

THE EFFECT OF SMALL-SIDED GAMES AS A CONTEXTUAL TRAINING METHOD ON SHOOTING ACCURACY AND PHYSICAL ACTIVITY ENJOYMENT IN FUTSAL EXTRACURRICULAR PARTICIPANTS

YAHYA EKO NOPIYANTO¹, IPA SARI KARDI², CAHYO WIBOWO³, MUHAMMAD MAULANA FAJAR⁴, EKO PUTRA UTAMA⁵,
HERDIANSYAH AGUS⁶, NOVRIANSYAH⁴

¹University of Bengkulu, Department of Physical Education, Bengkulu, Indonesia

²University of Cenderawasih, Faculty of Sport Science, Jayapura, Indonesia

³Satya Wacana Christian University, Faculty of Medicine and Health Sciences, Salatiga, Indonesia

⁴Universitas Samudra, Department of Physical Education, Aceh, Indonesia

⁵Universitas Dehasen, Department of Physical Education, Bengkulu, Indonesia

⁶Universitas Pendidikan Indonesia, Department of Physical Education, Bandung, Indonesia

Correspondence:

Yahya Eko Nopiyanto

University of Bengkulu, Department of Physical Education, Bengkulu, Indonesia, yahyaekonopiyanto@unib.ac.id

Abstract: Student enthusiasm for futsal continues to increase, but has not been accompanied by a contextual training model to enhance shooting accuracy and enjoyment of physical activity. This study aimed to investigate the impact of small-sided games on shooting accuracy and enjoyment of physical activity in futsal extracurricular participants. A quasi-experimental method with a one-group pretest and posttest design was used to achieve the research objectives. Participants in this study were 20 futsal extracurricular at State Senior High School 10, Bengkulu City, selected using a purposive sampling technique. All participants participated in the intervention for 4 weeks, with a frequency of 4 sessions per week, and a duration of 60 minutes per session. The shooting accuracy test was used to determine shooting accuracy, and the physical activity scale was used to determine players' physical activity during small-sided games. SPSS software version 22 was used to analyze the research data. Paired sample t-tests revealed that small-sided games significantly improved shooting accuracy and enjoyment of physical activity, with Cohen's d indicating contributions of 66.67% and 27.45%, respectively. It can be concluded that this contextual training method is efficacious in improving shooting accuracy and enhancing the enjoyment of physical activity among young futsal players. Small-sided games training is recommended as a practical approach to simultaneously improve shooting accuracy and enhance enjoyment in high school futsal players.

Keywords: games, shooting, physical activity, futsal

INTRODUCTION

High school students show a high level of interest in futsal. Students participate in futsal as an extracurricular activity at both school and club levels, catering to students of all ages (Gemael & Sari, 2025). Futsal has dynamic characteristics, making it an appropriate medium for developing students' motor and cognitive skills (Machado et al., 2018). Student success in playing futsal cannot be separated from mastering basic technical skills such as passing, dribbling, controlling, heading, tackling, and shooting (Khurrohman et al., 2021). Of these various techniques, shooting accuracy is dominant in determining the effectiveness of attacks and overall success in the game (Doewes et al., 2022). However, mastering shooting accuracy presents its own challenges for students. Based on observations, many students experience limitations in executing accurate shots due to training environments that are not contextual and attractive to futsal extracurricular participants.

Most school coaches and physical education teachers employ traditional training methods, such as drills, to improve basic game techniques. Drills training can improve basic technical skills, but are less relevant to real-life match conditions (Hidayat et al., 2025). Furthermore, repetitive and unvaried training can lead to training boredom, resulting in decreased motivation. Therefore, training methods that accommodate futsal extracurricular participants to real-world match conditions are needed. To address these issues, many researchers have focused on small-sided games (SSG) as a training method to address technical, tactical and physiological indicators in futsal student in an educational context (Coutinho et al., 2016).

SSG is a training method that involves modifying the number of players, field size, and game rules to facilitate

athletes' self-exploration, as outlined in the provided training materials (Bujalance-Moreno et al., 2019). SSG creates greater opportunities for athletes to move with the ball, provides opportunities for making correct decisions, and offers experience in pressure situations similar to real matches (Coutinho et al., 2024). In addition to improving technique and tactics, the SSG method can also improve an athlete's physiology and psychology (Clemente et al., 2022).

SSG increases the enjoyment of physical activity, enhances athlete enthusiasm, encourages engagement in meaningful physical activity, boosts intrinsic motivation, and fosters a sense of connectedness among players (Clemente, 2025). The psychological aspect focused on in this study is the enjoyment of physical activity. For high school futsal extracurricular participants, the enjoyment of physical activity deserves attention because it plays a crucial role in supporting their involvement and development (Domville et al., 2019). Futsal training delivered in a fun way can increase training motivation, thereby strengthening technical skills and tactical understanding. Furthermore, positive experiences during training encourage teamwork, social interaction, and reduce stress and psychological fatigue. Enjoyment in playing futsal also contributes to long-term participation in physical activity, which has a positive impact on overall fitness and health. Therefore, physical activity enjoyment is a crucial factor supporting the effectiveness of training and the development of student-athletes in both sports and academic competitions.

SSG has been widely implemented as a training method in futsal, but the majority emphasize aerobic aspects, tactical development, and general skills (Amani-Shalamzari et al., 2019; Clemente et al., 2023). Meanwhile, the effect of SSG on shooting accuracy and enjoyment of physical activity in futsal among adolescent players in educational settings remains limited. The selection of SSG as a training method is appropriate because it aligns with contemporary pedagogical models that emphasize student-centered and game-based learning in physical education and youth sports development (Kizi, 2025). Therefore, training methods that balance technical improvement with enjoyment of physical activity are needed to encourage performance and promote lifelong adherence to physical activity (Heisz et al., 2016).

Based on the description above, this study aims to examine the effect of SSG on shooting accuracy and enjoyment of physical activity in futsal extracurricular participants. The results of this study can provide empirical support for the application of contextual and pedagogical training models in improving futsal performance.

MATERIAL AND METHODS

This research employed an experimental method to investigate the effect of SSG on shooting accuracy and satisfaction with physical activity in futsal players. The research design used a one-group pretest-posttest design, with a pretest to assess baseline levels before treatment and a posttest to determine levels after treatment. This allowed for more accurate comparisons because it enabled comparisons between the before and after treatment periods.

Participants

Participants in this study were 20 futsal extracurricular at State Senior High School 10 in Bengkulu City, selected using a purposive sampling technique. Sampling criteria included volunteering, actively participating in training for at least six months, no sports injuries, and obtaining parental/guardian permission. All participants underwent a four-week intervention, with four sessions per week, each lasting 60 minutes. Each session consisted of a warm-up, a 10-minute shooting technique drill, and a 30-minute main training session (SSG), with modified rules to increase enjoyment of physical activity.

Instrument

The shooting accuracy test determines a player's shooting accuracy before and after the SSG. Before the test, players are allowed to attempt it twice. After that, players shoot 10 times. The shooting position is 10 meters from the goal. The goal is divided into nine sections, as shown in Figure 1 below. A score of 1 is awarded for the center target, a score of 2 for the bottom and top middle targets, a score of 3 for the right and left middle targets, a score of 4 for the bottom right and left targets, and a score of 5 for the top right and left targets. If the shot hits the goalpost, the rope, or goes outside the designated target, it does not receive a score. To determine the test ability category, the final score obtained in the test is converted to the corresponding category in Table 1.

Table 1. *Category of Shooting Test*

No	Interval	Category
1	41 - 50	Excellent
2	31 - 40	Good
3	21 - 30	Fair
4	11 - 20	Poor
5	1 - 10	Very Poor

The physical activity scale assessed enjoyment of physical activity during the SSG training program. The questionnaire consisted of four indicators, 15 statements, and five Likert-type response options. Each positive statement with a strongly agree response received a score of 5, and vice versa.

Table 2. *Physical Activity Enjoyment Indicator*

No.	Indicator	Items
1	Excitement and Enjoyment	1. 2. 3. 4
2	Engagement and Challenge	5. 6. 7. 8
3	Motivation	9. 10. 11. 12
4	Discomfort	13. 14. 15

The final score is converted into Table 3 to determine the category of physical activity enjoyment.

Table 3. *Category of physical activity enjoyment*

No.	Score	Category
1	61-75	Very High
2	46-60	High
3	31-45	Moderate
4	16-30	Low
5	15	Very Low

Data Analysis

Data normality and homogeneity were tested using the Shapiro–Wilk test, and data homogeneity was tested using the Levene test. If the data were regular and homogeneous, a paired-sample t-test was used. Cohen’s d was used to determine the effectiveness of the treatment.

RESULT

The data are presented in tables and graphic visualizations to show the differences in shooting accuracy and enjoyment of physical activity categories before and after the intervention.

Table 4. *Descriptive data on shooting accuracy*

Test	Mean	Median	Variance	Std deviation	Minimum	Maximum
Pre	19.83	16.50	17.04	4.12	12	25
Post	33.05	33.00	18.78	4.33	25	41

Table 4 shows a clear improvement in shooting accuracy after SSG training. The mean score increased from 19.83 to 33.05, indicating a significant improvement in shooting accuracy. Data on variance and standard deviation suggest that this improvement occurred consistently, with no substantial differences between participants.

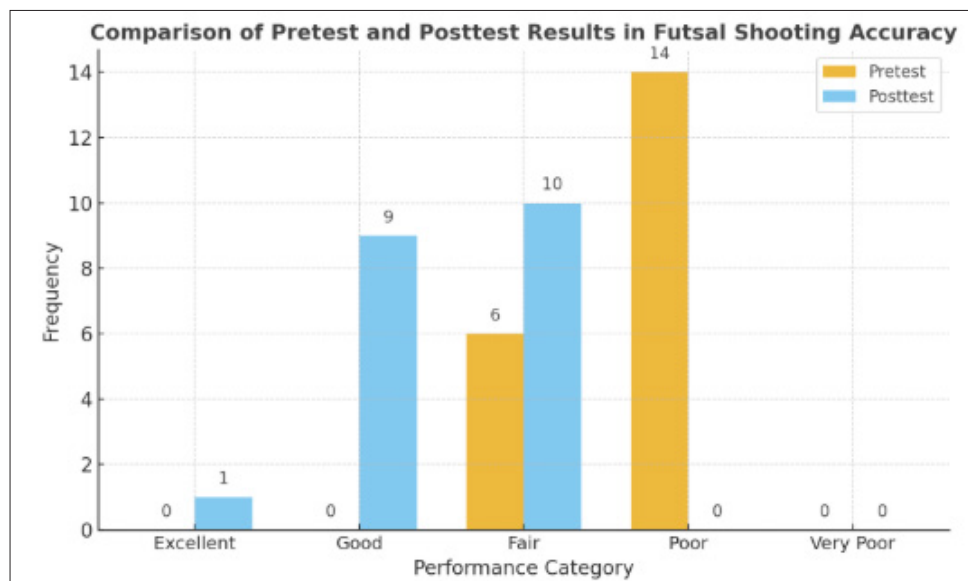


Figure 1. Pretest and Posttest Shooting Accuracy

Figure 1 illustrates the improvement in futsal shooting accuracy from the pre-test to the post-test. In the pretest, most participants were in the Poor category. After participating in the SSG, shooting accuracy increased to the Fair, Good, and Excellent categories. These results indicate an overall improvement in shooting ability.

Table 5. Tests of Normality

	Shapiro-Wilk		
	statistic	df	Sig.
Pre	.923	20	.113
Post	.962	20	.578

Table 5 shows the results of the Shapiro–Wilk normality test for the pretest and posttest data on futsal shooting accuracy. The significance values (Sig.) for the pretest and posttest data are both > 0.05 . Since both data sets were normally distributed, a paired sample t-test statistical analysis could be used to test their differences.

Table 6. Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.703	1	38	.607

Table 6 shows that the Levene's Statistic value is 0.703, which is greater than 0.05, meaning the data have homogeneous variance between the pretest and posttest groups. Therefore, a paired sample t-test statistical analysis could be used to test the differences between the pretest and posttest.

Table 7. Paired Sample t-test

t	df	Sig. (2-tailed)
-43.286	19	.000

The results of the Paired Sample t-test showed that Sig. = 0.000 ($p < 0.05$), indicating a highly significant difference between the pretest and posttest scores, which suggests that the training provided was effective in improving the participants' futsal shooting abilities.

Table 8. Descriptive Data on Physical Activity Enjoyment

Test	Mean	Median	Variance	Std deviation	Minimum	Maximum
Pre	44.65	43.5	34.45	5.87	35	55
Post	56.9	57.5	35.25	5.9	47	66

Table 8 shows an increase in enjoyment of physical activity after the SSG exercise. The mean score increased from 44.65 to 56.9, indicating a significant rise in Physical Activity Enjoyment. Data on the variance and standard deviation suggest that this increase occurred consistently, without significant differences among participants.

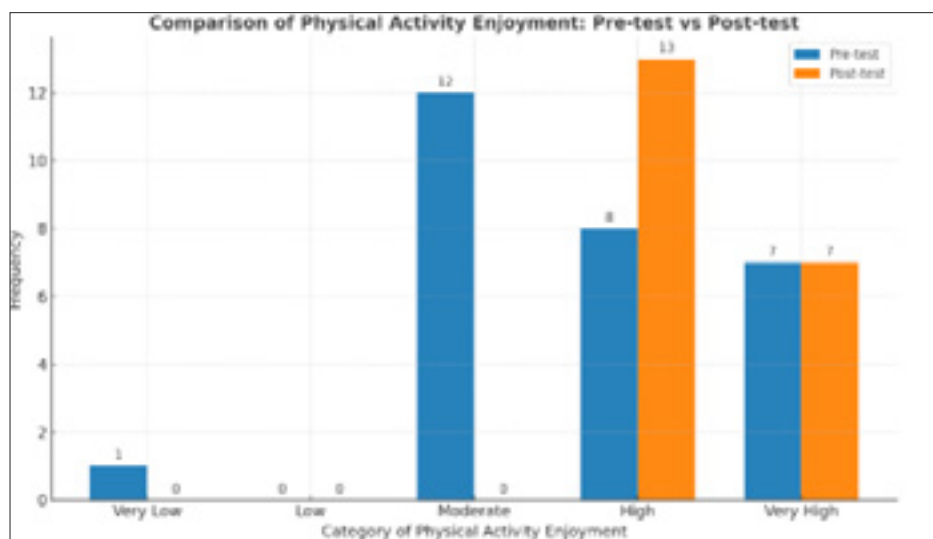


Figure 2. Pretest and Posttest Physical Activity Enjoyment

The graph shows an increase in enjoyment levels of physical activity after SSG. Before SSG, most participants were in the moderate and high categories, while after SSG, there was a shift to the high and very high categories. This indicates a significant increase in enjoyment of physical activity after SSG.

Table 9. Tests of Normality

	Shapiro-Wilk		
	statistic	df	Sig.
Pre	.954	20	.434
Post	.944	20	.286

The Shapiro-Wilk test results show a significance value of 0.434 for the pretest data and 0.286 for the posttest data. Both values are greater than the 0.05 significance level, thus concluding that the data are normally distributed.

Table 10. Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.17	1	38	.896

Based on the results of the Levene test, a significance value of 0.896 was obtained, which is greater than the significance level of 0.05. Thus, the data have homogeneous variance.

Table 11. Paired Sample t-test

t	df	Sig. (2-tailed)
-36.957	19	.000

The results of the Paired Sample t-test showed that Sig. = 0.000 ($p < 0.05$), indicating a highly significant difference between the pretest and posttest scores, which suggests that the training provided was effective in increasing physical activity enjoyment.

DISCUSSION

This study demonstrated that SSG training had a positive impact on the shooting accuracy of futsal extra-curricular participants. SSG offers a higher frequency of shooting opportunities compared to conventional training

(Yenes et al., 2025). Shooting training with the SSG model was implemented by modifying the number of players, field size, and game rules to create greater intensity and engagement within a real-life game context (Castillo et al., 2021). Shooting technique drills conducted in SSG make this skill more easily transferable to real-life match conditions. Students develop good technique and the ability to do so under tactical pressure and high game speed. The SSG method enables players to experience realistic yet controlled match situations, thereby practicing shooting accuracy in conditions similar to those of a real match (Coutinho et al., 2024).

The formats 1 vs 1, 2 vs 1, 2 vs 2, 3 vs 2, and 3 vs 3 were applied in this study. This training method allows students to experience realistic yet controlled match situations, thus practicing shooting accuracy in conditions close to a real match. In the 1 vs 1 format, students are directed to shoot under direct pressure from an opponent, so fundamental technical aspects such as body position, shot angle, and ball contact are the primary focus. This training sharpens shooting precision, as any errors in control or execution immediately result in a missed opportunity. As there are fewer students, everyone is more responsible for the attack, and each student has multiple opportunities to shoot. The constant training of high frequency improves eye-foot coordination, reaction speed, and shot direction control.

The 2 vs 1 format makes the situation more saturated with tactical elements. Students get the opportunity to choose the optimal time to start a shot. The right choice reinforces the coordination between the perception of a place in space and the signal for a shot. The 2 vs 2 format allows the students to maintain the accuracy indicator even if the opponent's pressure increases and the areas in which they act are reduced. This fosters a consistent shooting technique under tight playing conditions. SSG places students under pressure in limited time and space, demanding quick decision-making and precise technique execution (Trecroci et al., 2020).

The format of the 3 vs 2 not only develops the formation of a sense of space and time when the goal and positioning of the goalkeeper are quickly assessed, but also enables one to increase the proportion of accurately hit shots. Thus, while playing 3 vs 2, the students note the force, angle, and playtime of their shots to adapt them to the game's circumstances. The activities in 3 vs 2 allow students to focus on the existing numerical advantage and create shot-taking opportunities with more favorable body postures and shot angles. Then, these individuals engage in an intense, high-tempo game of 3 vs 3, and the ability to maintain accurate hits is crucial because they are more game-specific.

The results of this study also demonstrate that SSG has a positive impact on increasing the enjoyment of physical activity among students (Entezari et al., 2023; Ouertatani et al., 2022). The SSG provides ample opportunity for each student to touch the ball, pass, shoot, assist in defense, and attack. The SSG model can meet each student's basic needs for making critical decisions during training, improving technical and tactical skills, and fostering enjoyable social interaction. Furthermore, the SSG model facilitates a balance of competition and collaboration. Students learn to work together while challenging themselves in a realistic game context. This pattern stimulates positive emotions, such as enthusiasm, satisfaction, and excitement (Selmi et al., 2020).

The high intensity of SSG also contributes to the release of endorphins and increased blood flow, resulting in a feeling of refreshment, focus, and post-exercise euphoria (Selmi et al., 2018). These responses in combination cause the body to be refreshed, a better sense of mental concentration, and produce a feeling of post-exercise euphoria. The combination of these three experiences can push the perception of physical and emotional enjoyment. SSG may not only enhance shooting precision, but might have boosted the perception of fun in physical and emotional activity. Given the brevity of this research and the fact that it contains no control group, the findings must be interpreted cautiously to infer causality.

Although this study provides a positive picture, this single educational institution's sample size limits this paper's ability to extrapolate its conclusions to a more varied population. Both shooting accuracy and physical activity enjoyment were also assessed using standard measures and questionnaires, which may have led to assessor bias. These problems with the research do not negate the result. These limitations provide significant opportunities for the use of control groups and technology-based research instruments.

CONCLUSION

The results of this study indicate that SSG was efficacious in improving shooting accuracy and enjoyment of physical activity in extracurricular futsal participants. The varied game formats allow players to practice their shooting in situations that mimic real matches. The high intensity and interaction during training also increase player engagement. Coaches and physical education teachers should integrate the SSG model into school futsal training programs to enhance both technical and psychological aspects of players. Future research could expand the focus

to include physiological and psychological variables, thereby gaining a more comprehensive understanding of the benefits of SSG in developing the performance and character of young players.

REFERENCES

- Amani-Shalamzari, S., Khoshghadam, E., Doniaee, A., Parnow, A., Bayati, M., & Clemente, F. M. (2019). Generic vs. small-sided game training in futsal: Effects on aerobic capacity, anaerobic power and agility. *Physiology and Behavior*, 204(February), 347–354. <https://doi.org/10.1016/j.physbeh.2019.03.017>
- Bujalance-Moreno, P., Latorre-Román, P. Á., & García-Pinillos, F. (2019). A systematic review on small-sided games in football players: Acute and chronic adaptations. *Journal of Sports Sciences*, 37(8), 921–949. <https://doi.org/10.1080/02640414.2018.1535821>
- Castillo, D., Raya-gonzález, J., Yanci, J., & Clemente, F. M. (2021). Influence of Pitch Size on Short-Term High Intensity Actions and Body Impacts in Soccer Sided Games by. *Journal of Human Kinetics*, 78(April), 187–196. <https://doi.org/10.2478/hukin-2021-0037>
- Clemente, F. M. (2025). The enjoyment of small-sided games: a narrative review. *Human Movement*, 26(1), 1–14. <https://doi.org/10.5114/hm/197230>
- Clemente, F. M., Moran, J., Ramirez-Campillo, R., Beato, M., & Afonso, J. (2023). Endurance Performance Adaptations between SSG and HIIT in Soccer Players: A Meta-analysis. *International Journal of Sports Medicine*, 45(3), 183–210. <https://doi.org/10.1055/a-2171-3255>
- Clemente, F. M., Soyulu, Y., Arslan, E., Kilit, B., Garrett, J., van den Hoek, D., Badicu, G., & Silva, A. F. (2022). Can high-intensity interval training and small-sided games be effective for improving physical fitness after detraining? A parallel study design in youth male soccer players. *PeerJ*, 10. <https://doi.org/10.7717/peerj.13514>
- Coutinho, D., Gonçalves, B., Kelly, A. L., Santos, S., Figueiredo, P., Soares, C., & Travassos, B. (2024). Exploring the impact of ball possession directionality on youth footballers' positioning, technical skills and physical abilities in small-sided games. *International Journal of Sports Science and Coaching*, 19(6), 2438–2448. <https://doi.org/10.1177/17479541241257016>
- Coutinho, Gonçalves, S., Varanda, B. S., Pereira, A. M., da Eira, A. J., & Correia, N. M. (2016). Manipulating the number of players and targets in team sports. Small-Sided Games during Physical Education classes. *Revista de Psicologia Del Deporte*, 25(1), 169–177.
- Doewes, R. I., Elumalai, G., & Azmi, S. H. (2022). Futsal Shooting Moving Ball Test (FSMT) Assessment as a New Testing Protocol. *International Journal of Human Movement and Sports Sciences*, 10(6), 1302–1310. <https://doi.org/10.13189/saj.2022.100621>
- Domville, M., Watson, P. M., Richardson, D., & Graves, L. E. F. (2019). Children's perceptions of factors that influence PE enjoyment: a qualitative investigation. *Physical Education and Sport Pedagogy*, 24(3), 207–219. <https://doi.org/10.1080/17408989.2018.1561836>
- Entezari, M., Shams, A., & Bahram, A. (2023). Effectiveness of Small-Sided Games (SSG) Training on Mental Toughness, Physical Activity Enjoyment and Performance of Soccer Players. *Sport Psychology Studies*, 12(44), 73–96. https://spsyj.ssre.ac.ir/article_2578.html?lang=en
- Gemael, Q. A., & Sari, Z. N. (2025). Exploring the interest of early teenagers in futsal extracurricular participation. *Jurnal SPORTIF : Jurnal Penelitian Pembelajaran*, 11(1), 64–80. https://doi.org/10.29407/js_unpgri.v11i1.25108
- Heisz, J. J., Tejada, M. G. M., Paolucci, E. M., & Muir, C. (2016). Enjoyment for high-intensity interval exercise increases during the first six weeks of training: Implications for promoting exercise adherence in sedentary adults. *PLoS ONE*, 11(12), 1–10. <https://doi.org/10.1371/journal.pone.0168534>
- Hidayat, T., Hudain, M. A., Hasan, M. S., Kasmad, M. R., & Jamaluddin, J. (2025). Tactical Approach with Drilling Method on Shooting Ability of Futsal Extracurricular Participants in Elementary Schools. *ETDC: Indonesian Journal of Research and Educational Review*, 4(3), 920–931. <https://doi.org/10.51574/ijrer.v4i3.3410>
- Khurrohman, M. F., Purwanto, S., Nopembri, S., & Festiawan, R. (2021). The Effectiveness of Small-Sided Game Practice on Improving Basic Futsal Skills. *Jurnal Pendidikan Jasmani Dan Olahraga*, 6(2), 211–216. <https://doi.org/10.17509/jpjo.v6i2.36461>
- Kizi, O. A. M. (2025). The effectiveness of using game sports in physical education classes for students of higher educational institutions. *European International Journal of Pedagogics*, 5(3), 25–27. <https://doi.org/10.55640/eijp-05-03-07>
- Machado, A. A., Bezerra, I. S., Ponciano, K., Rica, R. L., Gama, E. F., Figueira, A., Gimenez, R., & Bocalini, D. S. (2018). Futsal as a strategy for the improvement of elementary abilities and for the development of the body image in children. *Motricidade*, 14(2–3), 11–19. <https://doi.org/10.6063/motricidade.12299>
- Ouertatani, Z., Selmi, O., Marsigliante, S., Aydi, B., Hammami, N., & Muscella, A. (2022). Comparison of the Physical, Physiological, and Psychological Responses of the High-Intensity Interval (HIIT) and Small-Sided Games (SSG) Training Programs in Young Elite Soccer Players. *International Journal of Environmental Research and Public Health*, 19(21), 1–18. <https://doi.org/10.3390/ijerph192113807>
- Selmi, O., Haddad, M., Majed, L., Khalifa, W. Ben, Hamza, M., & Chamari, K. (2018). Soccer training: high-intensity interval training is mood disturbing while small sided games ensure mood balance okba. *The Journal of Sports Medicine and Physical Fitness*, 58(7), 1163–1170. <https://doi.org/10.23736/S0022-4707.17.07292-9>
- Selmi, O., Ouergui, I., Levitt, D. E., Nikolaidis, P., Knechtel, B., & Bouassida, A. (2020). Small-Sided Games are More Enjoyable Than High-Intensity Interval Training of Similar Exercise Intensity in Soccer. *Journal of Sports Medicine*, 77–84.
- Trecroci, A., Boccolini, G., Duca, M., Formenti, D., & Alberti, G. (2020). Mental fatigue impairs physical activity, technical and decision-making performance during small-sided games. *PLoS ONE*, 15(9), 1–12. <https://doi.org/10.1371/journal.pone.0238461>
- Yenes, R., Pratama, A. O., Astuti, Y., Orhan, B. E., Kaur, D., Beulah, S., & Valappil, I. N. K. (2025). Small-Side Games (SSG) and Conventional Training: How It Affects the Improvement of Shooting Ability of Young Basketball Athletes? *International Journal of Human Movement and Sports Sciences*, 13(2), 274–279. <https://doi.org/10.13189/saj.2025.130203>

Primljen: 20. novembar 2025. / Received: November 20, 2025

Izmjene primljene: 20. decembar 2025. / Changes Received: December 20, 2025

Prihvaćen: 30. mart 2026. / Accepted: March 30, 2026



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.