

The Effect of Half Squat Jump Exercises On Shooting Accuracy In Futsal Players In SMA Negeri 8 Makassar

Muh Said Hasan^{1A-E*}, Ahmad Rum Bismar^{2B-D}

3Sports Coaching Education Study Program, Faculty of Sports and Health Sciences, Makassar State University, Makassar City, Indonesia

said75hasan@unm.ac.id^{1*}, ahmadrumbismar@unm.ac.id²

ABSTRACT

The type of research in this thesis is experimental research. This study aims to determine: 1) The effect of half squat jump training on shooting accuracy in futsal players of SMA Negeri 8 Makassar; 2) The effect of training without half squat jump on shooting accuracy in futsal players of SMA Negeri 8 Makassar; and 3) The difference in the effect of half squat jump training and without half squat jump on shooting accuracy in futsal players of SMA Negeri 8 Makassar. The population in this study was futsal athletes of SMA Negeri 8 Makassar, with a sample of 40 athletes, with a total sampling technique using Total sampling and a group division system using matching ordinal pairing. The research instruments used were descriptive analysis, data normality analysis, homogeneity analysis, and t-test analysis with the help of the SPSS version 20.00 application. The results of the study showed that; (1) There is an effect of half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar as evidenced by an increase from an average value of 8.4000 to 15.4000 with an observation value of 10.405 > t table 2.093 and a significant value of 0.000 < α 0.05; (2) There is an effect of training without half squat jumps on shooting accuracy in futsal players at SMA Negeri 8 Makassar as evidenced by an increase in the average value 8.4000 increased to 11.7000 with an observation value of -4.931 > t-table 2.093 and a significant value of 0.000 < α 0.05; (3) There is a difference in the influence between half squat jump training and training without half squat jump on shooting accuracy in futsal players at SMA Negeri 8 Makassar with a difference value of 15.4000 > 11.7000 with an observation value of 4.665 > t-table 2.024 and a significant value of 0.019 < α 0.05. The conclusion is that half squat jump training has a greater influence compared to training without half squat jump on shooting accuracy in futsal players at SMA Negeri 8 Makassar.

ARTICLE HISTORY

Received: 2025/02/21
Accepted: 2025/02/25
Published: 2025/02/28

KEYWORDS

Training;
Half Squat Jump;
Shooting;
Futsal.

AUTHORS' CONTRIBUTION

A. Conception and design of the study;
B. Acquisition of data;
C. Analysis and interpretation of data;
D. Manuscript preparation;
E. Obtaining funding

Cites this Article : Hasan, Muh Said; Bismar, Ahmad Rum. (2025). The Effect of Half Squat Jump Exercises On Shooting Accuracy In Futsal Players In SMA Negeri 8 Makassar. **Competitor: Jurnal Pendidikan Kepeleatihan Olahraga**. 17(1), p.391-401

INTRODUCTION

In futsal games, shooting is very often done, and it is an important basic technique (Pratama et al., 2020). This technique looks easy to do, but requires concentration and excellent leg muscle power so that the shooting is directed at the goal or scores a goal

(Kuncoro, 2016). Therefore, to be able to shoot well, athletes must have excellent leg muscle power (Nosa et al., 2019). The most important thing in futsal is shooting, because shooting requires concentration, accuracy, and calmness so that when we shoot, we can create a goal and achieve victory (Alfian & Faruk, 2019).

In this case, one of the factors that makes shooting accuracy less than optimal in futsal is the lack of leg muscle power. Leg muscle power is needed to support the legs so that they can kick the ball hard and accurately. However, futsal players in South Sulawesi, especially in the SMA Negeri 8 Makassar futsal team, are not good at shooting. There are still many athletes who are not precise enough or hard enough in shooting. This can be found out by researchers through interviews with alumni of SMA Negeri 8 Makassar who are also former futsal players of SMA Negeri 8 Makassar who still often monitor the development of futsal at SMA Negeri 8 Makassar and are strengthened after researchers conducted observations related to the development of shooting quality in SMA 4 Negeri 16 Makassar players from each match followed by SMA Negeri 8 Makassar futsal players both in practice matches and tournaments. Although they often win every match. But the players are still not good at finishing. Many of the kicks from each player are still not right on goal and lack power, so they can still be blocked by the opposing goalkeeper.

A player must be able to master the basic movement skills of kicking the ball (Ramadhan et al., 2019) and then develop a series of shooting techniques that allow him to shoot and score goals from various positions on the field (Mashud et al., 2019). A very young player usually shoots from near the goal (Oman Hadiana, 2020). It should be emphasized that shooting requires repeated repetition and also excellent muscle strength, especially in the leg muscles (Pizarro et al., 2021).

Researchers (Rosita et al., 2019) in their study aimed to determine the effect of balance, leg muscle strength, and coordination on shooting accuracy. The research method used in this study was a survey with path analysis techniques (Festiawan, 2020). Analysis testing was carried out by calculating data requirements, namely normality tests, significance tests and regression linearity with the results stating that leg muscle strength affected shooting accuracy of 20.5%. From these data, it can be said that leg muscle strength greatly influences shooting accuracy. Therefore, repetition in shooting needs to be intensified and also balanced with excellent leg muscle strength because basically, players are not able to do many technical training programs without excellent physical condition and even the risk of injury will increase. In this case, half squat jump training is proposed to be a problem-solving as well as an initial step for players with weak leg strength who without strong legs or in the sense that weak are not yet able to perform basic shooting techniques optimally.

METHODS

This research is an experiment. The experimental method is observation under artificial conditions, where the conditions are regulated by the researcher. Thus,

experimental research is research that is conducted by manipulating the research object and having control. The purpose of experimental research is to investigate whether or not there is a causal relationship.

By giving certain treatments to the experimental group and providing a control for comparison (Tarjo, 2019). This study is an experiment with non-separate samples because it cannot control all the variables that affect the results of the experiment. The experimental method with non-separate samples means that the researcher only has one group (sample), which is measured twice; the first measurement is carried out before the subject is given the first measurement test (pretest), then treatment, which is finally closed with the second measurement test (posttest). Good post-test results if the test results after carrying out those treatment show significant changes from before the treatment was given.

The shooting skill test adopted from the thesis (Setiawan, 2014) has a validity of 0.886 and a reliability of 0.866. The population in this study was futsal players of SMA Negeri 8 Makassar, and the subjects of this study were futsal players of SMA Negeri 8 Makassar, totaling 40 people. The data were compiled, processed, and analyzed systematically using computer assistance through the SPSS statistical program.

RESULTS AND DISCUSSION

Result

Analysis Description

The results of the descriptive data analysis, the calculations of which are listed in the appendix, can be described as follows:

Table 1.

Results of descriptive data analysis

Variable	N	Sum	Mean	Stdv	Variance	Range	Min	Max
Half squat jump exercise pretest	20	168,00	8,4000	2,68328	7,200	12,00	3,00	15,00
Half squat jump exercise post-test	20	308,00	15,4000	2,64376	6,989	12,00	9,00	21,00
Pretest without half squat jump exercise	20	168,00	8,4000	2,43656	5,937	8,60	5,00	13,00
Post-tes tanpa latihan half squat jump	20	234,00	11,7000	2,36421	5,589	10,00	7,00	17,00

Based on the summary of the results of the descriptive analysis of the data in Table 1 above, it can be described as follows:

1. The results of the descriptive data of the initial test (pretest) of the half squat jump exercise on the accuracy of shooting in futsal players at SMA Negeri 8 Makassar, from 20 samples obtained a total value of 168.00. The average value obtained was 8.4000 with a standard deviation of 2.68328 and a variance value of 7.200. For the range value obtained, 12.00 from a minimum value of 3.00 and a maximum value of 15.00.
2. The results of the descriptive data of the final test (posttest) of the half squat jump exercise on the accuracy of shooting in futsal players at SMA Negeri 8

Makassar, from 20 samples obtained a total value of 308.00. The average value obtained was 15.4000 with a standard deviation of 2.64376 and a variance of 6.989. For the range value, 12.00 was obtained from a minimum value of 9.00 and a maximum value of 21.00.

3. The results of the descriptive data of the initial test (pretest) without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar, from 20 samples, a total value of 168.00 was obtained. The average value obtained was 8.4000 with a standard deviation of 2.43656 and a variance of 5.937. For the range value, 8.00 was obtained from a minimum value of 5.00 and a maximum value of 13.00.
4. The results of the descriptive data of the final test (posttest) without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar, from 20 samples obtained a total value of 234.00. The average value obtained was 11.7000 with a standard deviation of 2.36421 and a variance value of 5.589. For the range value obtained, 10.00 from a minimum value of 7.00 and a maximum value of 17.00.

Test Requirements

Data grouped using the total population technique, the intention is that the sample members start from the same or almost the same accuracy, so that the changes that occur after the treatment can be convincing. For this purpose, the initial test data (pretest) between the two groups were analyzed by testing the sample normality and homogeneity tests.

Sample normality testing

Research data that will be analyzed statistically must meet the analysis requirements. For this reason, after the initial test data between half squat jump training and without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar in this study were collected, before the inferential statistical analysis was carried out for hypothesis testing, a requirement test was first carried out, namely normality with the Kolmogorov-Smirnov Test.

From the results of the Kolmogorov-Smirnov Test carried out, the results were obtained as attached. The calculation results can be seen in Table 2. The following summary:

Table 2.
Results of data normality test

group	Kolmogorov Statistic	Smirnov P	α	Information
Half squat jump exercise	0,162	0,182	0,05	Normal
Without a half-squat jump exercise	0,167	0,145	0,05	Normal

Based on Table 2, which is a summary of the results of the data normality test on each research variable, it can be described as follows:

1. The results of the data normality test with the Kolmogorov-Smirnov Test, then the half squat jump exercise on shooting accuracy in futsal players at SMA Negeri 8 Makassar, the Kolmogorov-Smirnov Test value obtained was 0.162 with a probability level (P) of 0.182, greater than the value of $\alpha_{0,05}$. Thus, the half squat jump exercise data on shooting accuracy in futsal players at SMA Negeri 8 Makassar follows a normal distribution or is normally distributed.
2. The results of the data normality test using the Kolmogorov-Smirnov Test, then without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar, the Kolmogorov-Smirnov Test value was obtained as 0.167 with a probability level (P) of 0.145, greater than the value of $\alpha_{0,05}$. Thus, the data without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar follows a normal distribution or is normally distributed.

Homogeneity test

The homogeneity test is used to test the similarity of variance between the half squat jump exercise variable and the variable without half squat jump exercise obtained from the data from the pretest (initial test) of shooting accuracy in futsal players at SMA Negeri 8 Makassar. This homogeneity test functions as a requirement in testing samples from a homogeneous population.

Table 3.

Summary of homogeneity test of variable data

Shooting accuracy of futsal players at SMA Negeri 8 Makassar	Levene Statistic	Df 1	Df 2	Sig
Pretest of the half squat jump training group and without half squat jump training	0,018	1	38	0,917

For shooting accuracy in futsal players at SMA Negeri 8 Makassar with the Levene test is 0.018 with a significant value of 0.917, because the probability value is greater than $\alpha_{0.05}$ or a significant level of 95%, therefore the pretest of the half squat jump training group and without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar for both training groups is homogeneous or comes from the same group. The second requirement, namely the homogeneous test, shows that the pretest-posttest of the half squat jump training group and without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar is homogeneous or comes from the same group.

The results of the group data above show a general description of the data obtained from the actual research results. The data above has met the requirements for conducting statistical tests aimed at finding out the results of the research. The experimental data will be further analyzed using parametric statistics to test the hypothesis through the t-test with the help of SPSS 20.00 with a significance level of 95%.

Hypothesis Testing

Hypothesis testing in this study used the t-test. The t-test was used to test the effect of the treatment on the half squat jump training group and without half squat jump

training. Summary of the results of the paired t-test analysis and the unpaired t-test of the half squat jump training group and without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar.

The effect of half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar

The first hypothesis test is to determine the effect of the half squat jump training group on shooting accuracy in futsal players at SMA Negeri 8 Makassar, using a paired t-test, namely pretest and post-test shooting accuracy in futsal players at SMA Negeri 8 Makassar. The explanation can be seen in the following summary Table 4:

Statistical hypothesis:

$$H_0: \mu_{A1} - \mu_{A2} = 0$$

$$H_1: \mu_{A1} - \mu_{A2} \neq 0$$

Table 4.
Results of processing the first hypothesis data

Hipotesis	Mean	t _{observasi}	t _{tabel}	P	α	Keterangan
Pretest	8,4000	10,405	2,093	0,000	0,05	Signifikan

Analysis results:

Summary of pretest and posttest data analysis on shooting accuracy in futsal players at SMA Negeri 8 Makassar, with a paired t-test in the half squat jump training group.

It can be concluded that there is a significant effect on the half squat jump training group on shooting accuracy in futsal players at SMA Negeri 8 Makassar, the observation value is -10.405 greater than the t-table value of 2.093 (-10.405 > 2.093) with a significant value of 0.000 smaller than α0.05. So H₀ is rejected and H₁ is accepted, meaning there is a difference between the initial test (pretest) and the final test (posttest). Thus, it can be concluded that there is a significant effect of half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar.

It can be proven that the average value of the posttest is higher than the average value of the pretest, or (μ_{A1} 8.4000 < μ_{A2} 15.4000) with a difference of 7. Thus, it can be concluded that there is a significant effect of half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar.

Effect of half-squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar

The second hypothesis test is to determine the effect of half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar, using a paired t-test, namely pretest and post-test shooting accuracy in futsal players at SMA Negeri 8 Makassar. The explanation can be seen in the following summary Table 5:

Statistical hypothesis:

$$H_0: \mu_{A1} - \mu_{A2} = 0$$

$$H_1: \mu_{A1} - \mu_{A2} \neq 0$$

Table 5.
Results of processing the second hypothesis data

Hipotesis	Mean	t _{observasi}	t _{tabel}	P	α	Keterangan
Pretest	8,4000	-4,931	2,093	0,000	0,05	Signifikan
Post-test	11,700					

Analysis results:

Summary of pretest and posttest data analysis on shooting accuracy in futsal players at SMA Negeri 8 Makassar, with a paired t-test without half squat jump training.

It can be concluded that there is a significant effect without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar, the observation value is -4.931, which is greater than the t-table value of 2.093 (-4.931 > 2.093) with a significant value of 0.000 which is greater than α0.05. So Ho is rejected and H1 is accepted, meaning there is a difference between the initial test (pretest) and the final test (posttest). Thus, it can be concluded that there is a significant effect without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar.

It can be proven that the average posttest value is higher than the average pretest value ($\mu_{A1} 8.4000 < \mu_{A2} 11.7000$) with a difference of 3.3. Thus, it can be concluded that there is a significant effect of half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar.

The difference in the effect between half squat jump training and without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar

The third hypothesis test, namely to determine the difference in the effect of the half squat jump training group and without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar, using an unpaired t-test, the final test (posttest) of shooting accuracy in futsal players at SMA Negeri 8 Makassar, the half squat jump training group and without half squat jump training. The explanation can be seen in the summary of Table 6 below:

Hipotesis statistik :

Ho : $\mu_{A2} - \mu_{B2} = 0$

H1 : $\mu_{A2} - \mu_{B2} \neq 0$

Table 6.
Results of processing the third hypothesis data

Hipotesis	Mean	t _{observasi}	t _{tabel}	P	α	Keterangan
Pretest	15,4000	4,665	2,024	0,000	0,05	Signifikan
Post-test	11,7000					

Analysis results:

Based on Table 6, the results of the posttest data analysis of the half squat jump training group and without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar

It can be concluded that there is a significant difference in influence between the half squat jump training group and without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar, the observation value of 4.665 is greater than

the t-table value of 2.024 ($4.665 > 2.024$) with a significant value of 0.000 greater than $\alpha 0.05$. So H_0 is rejected, and H_1 is accepted, meaning there is a difference in influence between the final test (posttest) of the half squat jump training group and without half squat jump training. Thus, it can be concluded that there is a significant difference in influence between half squat jump training and without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar.

To prove the difference between the half squat jump training group and without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar. This can be proven by the posttest of the half squat jump training group, which obtained an average value of 15.4000, which is greater than the average value without half squat jump training of 11.7000 ($\mu B1 15.4000 > \mu B2 11.7000$).

These results show a difference in the average value of 3.7 after the posttest or final test of shooting accuracy in futsal players at SMA Negeri 8 Makassar, and the half squat jump training group is better than without half squat jump training.

Discussion

The significant effect of half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar

The first hypothesis is accepted: there is a significant effect of half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar. According to the results of the t-test of the initial test data and the final test data on shooting accuracy in futsal players at SMA Negeri 8 Makassar in the half squat jump training group, it turns out that the calculation results show that the observation t value is greater than the table t value at a significance level of 95%. This proves that the first hypothesis proposed is accepted at a significance level of 95%. The prediction that can be put forward is that providing half squat jump training in a systematic and programmed manner will be able to increase shooting accuracy in the sport of futsal. This proves that half-squat jump training plays a role in increasing shooting accuracy in the sport of futsal. This proves that a player or student performs half-squat jump training movements to achieve increased shooting accuracy in the sport of futsal. These results provide an explanation that squat jump training in a student greatly affects the shooting kick movement in the game of futsal. According to Pratama and Erawan (2019:78), it states that: "Squat jump training with short intervals can increase leg muscle power". So, the squat jump exercise is a plyometric exercise to train the lower body. This exercise targets the quadriceps, hamstrings, glutes, and calves. How to exercise: squat into a squat position, press the tips of the feet, and push the body into the air as high as possible. When going down, immediately bend the knees, go back down to the squat position, and jump again. The position of the feet must be on tiptoe when landing at a predetermined time. The connection between the squat jump exercise movement in performing shooting accuracy movements in futsal games is that squat jump exercises are one of the exercises that can increase leg explosive power; therefore, in doing hard kicks or shooting, a person's leg muscle explosive power is needed. These results explain that half squat jump exercises in

a student greatly affect the movement in performing shooting accuracy in futsal. Thus, half squat jump exercises have a significant influence on shooting accuracy in futsal players at SMA Negeri 8 Makassar.

Significant effect of half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar

The second hypothesis is accepted: there is a significant effect without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar. According to the results of the t-test of the initial test data and the final test data on shooting accuracy in futsal players at SMA Negeri 8 Makassar without half squat jump training, it turns out that from the calculation results, the observation t value is greater than the t table value at a significance level of 95%. This proves that the first hypothesis proposed is accepted at a significance level of 95%. The prediction that can be put forward is that by providing training without half squat jumps in a systematic and programmed manner, it will be able to increase shooting accuracy in futsal. This proves that half squat jump training plays a role in increasing shooting accuracy in futsal. So, in doing a training, routine training is needed so that the results obtained can be maximized. Thus, half squat jump training has a significant effect on shooting accuracy in futsal players at SMA Negeri 8 Makassar.

Significant difference in influence between half squat jump training and without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar

The third hypothesis proposed is accepted: there is a significant difference in influence between half squat jump training and without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar. According to the results of the t-test of the final test data on shooting accuracy in futsal players at SMA Negeri 8 Makassar in both groups, it turns out that the calculation results obtained an observation t value greater than the t table value at a significance level of 95%. This proves that the proposed hypothesis is accepted at a significance level of 95%. Half squat jump training is better at improving shooting accuracy in futsal than without half squat jump training. In carrying out shooting accuracy in futsal, players or students do repeated training to gain practical skills and dexterity about the knowledge learned. Therefore, in carrying out good shooting accuracy in futsal, repeated training is needed. These results provide an explanation that squat jump training in a student greatly affects the shooting kick movement in futsal. According to Pratama and Erawan (2019:78) stated that: "Squat jump training with short intervals can increase leg muscle power". So, squat jump training is a plyometric exercise to train the lower body. This exercise targets the quadriceps, hamstrings, glutes, and calves. How to exercise: squat into a squat position, press the tips of the feet, and push the body into the air as high as possible. When going down, immediately bend your knees, go back down to the squat position, and jump again. The position of the feet must be on tiptoe when landing at a predetermined time. The connection between the squat jump exercise movement in performing shooting accuracy movements in futsal games is that squat jump training is one of the exercises that can

increase leg explosive power; therefore, in doing hard kicks or shooting, a person's leg muscle explosive power is needed. So, half squat jump training can improve shooting accuracy in futsal. For this reason, half squat jump training is the most effective in improving shooting accuracy in futsal. The two methods that are the focus of the study, namely half squat jump training and without half squat jump training, have a function in training to improve shooting accuracy in futsal. Therefore, both forms of training are nerve stimulation that can help improve shooting accuracy, or commonly interpreted as the accuracy of a person immediately acting quickly in responding to stimuli that come through the senses, nerves, or other feelings. Thus, half squat jump training and without half squat jump training have a significant difference in influence on shooting accuracy in futsal players at SMA Negeri 8 Makassar, and half squat jump training is better in increasing shooting accuracy in futsal than without half squat jump training.

CONCLUSION

After researching the problem of the influence of half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar, the following conclusions were drawn:

There is a significant influence of half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar. There is a significant influence without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar. There is a significant difference in influence between half squat jump training and without half squat jump training on shooting accuracy in futsal players at SMA Negeri 8 Makassar, and half squat jump training is better than without half squat jump training.

From the results of the conclusions, the following suggestions will be put forward: For coaches and trainers of futsal sports, to improve shooting accuracy, half squat jump training must be carried out regularly. The school needs to facilitate training facilities and infrastructure so that there are no problems that can hinder the training process. For those interested in conducting further research, it is recommended to involve other variables that are relevant to this study as well as with a wider population and sample.

REFERENCES

- Alfian, D., & Faruk, M. (2019). Efektifitas Shooting Liga Futsal Profesional Indonesia 2018 (Studi Pada Vamos FC Mataram). *Jurnal Prestasi Olahraga*, 2(1).
- Amirullah, A. (2013). *Metode Penelitian Untuk Manajemen*. Penerbit bayumedia Publishing
- Festiawan, R. (2020). Pendekatan Teknik Dan Taktik: Pengaruhnya Terhadap Keterampilan Bermain Futsal. *Jurnal Pendidikan Jasmani dan Olahraga*, 3(2), 143-155. <https://journal.ipm2kpe.or.id/index.php/JPJO/article/view/1080>
- Kuncoro, R. adi C. (2016). Tingkat Keterampilan Dasar Bermain Futsal Peserta Ekstrakurikuler Futsal Di Sekolah Menengah Atas Negeri 3 Sragen. *Journal of Chemical Information and Modeling*, 1-81.

- Mashud, M., Hamid, A., & Abdillah, S. (2019). Pengaruh Komponen Fisik Dominan Olahraga Futsal Terhadap Teknik Dasar Permainan Futsal. *Gladi : Jurnal Ilmu Keolahragaan*, 10(1), 28–38. <https://doi.org/10.21009/gjik.101.04>
- M.Mustakim. (2022). Pengaruh Latihan Resitance Band Dan Resistance Band Leg Press Terhadap Power Otot Tungkai Anggota Ukm Futsal STKIP PGRI. *Suparyanto Dan Rosad* (2015, 5(3).
- Mulyono, M. (2016). *Buku Pintar Panduan Futsal* (W. Wahyuni & A. Abdul (eds.)). Laskar Aksara.
- Nosa, V. T. A., Sulaiman, I., Nurdin, F., & Praniata, A. R. (2019). Model Pembelajaran Shooting Futsal Untuk Siswa SMA. *Jurnal Pendidikan Olahraga*, 8(1), 27. <https://doi.org/10.31571/jpo.v8i1.1218>
- Oman Hadiana. (2020). Implementasi Pendekatan Taktis Dalam meningkatkan Motivasi Belajar Futsal. *Indonesian Journal of Science*, 1(1), 38–44. <http://jurnal.pusatsains.com/index.php/jsi/article/view/5>
- Pizarro, D., Práxedes, A., Travassos, B., Gonçalves, B., & Moreno, A. (2021). How the number of players and floaters' positioning changes the offensive performance during futsal small-sided and conditioned games. *International Journal of Environmental Research and Public Health*, 18(14), 1–10. <https://doi.org/10.3390/ijerph18147557>
- Pratama, A. P., Alsaudi, A. T. B. D., & Iqbal, M. (2020). Upaya Meningkatkan Hasil Akurasi Shooting dengan Menggunakan Media Target Ban pada Permainan Futsal. *Prosiding Seminar Nasional Pendidikan STKIP Kusuma Negara II*, 63–69. <http://jurnal.stkipkusumanegara.ac.id/index.php/semnara2020/article/view/624>
- Purnomo, M., & Firma Ditha, A. (2018). Pengaruh Latihan Drop Jump Dan Half Squ Terhadap Peningkatan Otot Tungkai. *Jurnal Prestasi Olahraga*, 1, 1.
- Ramadhan, C. U., Widiastuti, & Samsudin. (2019). Model Pembelajaran Keterampilan Passing Futsal Berbasis Permainan Untuk SMA. *Jurnal Pendidikan Olahraga*, 8(1), 45–52. <https://doi.org/10.31571/jpo.v8i1.1219>
- Rhama, A., & Afrizal, A. (2019). Studi Tingkat Kondisi Fisik Pemain Sekolah Sepakbola Campago, Kampung Dalam Kabupaten Padang Pariaman. *Jurnal JPDO*, 2(1), 1–6.
- Rosita, T., Hernawan, H., & Fachrezzy, F. (2019). Pengaruh Keseimbangan, Kekuatan Otot Tungkai, dan Koordinasi terhadap Ketepatan Shooting Futsal. *Jurnal Terapan Ilmu Keolahragaan*, 4(2), 117–126. <https://doi.org/10.17509/jtikor.v4i2.18991>
- Setiawan, Agus. (2014). *Hubungan Motor Ability Dengan Keterampilan Tehnik Dasar Pada Cabang Olahraga Futsal*. Universitas Pendidikan Indonesia.
- Suwartono, S. (2014). *Dasar-Dasar Metodologi Penelitian* (R. Erang (ed.); 1st ed.). ANDI OFFSET.
- Syafaruddin, S. (2019). Tinjauan Olahraga Futsal. *Altius : Jurnal Ilmu Olahraga Dan Kesehatan*, 7(2). <https://doi.org/10.36706/altius.v7i2.8108>
- Tarjo, T. (2019). *Metode Penelitian Sistem 3x Baca*. Deepublish.
- UNM. (2019). *Pedoman penulisan tugas akhir mahasiswa universitas negeri makassar 2019*.
- Wamena, T. (2018). Kontribusi power otot tungkai, kekuatan otot lengan, dan koordinasi mata tangan dengan kemampuan jump shot bolabasket pada mahasiswa FIK Uncen. *Journal Power Of Sports*, 1, 8–13.