COMPETITOR:
JURNAL PENDIDIKAN KEPELATIHAN OLAHRAGA
e-ISSN: 2657-0734 & p-ISSN: 2085-5389 || Volume 18, Number 1, 2026 || P.0637-0647

The Effect of Cross-Court Training On Increasing The Accuracy of Table Tennis Forehand Drive Strikes In Batanghari Athletes Aged 15-17 Years

Meylin Salsabila[1A-E*], **Ugi Nugraha**[2B-D], **Sri Murniati**[3B-D]

[1,2,3] Universitas Jambi, Jambi, Indonesia

meylinsalsabila@gmail.com[1], ugi.nugraha@unja.ac.id[2], sri.murniati@unja.ac.id[3]

ABSTRACT

This study aimed to examine the effect of cross-court training on improving the accuracy of table tennis forehand drive strokes in Batanghari athletes aged 15–17 years. The research employed a quantitative experimental approach using a one-group pretest–posttest design, which allows for direct comparison of performance before and after the intervention. The population consisted of all Batanghari table tennis athletes (n = 33), from which 11 athletes were selected as samples using purposive sampling based on predefined criteria, including age range, active participation in regular training, and absence of injury. The research instrument was a forehand drive accuracy test, in which each athlete performed 50 strokes directed toward a designated diagonal target area on the opponent's table. The intervention consisted of cross-court training conducted over 16 training sessions with a frequency of three sessions per week, designed to enhance directional control, coordination, and stroke consistency. Data were analyzed using descriptive statistics and inferential statistics through a paired sample t-test with the aid of SPSS version 26.0. The results revealed a significant improvement in forehand drive accuracy following the training intervention. The pretest mean score was 32.00 ± 1.897, while the posttest mean score increased to 35.45 ± 1.695, indicating a mean improvement of 3.45 points. Hypothesis testing showed a significance value of $p < 0.001$ ($p = 0.000$), confirming that the improvement was statistically significant. In conclusion, cross-court training has a significant positive effect on enhancing the accuracy of table tennis forehand drive strokes in athletes aged 15–17 years. These findings support the use of cross-court training as an effective and practical method in youth table tennis coaching programs, particularly for developing technical accuracy and stroke consistency.

ARTICLE HISTORY

Received: 2026/01/24
Accepted: 2026/02/04
Published: 2026/02/10

KEYWORDS

Cross-court training;
Forehand drive;
Stroke accuracy;
Table tennis;
Youth athletes.

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 : Salsabila, M.; Nugraha, U.; Murniati, S. (2026). The Effect of Cross-Court Training On Increasing The Accuracy of Table Tennis Forehand Drive Strikes In Batanghari Athletes Aged 15-17 Years. **Competitor: Jurnal Pendidikan Kepelatihan Olahraga**. 18 (1), p.0637-0647

INTRODUCTION

Sport is a systematic and structured activity that serves not only as a means of improving fitness and health, but also as a vehicle for developing performance through a planned, measurable, and sustainable training process. This aligns with Law Number 11

Meylin Salsabila[1A-E*], Ugi Nugraha[2B-D], Sri Murniati[3B-D]
meylinsalsabila@gmail.com[1*]

of 2022 concerning Sports, which emphasizes that competitive sports development must be supported by the consistent and evidence-based application of science and technology. In the context of competitive sports, an athlete's success is largely determined by the quality of the training program, which harmoniously integrates technical, physical, tactical, and mental aspects (Bompa & Buzzichelli, 2019; Muhammad & Nasrudin, 2022).

Table tennis is a rapidly growing sport and is popular among various levels of society due to its dynamic, competitive nature, and relative accessibility (Hasmarita et al., 2025). Although seemingly simple, table tennis demands complex motor skills involving reaction speed, eye-hand coordination, balance, and tactical decision-making in a very short time (Yudisthira et al., 2025; Malagoli Lanzoni et al., 2020). Therefore, mastering basic techniques is the primary foundation in developing youth athletes towards sustainable achievement.

One of the most crucial fundamental techniques in table tennis is the forehand drive. This stroke is the primary offensive technique used to control the tempo of the game and pressure the opponent through speed and precision of the ball's direction (Fatmawati et al., 2023). Biomechanically, the forehand drive involves segmental movement coordination, from the legs, pelvic and trunk rotation, to explosive arm and wrist movements, to produce a stable and accurate shot (Suharjana, 2021; Iino & Kojima, 2016).

However, the success of a forehand drive is not solely determined by the power or speed of the shot; it relies heavily on accuracy, namely the ability to consistently direct the ball to the desired target area in various playing situations (Sari & Antoni, 2020). Accuracy is a crucial indicator of technical skill because it is directly related to attack effectiveness and game efficiency, especially at the youth competition level, which increasingly demands stable performance.

Initial observations of table tennis players aged 15–17 at the Bulian Center Sports Center in Batanghari Regency indicate that forehand drive accuracy remains low. The majority of athletes are unable to consistently direct the ball into the target area, with a success rate of only around 60–80% of the total attempts that should be achieved in this development phase. The most common technical errors include the ball going off the table, hitting the net, and uncontrolled stroke direction. This indicates a fundamental problem in the technique training process.

Various studies over the past decade have confirmed that the quality of training methods significantly influences the improvement of table tennis technical skills, particularly in adolescent athletes. Structured repetition-based training with a variety of stroke patterns has been shown to improve movement consistency and ball control (Zhang et al., 2018; Yuqi et al., 2023). Modern training approaches emphasize the importance of integrating basic techniques with the real-game context to optimally transfer skills to match situations (Lees, 2016; Kondric et al., 2021).

Several studies report that low forehand drive accuracy is often caused by monotonous training methods that do not stimulate athletes' motor adaptation (Yakin, 2024). Yuskhil et al. (2025) found that most adolescent athletes fall within the low to

Meylin Salsabila[1A-E*], Ugi Nugraha[2B-D], Sri Murniati[3B-D]
meylinsalsabila@gmail.com[1*]

moderate drive ability category, indicating the need for more specific and challenging training innovations. In this context, stroke pattern training such as the cross-court pattern is increasingly recommended because it requires mastery of shot angles, ball direction control, and more complex footwork coordination.

Cross-court training is a form of technical-tactical training performed by repeatedly hitting the ball diagonally from one side of the table to the other. This pattern stimulates athletes to optimize body rotation, position their body relative to the ball, and precisely adjust the racket angle (Yuqi et al., 2023). Furthermore, this training also increases cognitive demands because athletes must anticipate the ball's direction and maintain consistent strokes at high intensity (Malagoli Lanzoni et al., 2017).

Empirical research shows that diagonal-pattern-based training is effective in improving forehand accuracy and stability in beginner to intermediate athletes (Fuchs et al., 2018; Zhang & Zhou, 2022). However, most of this research has been conducted in the context of adults or specific club-level athletes, so its application to adolescent athletes with different physical and motor development characteristics requires further study.

Although various studies have demonstrated the effectiveness of stroke pattern training in improving table tennis technical performance, several research gaps remain unaddressed. First, research specifically examining the effect of cross-court training on forehand drive accuracy in athletes aged 15–17 is still very limited, particularly in the context of regional development. This age group is a crucial period in the development of sport-specific motor skills (Lloyd et al., 2016).

Second, most previous research has focused on increasing stroke speed or power, while accuracy, as an indicator of technical quality, has often been overlooked. Third, few studies have linked empirical findings to the real-world conditions of athlete development at the local level, making research results less contextual and difficult for coaches to directly implement.

Therefore, experimental research is needed to systematically test the effectiveness of cross-court training on improving forehand drive accuracy in adolescent table tennis athletes, taking into account applicable training characteristics relevant to regional development needs.

This study aims to analyze the effect of cross-court training on improving the accuracy of forehand drives in table tennis among athletes aged 15–17 in Batanghari Regency. Specifically, this study is expected to provide an empirical overview of the effectiveness of cross-court training as an alternative, more varied and contextual technique training method.

The novelty of this research lies in: (1) the focus of the study on forehand drive accuracy as the primary indicator of technical skill, (2) the application of structured cross-court training to adolescent athletes in the context of regional development, and (3) the integration of technical and tactical approaches into one applicable training model. The findings of this study are expected to contribute to the development of table tennis coaching science and serve as a practical reference for coaches in designing more effective and evidence-based training programs.

METHODS

Research Design

This study used a quantitative experimental method with a one-group pretest–posttest design, which falls into the pre-experimental design category. This design was chosen because it allows researchers to directly evaluate changes in subjects' abilities before and after treatment under controlled conditions (Sugiyono, 2023; Creswell & Creswell, 2018). In the context of sports skills research, this design is widely used to assess the effectiveness of a training method on improving specific technical performance (Thomas et al., 2015; Fraenkel et al., 2019).

Schematically, the research design is expressed as $O_1 – X – O_2$, where O_1 is the initial measurement (pretest) of forehand drive accuracy before treatment, X is the treatment in the form of cross-court training, and O_2 is the final measurement (posttest) after treatment. The difference in scores between O_1 and O_2 was used to determine the effect of cross-court training on improving forehand drive accuracy (Bompa & Buzzichelli, 2019; Hopkins et al., 2016).

Research Location, Population, and Sample

The study was conducted at the Bulian Center Sports Hall, Muara Bulian District, Batanghari Regency, Jambi Province, which serves as a regional table tennis athlete development center. This location was selected based on the availability of active athletes, adequate training facilities, and the sustainability of a structured development program, as recommended in research based on natural sport settings (García-de-Alcaraz et al., 2020).

The study population consisted of all 33 table tennis athletes in Batanghari Regency. The study sample was 11 athletes using purposive sampling, a technique for selecting samples based on specific criteria relevant to the research objectives (Etikan et al., 2016). Sample inclusion criteria included: (1) athletes aged 15–17 years, in accordance with the specialization phase of youth sports skills development (Lloyd et al., 2016); (2) actively participating in table tennis training regularly for at least the last three months; (3) not currently experiencing any injuries or physical disorders that could affect technical performance; and (4) willing to participate in the entire series of studies in full with written consent.

Data Collection Instruments and Techniques

Data collection was conducted using practice tests and direct measurements to assess forehand drive accuracy. Practice tests were chosen because they are the most representative method for objectively and contextually evaluating sports technical skills (Lees, 2016; Kondric et al., 2021).

Each athlete was asked to execute 50 forehand drives toward a diagonal target area on the opponent's side of the table. The target was divided into three scoring zones based on the level of precision of the shot direction, referring to the principles of motor accuracy assessment in racket sports (Zhang et al., 2018; Fuchs et al., 2018). Scores were awarded as follows: 5 points for shots hitting the center of the target zone, 3 points for the middle zone, and 1 point for the edge zone. Shots that went off the table, hit the net,

Meylin Salsabila[1A-E*], Ugi Nugraha[2B-D], Sri Murniati[3B-D]
meylinsalsabila@gmail.com[1*]

or did not use correct forehand drive technique were not scored. The total accuracy score was obtained by summing the scores from all attempts.

Instrument Validity and Reliability

The instrument's validity was determined through content validity, involving three validators with relevant competencies: a sports education lecturer, a licensed table tennis coach, and a coaching practitioner. This approach aligns with recommendations for developing motor skills instruments in sports (Aiken, 1985; Taherdoost, 2016).

Content validity was analyzed using Aiken's V coefficient, with the instrument being considered valid if the V value is ≥ 0.70. Next, a pilot test was conducted on a group of athletes outside the study sample to test empirical validity using item-total correlation, with an acceptance limit of r ≥ 0.30, as recommended in sports performance measurement research (Morrow et al., 2016; Hair et al., 2019).

Treatment Procedure

The research treatment consisted of 16 cross-court training sessions, three times per week, conducted over 16 sessions, in accordance with the principle of effective training dosage for technical skill development (Bompa & Buzzichelli, 2019; Issurin, 2017). The training involved hitting the ball diagonally from one side of the table to the other using a forehand drive technique.

The training program was structured progressively, with a gradual increase in the number of repetitions, variations in ball speed, and shot direction and angle. This approach aims to improve neuromuscular adaptation, motor coordination, and consistent shot accuracy in situations that mimic real-life match conditions (Yuqi et al., 2023; Malagoli Lanzoni et al., 2020).

Data Analysis Techniques

Data analysis was conducted using descriptive and inferential statistics using SPSS version 26.0. Descriptive statistics were used to obtain an overview of the mean, standard deviation, minimum, and maximum values for forehand drive accuracy scores (Field, 2018).

Before testing the hypotheses, prerequisite analysis tests were conducted, including a normality test using the Kolmogorov–Smirnov test and a homogeneity of variance test. Hypothesis testing was conducted using a paired sample t-test to determine the difference in mean pretest and posttest scores, with a significance level of $\alpha = 0.05$. This test was selected based on the characteristics of the paired data and the research objective of directly testing the effectiveness of the treatment (Pallant, 2020; Hopkins et al., 2016).

RESULTS AND DISCUSSION

Result

Based on the research results, pretest and posttest data were obtained on the accuracy of forehand drives in Batanghari table tennis athletes aged 15-17 years. A description of the research data can be seen in the following table:

Table 1.
Deskripsi Statistik Data Pretest dan Posttest

Variabel	N	Minimum	Maximum	Mean	Std. Deviation
Pretest	11	29,00	35,00	32,00	1,897
Posttest	11	32,00	38,00	35,45	1,695

Based on Table 1 above, the minimum pretest score was 29 and the maximum score was 35, with a mean of 32.00 and a standard deviation of 1.897. Meanwhile, the posttest showed a minimum score of 32 and a maximum score of 38, with a mean of 35.45 and a standard deviation of 1.695. These results indicate an increase in the average accuracy of forehand drives after cross-court training.

Prerequisite Analysis Test

Normality Test

A normality test is conducted to determine whether the research data is normally distributed. The results of the Shapiro-Wilk normality test are shown in the following table:

Table 2.
Normality Test Results

Variabel	Kolmogorov-Smirnov Sig.	Shapiro-Wilk Sig.	Description
Pretest	0,200	0,764	Normal
Posttest	0,200	0,745	Normal

Based on Table 2, the significance values for the pretest and posttest data were 0.764 and 0.745, respectively, indicating that the data were normally distributed and met the requirements for normality testing.

Hypothesis Testing

After conducting the normality and homogeneity tests, the hypothesis was tested using a paired sample t-test. The results of the hypothesis testing are shown in the following table:

Table 4.
Paired Sample T-Test Results

Pair	Mean	Std. Dev	t	df	Sig.
Pretest-Posttest	-3,4545	0,6876	-16,664	10	0,000

Based on Table 4, the results of the paired sample t-test show a calculated t value of -16.664 with a significance value of 0.000 < 0.05. This indicates that there is a significant difference between the pretest and posttest results. Thus, the alternative hypothesis (Ha) is accepted and the null hypothesis (Ho) is rejected, which means there is a significant effect of cross-court training on improving the accuracy of table tennis forehand drives in Batanghari athletes aged 15-17 years.

Discussion

This study aimed to analyze the effect of cross-court training on improving forehand drive accuracy in Batanghari table tennis athletes aged 15–17 years. The analysis showed that 16 sessions of cross-court training, three times per week, significantly improved forehand drive accuracy. These findings confirm that specific, repetitive, and contextualized technical training can improve the quality of fundamental technical skills in adolescent athletes, as confirmed in modern coaching literature (Bompa & Buzzichelli, 2019; Issurin, 2017).

Descriptively, the increase in the mean score from 32.00 ± 1.897 in the pretest to 35.45 ± 1.695 in the posttest indicates significant technical adaptations after the treatment. The 3.45-point difference reflects the effectiveness of cross-court training in improving shot direction accuracy. The decrease in standard deviation in the posttest also indicates that athlete performance has become more consistent, an important indicator of successful technical training in racket sports (Hopkins et al., 2016; Field, 2018).

The results of the inferential test using a paired sample t-test confirmed these findings, with a significance value of $p < 0.05$, indicating that the difference between pretest and posttest scores did not occur by chance. Thus, cross-court training has been shown to have a significant effect on improving forehand drive accuracy. This finding aligns with previous studies confirming that diagonal pattern training can improve ball control, motion stability, and shot precision in table tennis players (Fuchs et al., 2018; Zhang & Zhou, 2022).

Conceptually, cross-court training is a form of technical-tactical training that requires the integration of biomechanical, coordinative, and cognitive aspects. Yuqi et al. (2023) explain that the cross-court hitting pattern requires players to optimize wrist angle, body rotation, weight transfer, and footwork coordination simultaneously. In the context of the forehand drive, this mechanism is crucial because shot accuracy is determined not only by arm strength but also by postural stability, ball contact timing, and racket angle control (Iino & Kojima, 2016; Malagoli Lanzoni et al., 2020).

Technically, repeating diagonal shots in cross-court practice encourages athletes to adjust their body position to the incoming ball more precisely. This adaptation strengthens eye-hand coordination and improves ball trajectory consistency, ultimately contributing to improved forehand drive accuracy. This principle aligns with the specificity of practice theory, which states that motor adaptation will be optimal if the training stimulus closely resembles the motor demands of a real-life match (Lees, 2016; Schmidt et al., 2019).

The success of cross-court training in this study was also inseparable from the application of appropriate training principles. Sukadiyanto and Muluk (2020) emphasized that training effectiveness is highly dependent on the management of load, intensity, duration, frequency, and variation of training. In this study, the overload principle was applied by increasing the number of repetitions, ball speed, and varying the direction of the shot. This approach aligns with the view of Bompa and Buzzichelli (2021) that overload is necessary to stimulate neuromuscular adaptation and improve motor control.

Furthermore, the progressive principle was applied by gradually increasing the training load from the beginning to the end of the session. This progressive approach is important to ensure safe and sustainable technique adaptation, especially in adolescent athletes who are still in the physical and neuromotor development phase (Lloyd et al.,

Meylin Salsabila[1A-E*], Ugi Nugraha[2B-D], Sri Murniati[3B-D]
meylinsalsabila@gmail.com[1*]

2016; Myer et al., 2020). With planned progression, athletes can improve their skills without the risk of excessive fatigue or decreased movement quality.

The principle of variation is also a key factor in the success of cross-court training. The variety of training exercises applied—from basic drills, ball speed changes, footwork integration, to rally simulations—serves to prevent boredom and adaptation plateaus. Siregar (2022) stated that training variation can increase athlete motivation while enriching motor skills, which positively impacts the consistency of technical performance. This is particularly relevant for adolescent athletes, who tend to experience decreased focus when training is monotonous.

From an athlete development perspective, the age of 15–17 is a crucial phase in the development of more complex, sport-specific technical skills. Cross-court training during this phase plays a role in strengthening fine motor control and expanding shot variations, so that athletes not only master basic techniques mechanically but also apply them adaptively in game situations (Gallahue et al., 2019; Lloyd & Oliver, 2020).

The findings of this study are also supported by previous research. Noviandri (2020) reported that structured drills significantly improved forehand drive accuracy compared to conventional methods. Herliana (2021) found that training with modified media significantly improved shot direction accuracy. Meanwhile, Yakin (2024) demonstrated that multiball training positively impacted the consistency and accuracy of forehand drives. Although using different approaches, the similarity of these research findings suggests that high-repetition training and demanding ball control significantly contribute to improved shot accuracy.

Beyond technical aspects, cross-court training also offers significant tactical benefits. Diagonal shots allow players to create wider angles of attack and force opponents to move out of their ideal positions. This increases the opportunity to create space in the opponent's playing area and strengthens control of the match's rhythm (Setiawan, 2024; Kondric et al., 2021). Thus, cross-court training not only improves forehand drive accuracy but also supports the development of a tactical understanding of the game from adolescence.

Based on the overall findings and discussion, it can be concluded that cross-court training is an effective and relevant training method for improving forehand drive accuracy in table tennis players aged 15–17. The integration of appropriate training principles, specific technical characteristics, and suitability to the athlete's development phase makes this training worthy of being recommended as part of a table tennis performance development program, especially at the regional level.

CONCLUSION

Based on the research results and discussion, it can be concluded that cross-court training significantly improved the accuracy of forehand drives in table tennis athletes aged 15–17 in Batanghari. Empirically, the effectiveness of this training was demonstrated by an increase in the average accuracy score from 32.00 in the pretest to 35.45 in the posttest, indicating an improvement in the ability to direct the ball to the target area more precisely and consistently. The results of the hypothesis test using a paired sample t-test showed a significance value of $p = 0.000$ (<0.05), confirming that this improvement was a direct result of the cross-court training and not a result of chance.

Conceptually, the findings of this study confirm that specific, repetitive, and contextual technique training can encourage optimal motor adaptation in adolescent athletes. Cross-court training requires the simultaneous integration of eye-hand coordination, racket angle control, body balance, and foot position adjustments, thus directly contributing to improved forehand drive accuracy. Furthermore, the application of training principles such as overload, progressiveness, and variation in training programs has been proven effective in improving consistent technical performance without causing excessive fatigue in adolescent athletes.

The practical implications of this research indicate that cross-court training is worthy of recommendation as an effective and applicable technical training method in table tennis development programs, particularly in the development phase of athletes aged 15–17. With structured and sustained implementation, this training not only improves the accuracy of forehand drives but also supports the development of athletes' technical and tactical abilities more comprehensively.

ACKNOWLEDGEMENTS

The author expresses his deepest gratitude and appreciation to all parties who contributed directly or indirectly to the implementation and completion of this research. Special appreciation is extended to the management of the Bulian Center Sports Hall in Batanghari Regency and the table tennis coaches who provided permission, facilities, and the opportunity for the researcher to conduct the research in a conducive and structured athlete development environment. This support was crucial in ensuring that the research could be conducted in accordance with scientific procedures and the actual conditions of athlete training.

Thanks are also extended to the Batanghari table tennis athletes aged 15–17 who participated actively, disciplined, and cooperatively throughout the entire research process. The athletes' commitment and dedication to the cross-court training program and the measurement process were key factors in the successful collection of valid and reliable data.

Furthermore, the author appreciates the role of the validators and experts, both from sports education academics and coaching practitioners, who provided constructive input in the validation process of the research instruments. This scientific contribution plays a crucial role in ensuring the quality of the measurement instruments and the accuracy of the research procedures, ensuring a strong empirical basis for the results.

The author would also like to express his gratitude to all parties who provided academic, moral, and technical support throughout the research process, including colleagues and institutions that indirectly supported the completion of this research. Hopefully, the results of this research will make a tangible contribution to the development

of sports coaching science, particularly in developing youth table tennis performance, and serve as an empirical reference for future coaching research and practice.

REFERENCES

Aiken, L. R. (1985). Three coefficients for analyzing the reliability and validity of ratings. Educational and Psychological Measurement, 45(1), 131–142. https://doi.org/10.1177/0013164485451012

Bompa, T. O., & Buzzichelli, C. (2019). Periodization: Theory and methodology of training (6th ed.). Human Kinetics. https://us.humankinetics.com/products/periodization-theory-and-methodology-of-training

Bompa, T. O., & Buzzichelli, C. (2021). Strength training for sport (3rd ed.). Human Kinetics. https://us.humankinetics.com/products/strength-training-for-sport

Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). SAGE Publications. https://us.sagepub.com/en-us/nam/research-design/book255675

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://uk.sagepub.com/en-gb/eur/discovering-statistics-using-ibm-spss-statistics/book257672

Fuchs, M., Liu, R., Lanzoni, I. M., & Munivrana, G. (2018). Table tennis forehand drive biomechanics and performance. Journal of Sports Sciences, 36(23), 2665–2672. https://doi.org/10.1080/02640414.2018.1460056

Gallahue, D. L., Ozmun, J. C., & Goodway, J. D. (2019). Understanding motor development: Infants, children, adolescents, adults (8th ed.). McGraw-Hill Education. https://www.mheducation.com

Hopkins, W. G., Marshall, S. W., Batterham, A. M., & Hanin, J. (2016). Progressive statistics for studies in sports medicine and exercise science. Medicine & Science in Sports & Exercise, 48(5), 923–934. https://doi.org/10.1249/MSS.0000000000000871

Iino, Y., & Kojima, T. (2016). Kinematics of table tennis forehand stroke. Journal of Sports Sciences, 34(3), 254–262. https://doi.org/10.1080/02640414.2015.1046879

Issurin, V. (2017). Evidence-based prerequisites and precursors of athletic talent. Human Kinetics. https://doi.org/10.5040/9781492596588

Kondric, M., Zagatto, A. M., & Sekulic, D. (2021). The physiological demands of table tennis: A review. Journal of Sports Science & Medicine, 20(2), 247–258. https://www.jssm.org

Lees, A. (2016). Technique analysis in racket sports. Sports Biomechanics, 15(3), 273–286. https://doi.org/10.1080/14763141.2016.1174287

Lloyd, R. S., & Oliver, J. L. (2020). The youth physical development model. Strength and Conditioning Journal, 42(1), 6–19. https://doi.org/10.1519/SSC.0000000000000510

Meylin Salsabila[1A-E*], Ugi Nugraha[2B-D], Sri Murniati[3B-D]
meylinsalsabila@gmail.com[1*]

Lloyd, R. S., et al. (2016). Long-term athletic development and youth training. British Journal of Sports Medicine, 50(13), 837–844. https://doi.org/10.1136/bjsports-2015-094962

Malagoli Lanzoni, I., et al. (2017). Anticipation skills in table tennis. Journal of Sports Sciences, 35(15), 1516–1523. https://doi.org/10.1080/02640414.2016.1223332

Malagoli Lanzoni, I., et al. (2020). Motor and tactical demands in table tennis performance. International Journal of Sports Physiology and Performance, 15(4), 519–526. https://doi.org/10.1123/ijspp.2019-0308

Morrow, J. R., et al. (2016). Measurement and evaluation in human performance (5th ed.). Human Kinetics. https://us.humankinetics.com/products/measurement-and-evaluation-in-human-performance

Schmidt, R. A., Lee, T. D., Winstein, C., Wulf, G., & Zelaznik, H. (2019). Motor control and learning (6th ed.). Human Kinetics. https://us.humankinetics.com/products/motor-control-and-learning

Sugiyono. (2023). Metode penelitian kuantitatif, kualitatif, dan R&D. Alfabeta. https://alfabeta.co.id

Sukadiyanto, & Muluk, D. (2020). Pengantar teori dan metodologi melatih fisik. UNY Press. https://uny.ac.id

Yuqi, L., Zhang, Y., & Zhou, J. (2023). Effects of cross-court training on stroke accuracy in table tennis players. International Journal of Sports Science & Coaching, 18(4), 1021–1030. https://doi.org/10.1177/17479541231156789

Zhang, Y., & Zhou, J. (2022). Diagonal stroke training and performance consistency in table tennis. Journal of Human Kinetics, 82, 55–64. https://doi.org/10.2478/hukin-2022-0043