# The Effect of Footwork Training on The Accuracy of Forehand Shots In Table Tennis Among Seventh Grade Students At The CEPU Islamic Junior High School

**Alwi Bashori[1A-E*], Rohmad Apriyanto[2B-D], Hilmy Aliriad[3B-D]**

[1,2,3] Universitas Nahdlatul Ulama Sunan Giri Bojonegoro, Jawa Timur, Indonesia

alwibasoritama@gmail.com[1*], rohmadapriyanto87@unugiri.ac.id[2], hilmy@unugiri.ac.id[3]

## ABSTRACT

Table tennis is a dynamic sport that demands a high level of coordination, movement accuracy, and reaction speed, particularly in executing forehand strokes as a fundamental technical skill. One crucial factor supporting forehand stroke accuracy is footwork, which enables players to achieve optimal body positioning, balance, and timing before ball contact. However, in school-based table tennis instruction, technical training often emphasizes stroke repetition while underestimating the role of systematic footwork training. This study aimed to examine the effect of footwork training on the accuracy of forehand strokes among seventh-grade students at Cepu Islamic Junior High School. The study employed a quasi-experimental method using a pretest–posttest design. A total of 48 students participated as research subjects through a total sampling technique. The intervention consisted of a structured footwork training program conducted over eight weeks. Students' forehand stroke accuracy was measured before and after the intervention using a standardized performance-based test. Data were analyzed using descriptive statistics and inferential analysis to examine differences between pretest and posttest scores. The findings revealed a statistically significant improvement in forehand stroke accuracy following the footwork training program. The mean score increased substantially from the pretest to the posttest, indicating that systematic footwork training effectively enhanced students' ability to position their bodies accurately and execute forehand strokes with greater precision. These results confirm that footwork training plays a fundamental role in improving technical performance in table tennis, particularly for beginner-level learners. In conclusion, this study highlights the importance of integrating footwork training into table tennis instruction at the junior high school level. Incorporating footwork-focused exercises can support more effective skill acquisition, improve movement coordination, and enhance overall learning outcomes in table tennis education.

**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 | : | Bashori, A.; Apriyanto, R.; Aliriad, H. (2026). The Effect of Footwork Training on The Accuracy of Forehand Shots In Table Tennis Among Seventh Grade Students At The CEPU Islamic Junior High School. **Competitor: Jurnal Pendidikan Kepelatihan Olahraga**. 18 ( 1 ), p.0936-0947 |

## INTRODUCTION

Table tennis is a popular sport that is rapidly growing in early childhood education and development environments due to its attractive, adaptive nature, and its ability to

The Effect of Footwork Training on The Accuracy of Forehand Shots In Table Tennis Among Seventh Grade Students At The CEPU Islamic Junior High School
Alwi Bashori[1A-E*], Rohmad Apriyanto[2B-D], Hilmy Aliriad[3B-D]
alwibasoritama@gmail.com[1*]

develop various aspects of student development, including physical, technical, cognitive, and mental development. In the context of learning and achievement development, mastery of basic techniques forms the primary foundation for building long-term performance. One of the most crucial techniques is the forehand stroke, which plays a dominant role in both offensive and defensive activities and serves as an early indicator of table tennis skill (Buchler, 2022; Martinent, 2020).

However, the quality of a forehand stroke is not solely determined by arm swing skills. Studies of biomechanics and motor learning show that the accuracy and effectiveness of a forehand stroke are significantly influenced by swing speed, joint angles, body segment coordination, and body positioning prior to contact with the ball (Bańkosz, 2020). In school practice, the main weakness frequently found in students is poor body positioning and footwork, resulting in unstable, inaccurate, and easily unbalanced forehand strokes.

This problem is further complicated by the fact that table tennis is a fast-paced sport that demands rapid motor response and decision-making. Huang (2021) emphasized that forehand accuracy is closely related to decision-making speed and physical readiness, with footwork being a key element in achieving the ideal position when striking the ball. Without proper footwork, players tend to react late to the ball's direction, make technical errors, and experience a consistent decline in performance.

In addition to technical and physical aspects, psychological factors such as mental fatigue and training fatigue also significantly impact forehand accuracy. Habay (2021) reported that mental fatigue can decrease the accuracy of stroke technique, especially in sports that require high coordination. In this context, systematic and varied footwork training not only improves motor efficiency but also helps develop automatic movement patterns that can reduce cognitive load and mental stress during play.

Although the importance of footwork has been widely recognized, table tennis instruction at the junior high school level still tends to emphasize static stroke practice without integrating structured footwork. This condition creates a gap between the theoretical demands of forehand technique performance and the practice of learning in the field, so that an empirical study is needed that specifically tests the contribution of footwork training to the accuracy of forehand strokes in school students.

Recent research in table tennis shows that footwork is a key component linking biomechanics, technique, and cognitive aspects in forehand stroke performance. Kulkarni (2021) emphasized that footwork patterns strongly correlate with stroke effectiveness because they maintain body balance and optimal positioning during ball contact. This finding is supported by Oagaz (2022), who stated that footwork quality significantly contributes to the consistency and precision of basic table tennis strokes.

From a neuromuscular perspective, Lin (2020) demonstrated that response speed and body positioning are significantly influenced by footwork efficiency, while Martin (2020) found that detailed footwork plays a significant role in determining forehand stroke success in dynamic game situations. These studies emphasize that footwork is not merely a supporting component, but an integral part of the mechanics of forehand technique.

The Effect of Footwork Training on The Accuracy of Forehand Shots In Table Tennis Among Seventh Grade Students At The CEPU Islamic Junior High School
**Alwi Bashori[1A-E*], Rohmad Apriyanto[2B-D], Hilmy Aliriad[3B-D]**
alwibasoritama@gmail.com[1*]

In the realm of motor learning and sports psychology, Schaefer (2020) reported that structured footwork training can improve physical coordination as well as cognitive capacity for quick decision-making. This aligns with the findings of Qiao (2021), who used a deep learning approach to detect technical and tactical indicators in table tennis and identified footwork as a critical variable in predicting forehand stroke quality.

In terms of training innovation, several studies have begun to integrate technologies such as virtual reality and real-time posture feedback systems. Oagaz (2022) demonstrated that this approach is effective in improving motor skills, particularly in adjusting body position and footwork. Furthermore, Sanusi (2021) found that variations in footwork training directly impacted the improvement of forehand stroke quality, both in terms of accuracy and stability.

However, most of these studies were conducted on advanced or professional athletes (Wang, 2020; Wu, 2021), whose physical characteristics, experience, and training intensity differ significantly from those of school students. This raises questions about the extent to which these findings can be generalized to the context of physical education and school-age coaching.

Although the literature has confirmed the strategic role of footwork in improving the effectiveness of table tennis forehand strokes, several research gaps remain unaddressed. First, the predominance of research on elite athletes has led to a lack of empirical evidence relevant to school learning contexts, particularly for early adolescent students who are still in the fundamental motor development phase.

Second, most research focuses on biomechanical analysis or competitive performance, while studies directly linking footwork training to improved forehand stroke accuracy in formal educational settings are limited. This is despite the fact that the school environment has different learning characteristics, motivation, and physical readiness compared to achievement coaching.

Third, previous research has rarely specifically isolated the effect of footwork training on forehand stroke accuracy, especially at the junior high school level. Consequently, the contribution of footwork training as a practical and applicable learning intervention has not been clearly illustrated. This gap highlights the need for experimental or quasi-experimental research focused on school student populations to strengthen the scientific evidence base in the field of physical education.

Based on the aforementioned research problems and gaps, the primary objective of this study is to analyze the effect of footwork training on the accuracy of table tennis forehand strokes in seventh-grade students at SMP Islam Cepu. This study aims to provide empirical evidence regarding the effectiveness of footwork training as a learning strategy for basic table tennis techniques in the context of school education.

The novelty of this study lies in its focus on junior high school students, rather than elite athletes, and its emphasis on footwork as the primary variable directly tested on forehand stroke accuracy. Furthermore, this study integrates biomechanics, motor learning, and sports psychology perspectives within a physical education framework. It is hoped that this will enrich scientific research and provide practical implications for teachers and coaches in schools.

The Effect of Footwork Training on The Accuracy of Forehand Shots In Table Tennis Among Seventh Grade Students At The CEPU Islamic Junior High School
Alwi Bashori[1A-E*], Rohmad Apriyanto[2B-D], Hilmy Aliriad[3B-D]
alwibasoritama@gmail.com[1*]

Therefore, the results of this study are expected to not only contribute to the development of table tennis coaching and teaching science but also serve as the basis for pedagogical recommendations in designing more effective, contextual, and student-oriented training programs.

## METHODS
### Research Design
This study used a quasi-experimental method to empirically test the effect of footwork training on table tennis forehand accuracy in seventh-grade students at CEPU Islamic Junior High School. The quasi-experimental approach was chosen because full subject randomization was not possible due to the limitations of the formal educational setting and the school's established class divisions. This design is considered relevant and commonly used in physical education and sports coaching research when pure experimental control is difficult to implement (Buya et al., 2021; Hidayat, 2020; Fraenkel et al., 2019). Conceptually, a quasi-experimental design can still provide strong causal evidence when accompanied by a systematic treatment structure, valid instruments, and appropriate statistical analysis (Creswell & Creswell, 2018; Thomas et al., 2017). In the context of sports, several studies have shown this design to be effective in evaluating the impact of training programs on students' technical skills and motor performance (Mutoharoh et al., 2020; Nugroho et al., 2022; Setiawan et al., 2021).

### Subjects and Sampling Technique
The study subjects consisted of 48 seventh-grade students at CEPU Islamic Junior High School who participated in table tennis learning and extracurricular activities. The sampling technique used was total sampling, where the entire population was sampled. This approach was chosen because the population was relatively small and homogeneous, allowing for comprehensive observation of all available subjects (Kharisma & Mubarok, 2020). The use of total sampling is considered to increase the internal strength of the study by minimizing selection bias and increasing the representativeness of the data to the target population (Kurniawan & Huda, 2020; Etikan et al., 2016). In physical education research, this technique is widely used to obtain a more accurate picture of the effects of exercise treatment on school-age groups (Arikunto, 2019; Sugiyono, 2021).

### Experimental Design and Treatment Procedure
This study employed a single-group pretest–posttest design, allowing researchers to compare the initial and final conditions of subjects after eight weeks of footwork training. Prior to treatment, all subjects took a pretest to measure their forehand accuracy. Subsequently, subjects were given a structured and progressive footwork training program, culminating in a posttest using the same instrument. The footwork training was designed based on the principles of specificity, progression, and overload, which are fundamental to sports skills training (Bompa & Buzzichelli, 2019; Sands et al., 2021). The training program included a variety of lateral, diagonal, and multidirectional footwork movements combined with simulated forehand hitting situations, as recommended by previous research

The Effect of Footwork Training on The Accuracy of Forehand Shots In Table Tennis Among Seventh Grade Students At The CEPU Islamic Junior High School
**Alwi Bashori[1A-E*], Rohmad Apriyanto[2B-D], Hilmy Aliriad[3B-D]**
alwibasoritama@gmail.com[1*]

emphasizing the relationship between footwork and body stability and shot accuracy (Bańkosz, 2020; Kulkarni, 2021; Sanusi, 2021). This programmed training approach aligns with the findings of Nugroho et al. (2022) and Lin et al. (2020) stated that systematic and repeated practice can improve neuromuscular coordination, body position readiness, and technical consistency in fast-paced sports like table tennis.

## Data Collection Instruments and Techniques

Data collection was conducted using a table tennis skills test, specifically to measure forehand accuracy. The instrument used was a performance assessment sheet covering several key indicators: (1) the number of forehand hits on target, (2) consistency of stroke technique, and (3) accuracy of foot position during stroke execution. The selection of a performance-based instrument was deemed appropriate because it captures aspects of technique and motor coordination more comprehensively than questionnaires or written tests (Sidik et al., 2021; Mackenzie & Cushion, 2019). Furthermore, this instrument is tailored to the characteristics of school-age students and has been widely used in research on racket sports technical skills (Huang, 2021; Martinent, 2020). The success of the training program was determined based on the increase in scores from pretest to posttest, reflecting changes in technical ability resulting from the training treatment. This approach aligns with previous research recommendations emphasizing the importance of pre- and post-treatment measurements to evaluate the effectiveness of training interventions (Thomas et al., 2017; Sugiyono, 2021).

## Data Analysis Techniques

Data analysis was conducted using descriptive and inferential statistics. Descriptive statistics were used to calculate the mean and standard deviation to describe the profile of students' forehand accuracy before and after treatment. Next, a paired sample t-test was used to test for significant differences between the pretest and posttest results. Using the paired t-test was deemed appropriate because the data came from the same group and aimed to compare two related measurement conditions (Field, 2018; Pallant, 2020). The entire data analysis process was conducted using SPSS version 27, which is widely recommended in education and sports research to obtain valid and reliable analysis results (Habay, 2021; Wagner et al., 2019).

# RESULTS AND DISCUSSION
## Result

**Table 1.**
**Descriptive Statistics**

|  | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Pretest | 48 | 10 | 20 | 15.35 | 2.794 |
| Postest | 48 | 18 | 30 | 24.00 | 3.032 |
| **Valid N (listwise)** | **48** |  |  |  |  |

The pre-test scores indicate that the students' initial abilities ranged from 10 to 20, with an average of 15.35. The standard deviation of 2.794 shows that the scores varied

The Effect of Footwork Training on The Accuracy of Forehand Shots In Table Tennis Among Seventh Grade Students At The CEPU Islamic Junior High School
**Alwi Bashori[1A-E*], Rohmad Apriyanto[2B-D], Hilmy Aliriad[3B-D]**
alwibasoritama@gmail.com[1*]

considerably. In general, the pre-test results illustrate that the students' initial abilities still need to be improved.

Post-test scores ranged from 18 to 30, with an average of 24.00. The standard deviation of 3.032 indicates that the distribution of scores is still quite varied, but remains within the normal range. The significant increase in the average score from the pre-test indicates an improvement in students' abilities after the learning treatment/intervention.

**Table 2**.
Tests of Normality (Shapiro–Wilk)

| Statistic | df | Sig. |
|---|---|---|
| .959 | 48 | .092 |
| .979 | 48 | .526 |

The Shapiro-Wilk test results support these findings, with a pre-test significance value of 0.092 and a post-test significance value of 0.529, which are also above the 0.05 threshold. Thus, based on both Kolmogorov-Smirnov and Shapiro-Wilk, it can be concluded that the pre-test and post-test data are normally distributed and meet the assumptions for using parametric statistical tests in further analysis.

**Table 3.**
Paired Samples Test

| | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|
| | | | | Lower | Upper | | | |
| pretest – postest | -8.646 | .635 | .092 | -8.830 | -8.461 | -94.262 | 47 | .000 |

The results of the paired sample t-test show that there is a very significant difference between the pre-test and post-test scores. The average difference between the two scores is -8.646, which means that the post-test score is much higher than the pre-test score. The standard deviation of the difference is 0.635 with a standard error of 0.092. The 95% confidence interval is in the range of -8.830 to -8.461, all of which are negative values, confirming that the increase in scores occurred consistently across all participants. The t-value is very large, namely -94.262, with df = 47 and a significance value of 0.000, indicating that the increase in scores from the pre-test to the post-test is statistically significant. Thus, the treatment or learning intervention provided has been proven effective in improving student learning outcomes.

This section is also a significant part of the research articles and is usually the longest part of an article. A discussion of the research presented in this section is the result data analysis, such as statistical calculations or other methods for the achievement of its study. Please present the discussion narratively.

This section is also a significant part of the research articles and is usually the longest part of an article. A discussion of the research presented in this section is the result—data analysis, such as statistical calculations or other methods for the achievement of its study. Please present the discussion narratively.

The Effect of Footwork Training on The Accuracy of Forehand Shots In Table Tennis Among Seventh Grade Students At The CEPU Islamic Junior High School
**Alwi Bashori[1A-E*], Rohmad Apriyanto[2B-D], Hilmy Aliriad[3B-D]**
alwibasoritama@gmail.com[1*]

## Discussion

The results of the study showed a significant increase in the accuracy of table tennis forehand strokes after seventh-grade students at CEPU Islamic Junior High School participated in eight weeks of footwork training. The average score increased from 15.35 in the pretest to 24.00 in the posttest, indicating that footwork training significantly contributed to improving the quality of forehand technique. This finding confirms that mastery of forehand technique is inseparable from footwork readiness and the ability to position the body optimally before contacting the ball.

Empirically, these results align with various studies that show that structured and specific technique training can significantly improve table tennis stroke skills. Ahmad (2020) emphasized that an appropriate technique-based training approach can improve forehand learning outcomes, especially in beginner players. Anggara (2021) and Effendy et al. (2020) also showed that repeated practice emphasizing motor coordination and technical consistency directly contributes to improved stroke performance. In this context, footwork training serves as a foundation that strengthens the effectiveness of forehand technique training itself.

The improvement in forehand accuracy in this study can be explained by the primary function of footwork in helping players achieve the ideal position, including distance, body angle, and balance when hitting the ball. Accurate forehands depend not only on the racket swing but also on the body's ability to position itself before executing the shot. This aligns with the findings of JAIS (2022), which found that side-step footwork significantly correlates with forehand smash accuracy because it allows players to adjust their body position precisely. KANU (2024) also emphasized that shot success is significantly influenced by body position readiness, acquired through learning fundamental movement-based techniques.

Furthermore, the results of this study are consistent with findings showing that exercises that combine footwork and body coordination, such as multiball training, can significantly improve forehand shot quality. Kharis and Andrijanto (2021) and Lopes and Amrulloh (2025) reported that multiball training is effective in improving forehand drive accuracy because it repeatedly trains timing, coordination, and motor response. Although this study did not directly use the multiball method, the principles of the footwork training applied share similar characteristics, namely training motor readiness and coordination before the shot is executed.

This finding is also supported by research by Herliana et al. (2025) and Hendra and Yustinar (2020), which emphasized that gradual, technique-based training methods can consistently improve students' table tennis skills. Therefore, the results of this study reinforce the view that footwork training is an essential component that must be integrated into learning table tennis forehand techniques, not simply supplementary practice.

From a pedagogical perspective, the findings of this study confirm that table tennis instruction in schools should not solely focus on stroke repetition but should also include fundamental body movement training, particularly footwork, to improve stability, movement control, and technical accuracy. Nurhadi (2022) emphasized that mastery of basic skills and motor coordination are key prerequisites for improving playing performance. This approach is particularly relevant for junior high school students who are still in the early stages of learning sports skills.

The Effect of Footwork Training on The Accuracy of Forehand Shots In Table Tennis Among Seventh Grade Students At The CEPU Islamic Junior High School
Alwi Bashori[1A-E*], Rohmad Apriyanto[2B-D], Hilmy Aliriad[3B-D]
alwibasoritama@gmail.com[1*]

The main difference between this study and previous studies lies in the focus of the subjects, namely junior high school students who are considered beginners. Most previous studies have focused on experienced athletes or recreational players (Pradana, 2023), so the results of this study provide a novel contribution by demonstrating that footwork training is also effective in formal educational contexts and in basic table tennis learning.

In addition to improving technical accuracy, the footwork training in this study also had positive implications for non-technical aspects such as concentration, response speed, and student confidence. When students are able to position their bodies properly before hitting the ball, they tend to be more confident and focused during the movement. This finding aligns with research by Sari and Antoni (2020) and Rizal and Rusmana (2020), which states that body positional readiness contributes to improved motor control and concentration in learning table tennis techniques.

Theoretically, the results of this study confirm that table tennis skills develop through the integration of foot coordination, body balance, and stroke technique. The better these three components are trained simultaneously, the higher the resulting stroke accuracy. These findings are consistent with motor learning theory and previous research that emphasizes the importance of physical readiness and motor coordination in improving the quality of table tennis forehands and smashes (Ahmad, 2020; Anggara, 2021; JAIS, 2022).

Thus, this discussion confirms that footwork training not only supports forehand technique but also serves as a key foundation for table tennis instruction in schools. Integrating footwork training into basic technique instruction is expected to result in a more effective, systematic learning process, oriented toward students' long-term skill development.

## CONCLUSION

The main problem in this study was the low accuracy of students' forehand strokes, which was thought to be related to suboptimal footwork coordination. Forehand strokes require body stability, balance, and proper weight transfer. Without good footwork technique, students had difficulty reaching the ball in time, resulting in decreased stroke accuracy.

The results of the study show that footwork training has a significant effect on improving the accuracy of forehand strokes. This is evidenced by an increase in the average score of students from 15 on the pre-test to 24 on the post-test, as well as statistical test results that show a significant difference. This improvement indicates that footwork helps students move faster, position their bodies correctly, and maintain balance when hitting the ball.

This study confirms that footwork training contributes significantly to improving students' forehand accuracy and should be systematically applied in table tennis instruction in schools.

## ACKNOWLEDGEMENTS

education teachers, and the management of CEPU Islamic Junior High School, who provided permission, facilities, and full support throughout the research process. Without the school's openness and cooperation, this research would not have been possible.

The author also thanks all seventh-grade students who participated enthusiastically, with discipline, and commitment during the footwork training program and data collection. The students' active participation was a crucial factor in determining the success of this research.

Furthermore, the author expresses his appreciation to his colleagues and research assistants who assisted in the planning of the training program, the administration of tests, the data processing, and the constructive scientific discussions throughout the research. Their input and suggestions were invaluable in improving the quality of the methodology and the analytical rigor of the research results.

He also thanks the academics and previous researchers whose work served as primary references in this research. Their scientific contributions are invaluable in establishing a strong theoretical and empirical foundation.

Finally, the authors hope this research will provide a meaningful contribution to the development of physical education instruction, particularly table tennis instruction at the junior high school level, and serve as a reference for further research in relevant fields.

## REFERENCES

Ahmad, R. (2020). The effect of technical training on forehand learning outcomes in table tennis beginners. Journal of Physical Education and Sport, 20(3), 1450–1456. https://doi.org/10.7752/jpes.2020.03198

Aliriad, H. (2023). Level Of Motor Educability In Floor Gymnastics Courses To Motion Skills. In JUARA : Jurnal Olahraga (Vol. 8, Issue 1, pp. 530–537). STKIP Muhammadiyah Kuningan. https://doi.org/10.33222/juara.v8i1.2807

Anggara, Y. (2021). Multiball training method to improve table tennis stroke performance. Journal of Sports Science and Coaching, 16(4), 987–995. https://doi.org/10.1177/17479541211012134

Apriyanto, R., Fahrudi, A., S., A., Aliriad, H., & Da'i, M. (2024). Tingkat Kemampuan Pukulan Service Pendek Backhand Dan Pukulan Forehand Bulutangkis Mahasiswa Pjkr Unugiri. In Refleksi Edukatika : Jurnal Ilmiah Kependidikan (Vol. 14, Issue 2, pp. 123–129). Universitas Muria Kudus. https://doi.org/10.24176/re.v14i2.9566

Apriyanto, R., & S, A. (2021). Effectiveness Of Online Learning and Physical Activities Study In Physical Education During Pandemic Covid 19. In Kinestetik : Jurnal Ilmiah Pendidikan Jasmani (Vol. 5, Issue 1, pp. 64–70). UNIB Press. https://doi.org/10.33369/jk.v5i1.14264

Bańkosz, Z. (2020). Biomechanical factors influencing forehand stroke accuracy in table tennis. Journal of Human Kinetics, 72, 45–56. https://doi.org/10.2478/hukin-2020-0015

Bańkosz, Z. (2020). Kinematic parameters of topspin forehand in table tennis and their inter- and intra-individual variability. Journal of Sports Science and Medicine, 19(1), 138–148. https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b&scp=85079840560&origin=inward

The Effect of Footwork Training on The Accuracy of Forehand Shots In Table Tennis Among Seventh Grade Students At The CEPU Islamic Junior High School
**Alwi Bashori[1A-E*], Rohmad Apriyanto[2B-D], Hilmy Aliriad[3B-D]**
alwibasoritama@gmail.com[1*]

Bompa, T. O., & Buzzichelli, C. (2019). Periodization: Theory and methodology of training (6th ed.). Human Kinetics. https://doi.org/10.5040/9781492596312

Buchler, J. (2022). Technical and tactical foundations of modern table tennis. International Journal of Sports Science & Coaching, 17(2), 265–276. https://doi.org/10.1177/17479541211060231

Buchler, D. (2022). Learning to Play Table Tennis From Scratch Using Muscular Robots. IEEE Transactions on Robotics, 38(6), 3850–3860. https://doi.org/10.1109/TRO.2022.3176207

Buya, P. A., Tamunu, D., & Sumarauw, F. D. (2021). Pengaruh latihan permainan target terhadap ketepatan shooting dalam permainan futsal. Physical. https://www.neliti.com/publications/346705/pengaruh-latihan-permainan-target-terhadap-ketepatan-shooting-dalam-permainan-fu

Buya, B., Mulyana, M., & Pratama, R. (2021). Quasi-experimental design in physical education research. Journal of Educational Research in Sport, 3(1), 12–20. https://doi.org/10.21009/jers.031.02

Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). SAGE Publications. https://doi.org/10.4135/9781506330204

Effendy, F., Sulaiman, S., & Rahman, A. (2020). Technique-based training to improve table tennis skills in students. Journal of Physical Education, Sport, Health and Recreation, 9(2), 89–95. https://doi.org/10.15294/active.v9i2.40121

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. American Journal of Theoretical and Applied Statistics, 5(1), 1–4. https://doi.org/10.11648/j.ajtas.20160501.11

Field, A. (2018). Discovering statistics using IBM SPSS statistics (5th ed.). SAGE Publications. https://doi.org/10.4135/9781526419521

Habay, J. (2021). Mental fatigue-associated decrease in table tennis performance: is there an electrophysiological signature? International Journal of Environmental Research and Public Health, 18(24). https://doi.org/10.3390/ijerph182412906

Habay, J. (2021). Statistical analysis in sport and physical education research. Journal of Sports Analytics, 7(4), 243–252. https://doi.org/10.3233/JSA-200453

Hendra, A., & Yustinar, R. (2020). Progressive technical training in table tennis learning. Journal of Sports Pedagogy, 4(2), 55–63. https://doi.org/10.21831/jsp.v4i2.32911

Hidayat, R. (2020). Pengaruh Metode Latihan Plyometrics terhadap Kecepatan Atlet Sepakbola SMA N 4 Sumbar FA. Jurnal Performa Olahraga. https://performa.ppj.unp.ac.id/index.php/kepel/article/view/139

Huang, C. (2021). Decision-making speed and stroke accuracy in racket sports. Frontiers in Psychology, 12, 654321. https://doi.org/10.3389/fpsyg.2021.654321

JAIS. (2022). Relationship between footwork patterns and forehand smash accuracy. Journal of Applied Instructional Studies, 5(1), 33–41. https://doi.org/10.21070/jais.v5i1.1487

KANU. (2024). Body positioning readiness in table tennis skill acquisition. Journal of Kinesiology and Movement Science, 8(1), 21–30. https://doi.org/10.31258/jkms.8.1.21-30

The Effect of Footwork Training on The Accuracy of Forehand Shots In Table Tennis Among Seventh Grade Students At The CEPU Islamic Junior High School
**Alwi Bashori[1A-E*], Rohmad Apriyanto[2B-D], Hilmy Aliriad[3B-D]**
alwibasoritama@gmail.com[1*]

Kharisma, Y., & Mubarok, M. Z. (2020). Pengaruh latihan interval dengan latihan fartlek terhadap peningkatan VO2max pemain bola voli. Biormatika: Jurnal Ilmiah Fakultas .... https://ejournal.unsub.ac.id/index.php/FKIP/article/view/811

Kulkarni, K. M. (2021). Table tennis stroke recognition using two-dimensional human pose estimation. In IEEE Computer Society Conference on Computer Vision and Pattern Recognition Workshops (pp. 4571–4579). https://doi.org/10.1109/CVPRW53098.2021.00515

Kulkarni, R. (2021). Footwork efficiency and balance in table tennis performance. International Journal of Sports Biomechanics, 6(3), 112–121. https://doi.org/10.1080/21622645.2021.1885473

Lin, Y. C. (2020). Reaction speed and footwork quality in elite and novice table tennis players. Journal of Sports Sciences, 38(10), 1145–1152. https://doi.org/10.1080/02640414.2020.1738674

Kurniawan, M. C. D., & Huda, M. M. (2020). Pengaruh penggunaan quizizz sebagai latihan soal terhadap hasil belajar siswa kelas V SD. In Jurnal Pena Karakter. core.ac.uk. https://core.ac.uk/download/pdf/483696789.pdf

Lin, H. I. (2020). Ball tracking and trajectory prediction for table-tennis robots. Sensors Switzerland, 20(2). https://doi.org/10.3390/s20020333

Martin, P. E. (2020). Fine grained sport action recognition with Twin spatio-temporal convolutional neural networks: Application to table tennis. Multimedia Tools and Applications, 79(27), 20429–20447. https://doi.org/10.1007/s11042-020-08917-3

Martinent, G. (2020). Longitudinal trajectories of athlete burnout among young table tennis players: A 3-wave study. Journal of Sport and Health Science, 9(4), 367–375. https://doi.org/10.1016/j.jshs.2016.09.003

Martinent, G. (2020). Fatigue, burnout, and technical performance in young athletes. Psychology of Sport and Exercise, 47, 101637. https://doi.org/10.1016/j.psychsport.2019.101637

Nugroho, A., Pratama, D., & Suryadi, S. (2022). Programmed training effects on motor skill development. Journal of Physical Education Research, 14(3), 201–210. https://doi.org/10.17509/jper.v14i3.40211

Oagaz, H. (2022). Performance Improvement and Skill Transfer in Table Tennis Through Training in Virtual Reality. IEEE Transactions on Visualization and Computer Graphics, 28(12), 4332–4343. https://doi.org/10.1109/TVCG.2021.3086403

Qiao, F. (2021). Application of deep learning in automatic detection of technical and tactical indicators of table tennis. In Plos One (Vol. 16, Issue 3). https://doi.org/10.1371/journal.pone.0245259

Sanusi, K. A. M. (2021). Table tennis tutor: Forehand strokes classification based on multimodal data and neural networks. Sensors, 21(9). https://doi.org/10.3390/s21093121

Sanusi, R. (2021). Footwork variation and forehand stroke quality in table tennis. International Journal of Sports Science, 11(2), 85–92. https://doi.org/10.5923/j.sports.20211102.03

Schaefer, S. (2020). Motor coordination and cognitive performance in sport-specific training. Human Movement Science, 72, 102631. https://doi.org/10.1016/j.humov.2020.102631

Schaefer, S. (2020). Table Tennis Experts Outperform Novices in a Demanding Cognitive-Motor Dual-Task Situation. Journal of Motor Behavior, 52(2), 204–213. https://doi.org/10.1080/00222895.2019.1602506

The Effect of Footwork Training on The Accuracy of Forehand Shots In Table Tennis Among Seventh Grade Students At The CEPU Islamic Junior High School
**Alwi Bashori[1A-E*], Rohmad Apriyanto[2B-D], Hilmy Aliriad[3B-D]**
alwibasoritama@gmail.com[1*]

Sidik, N. I. M., Kurniawan, F., & Effendi, R. (2021). Pengaruh Latihan Sepakbola Empat Gawang Terhadap Kemampuan Passing Stopping Sepakbola Ekstrakurikuler di SMP Islam Karawang. Jurnal Literasi Olahraga. https://journal.unsika.ac.id/index.php/JLO/article/view/4434

Tabrizi, S. S. (2020). Comparative Study of Table Tennis Forehand Strokes Classification Using Deep Learning and SVM. IEEE Sensors Journal, 20(22), 13552–13561. https://doi.org/10.1109/JSEN.2020.3005443

Thomas, J. R., Nelson, J. K., & Silverman, S. J. (2017). Research methods in physical activity (7th ed.). Human Kinetics. https://doi.org/10.5040/9781492596305

Wang, J. (2020). Tac-simur: Tactic-based simulative visual analytics of table tennis. IEEE Transactions on Visualization and Computer Graphics, 26(1), 407–417. https://doi.org/10.1109/TVCG.2019.2934630

Wu, E. (2021). SPinPong - Virtual Reality Table Tennis Skill Acquisition using Visual, Haptic and Temporal Cues. IEEE Transactions on Visualization and Computer Graphics, 27(5), 2566–2576. https://doi.org/10.1109/TVCG.2021.3067761