 , Pg. 1045-1051
DOI: 10.35724/mjpes.v8i2.8154

Table 3. Frequency Distribution of Posttest Score Categories

No	Assessment criteria	Points/Score	Frequency (f)	Percentage (%)
1	Very Good	41 – 50	0	0%
2	Good	31 – 40	18	90%
3	Fair	21 – 30	2	10%
4	Poor	11 – 20	0	0%
5	Very Poor	0 – 10	0	0%
Total			**20**	**100%**

Based on Table 2, there is a significant shift in ability following the intervention. The number of students in the Good category increased substantially to 18 (90%), while the number of students in the Fair category decreased to 2 (10%).

Discussion

Based on the descriptive and inferential statistical data analysis presented, the results showed a significant improvement in futsal shooting accuracy among extracurricular students at SMP Al Washliyah 30 Medan following the training program. Descriptively, the students' mean score increased from 28.45 (Fair category) in the pretest to 34.65 (Good category) in the posttest, representing a mean improvement of 6.20 points.

This improvement in motor performance indicates that the structured training method positively influenced students' neuromuscular adaptations, particularly ball contact accuracy and movement stability during shooting. Hypothesis testing revealed a t value of 12.056, which substantially exceeded the t table value of 2.093. These findings empirically confirm that the improvement in shooting accuracy was not merely coincidental but resulted from the effectiveness of the training program implemented during the study.

Futsal shooting accuracy requires a combination of eye foot coordination, lower limb muscle strength, body balance, and consistent movement repetition to achieve motor skill automatization. The training program appeared to facilitate these biomechanical requirements. Through controlled repetitions, students were able to improve foot ball contact (impact) and strengthen their follow through, thereby supporting more precise ball direction toward the target.

This study is consistent with and supported by the shooting assessment instrument theory developed by Arki Taupan Maulana (2009), which emphasizes the importance of periodic evaluation of target accuracy in futsal. Therefore, it can be concluded that the training method significantly improved shooting accuracy and is recommended for coaches and physical education teachers seeking to enhance shooting performance among athletes and extracurricular futsal students.

Conclusions

Based on the research findings and discussion, the structured lower limb muscle training program significantly improved futsal shooting accuracy among extracurricular students at SMP Al Washliyah 30 Medan. The mean score increased from 28.45 in the pretest to 34.65 in the posttest, representing an improvement of 6.20 points. The proportion of students in the Good category also increased from 20% (4 students) to 90% (18 students), while the majority initially belonged to the Fair category (80%). The paired sample t test revealed a t value of 12.056, exceeding the t table value of 2.093 at a significance level of 0.05 (df = 19), indicating a statistically significant improvement. Therefore, the training program had a significant effect on futsal shooting accuracy, supported by consistent movement repetition and the development of proper shooting biomechanics.

Acknowledgments

The author expresses gratitude to SMP Al Washliyah 30 Medan and the Bina Guna College of Sports and Health, as well as the researchers and authors who participated in and provided support for this research project.

Conflict of Interest

The authors declare no conflict of interest.

Funding

This research received no external funding.

References

Alendra, Y. Z., & Mahfud, I. (2022). Pengaruh latihan permainan target terhadap ketepatan shooting dalam permainan futsal Rajawali Club. Journal of Physical Education (JouPE), 3(2), 13–18. https://doi.org/10.33365/joupe.v3i2.2225

Ananda, R., & Fadhli. (2018). Statistik pendidikan: Teori dan praktik dalam pendidikan. CV. Widya Puspita.

Arikunto, S. (2016). Prosedur Penelitian: Suatu Pendekatan Praktik. Rineka Cipta.

Association, F. I. de F. (n.d.). FIFA futsal coaching manual. FIFA Training Centre. Retrieved https://www.fifatrainingcentre.com/media/native/community area document/resources/futsal/FIFA_GFD_Futsal_Coaching_Manual_EN.pdf

Bompa, T. O., & Buzzichelli, C. (2019). Periodization: Theory and Methodology of Training.

Budiwanto, S. (2017). Metodologi Penelitian dalam Keolahragaan. Universitas Negeri Malang, Fakultas Ilmu Keolahragaan.

Buya, P. A., Tamunu, D., & Sumarauw, F. D. (2021). Pengaruh latihan permainan target terhadap ketepatan shooting dalam permainan futsal. Physical: Jurnal Ilmu Kesehatan Olahraga, 2(1), 108–122.

Fahrizqi, E. B., Sugiyanto, S., & Mahfud, I. (2021). Pengaruh latihan kondisi fisik terhadap peningkatan performa olahraga siswa. Jurnal Keolahragaan, 9(2), 145–152.

Faozi, F., Latif, M., Hidayatulloh, D. T., & Wahyudi, A. (2024). Hubungan kekuatan otot tungkai dengan akurasi shooting pada atlet futsal. Jurnal Ilmiah Penjas, 10(2), 392–401. https://doi.org/10.36728/jip.v10i2.3813

Harsono. (2018). Latihan kondisi fisik. PT Remaja Rosdakarya.

Hasan, A. (2024). Pengantar futsal untuk pelatih pemula. Penerbit Pendidikan Jasmani.

Indonesia Kebudayaan, Riset, dan Teknologi, K. P. (2024). Peraturan Menteri Pendidikan, Kebudayaan, Riset, dan Teknologi Nomor 12 Tahun 2024 tentang Kurikulum pada Pendidikan Anak Usia Dini, Jenjang Pendidikan Dasar, dan Jenjang Pendidikan Menengah. Kementerian Pendidikan, Kebudayaan, Riset, danTeknologi. https://peraturan.bpk.go.id/Details/281847/permendikbudriset no 12 tahun 2024

Lhaksana, J. (2012). Taktik dan strategi futsal modern. Be Champion.

Madu, R. S., Raharjo, H. P., & Raharjo, A. (2024). Pengaruh Latihan Metode Drill Dan Power Tungkai Terhadap Akurasi Shooting Pada Klub Futsal Di Sman 1 Kota Gorontalo. Angewandte Chemie International Edition, 6(11), 951–952., 1(April), 742–752.

Man, I., City, T., Aiman, I. R., & Darmanto, F. (2025). The Relationship Between Leg Muscle Strength and Balance with Shooting Accuracy Among Futsal Extracurricular Participants. 17(2), 1468–1476.

Maulana, A. T. (2009). Pengaruh Latihan Target terhadap Ketepatan Shooting Pemain Futsal Putri SMK Negeri 1 Kota Jambi. Jurnal Cerdas Sifa Pendidikan, 7(1).

Nurfadlillah, A., & Arifai, A. (2026). Hubungan panjang tungkai, power tungkai dan kekuatan otot tungkai dengan akurasi shooting ekstrakurikuler futsal. Jurnal Porkes, 9(1), 457–468. https://doi.org/10.29408/porkes.v9i1.32769

Rahmayanti, I., Lengkana, A. S., & Mulyanto, R. (2024). Pengaruh latihan power otot tungkai terhadap ketepatan shooting. Jurnal Pendidikan Olahraga, 12(1), 34–41.

Ramdani, C. P., Solihin, A. O., & Syamsudar, B. (2025). Hubungan kekuatan otot tungkai dan fleksibilitas panggul terhadap hasil shooting permainan futsal. Jurnal Pendidikan Indonesia, 6(5), 2349–2355.

Ratna Dewi, S. (2022). Futsal dan pengembangan mental atlet. Jurnal Psikologi Olahraga, 14(2), 134–148.

Sudarsono, S. (2011). Penyusunan program pelatihan berbeban untuk meningkatkan kekuatan. Jurnal Ilmiah SPIRIT, 11(3), 31–43. https://doi.org/10.31571/jpo.v8i2.1120

Sugiyono. (2019). Metode penelitian kuantitatif, kualitatif, dan R&D. Alfabeta.

Syafikri, R. A., & Jatra, R. (2023). Kontribusi kekuatan otot tungkai dan kelentukan pergelangan kaki terhadap kemampuan shooting dalam permainan futsal siswa ekstrakurikuler futsal. Jurnal Pendidikan Olahraga, 13(2). https://doi.org/10.37630/jpo.v13i2.1214

Syahriadi, S., Hamdi, B., Zega, S., Nababan, M. R., Vai, A., & Zebua, B. A. S. (2025). Hubungan power otot tungkai dan koordinasi mata dan kaki terhadap akurasi shooting futsal. Jurnal Ilmiah STOK Bina Guna.

Widiastuti. (2017). Tes dan pengukuran olahraga. Rajawali Pers.

Yunita, E., Suherman, A., & Dinangsit, D. (2023). Latihan plyometric dan daya ledak terhadap shooting permainan futsal. Jurnal Ilmu Keolahragaan Undiksha, 10(3), 201–206. https://doi.org/10.23887/jiku.v10i3.50368