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The Effect of Sepak Sila Training on Ball Control In The Game of Sepak Takraw

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ABSTRACT

This study aims to analyze the effect of sepak sila trainingon improving ball control skills in male students at SMAN 1 Dampelas. Conceptually, sepak takraw is a fundamental basic technique that plays a role in maintaining stability, coordination, and accuracy of ball contact, thus serving as the main foundation for mastery of the game. The study used an experimental method with a pretest-posttest design in one treatment group. The sample consisted of 10 male students actively participating in sepak takraw extracurricular activities. The intervention, a sepak sila trainingprogram, was implemented in a structured and systematic manner throughout the study period. Data were collected through ball control ability tests before and after the treatment. Statistical analysis using a paired sample t-test showed a significant improvement, with a calculated t-value of 26.55, greater than the t-table of 2.262 at a significance level of $\alpha = 0.05$ (df = 9). Descriptively, the average ball control ability score increased from 6.2 in the pretest to 13.9 in the posttest. These findings demonstrate that specific technique training designed based on the principles of specificity and progression can optimize students' neuromuscular coordination and postural control. Therefore, sepak sila traininghas been shown to be effective in improving ball control and is worthy of recommendation as a core component of sepak takraw development programs at the secondary school level.

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INTRODUCTION

Sepak takraw is a sport deeply rooted in Southeast Asian culture and emphasizes not only physical skills but also ethical values, discipline, and sportsmanship, known as the sepak sila (silat) concept, symbolizing control, balance, and harmony of movement (Wiyaka et al., 2024). In the context of school sports development, internalizing these values must be accompanied by adequate mastery of basic techniques. One fundamental technique that determines the quality of play is sepak takraw, which involves kicking the ball using the inside of the foot in a cross-legged position to control, receive, and pass the ball stably (Hanif, 2023; Fajri Hasim et al., 2024).

Biomechanically, sepak takraw requires good neuromuscular coordination, postural control, dynamic balance, and precise perception-action skills (Ismail et al., 2022; Lim & Yusof, 2021). Mastery of this technique significantly contributes to accurate ball control and effective game transitions (Mongsidi & Rusli, 2023). However, in extracurricular coaching practices at schools, mastery of basic techniques often fails to develop optimally due to a monotonous training approach, a lack of variety, and a lack of scientific principles of training periodization (Bompa & Buzzichelli, 2019; Suchomel et al., 2018).

Preliminary observations of the sepak takraw extracurricular activities at SMAN 1 Dampelas indicate that despite regular training, individual skill improvement particularly ball control through sepak takraw has not shown significant progress. Several identified factors include a lack of systematic training program design, limited variety of training methods, limited infrastructure, and low motivation and commitment among some students to consistently participate in training (Januari Alfredo et al., 2020). Theoretically, training effectiveness is strongly influenced by the principles of specificity, progressiveness, and individualization (Turner, 2017; Lloyd et al., 2016). Without proper planning, repeated practice does not automatically improve technical skills. On the other hand, studies in the context of game sports show that strengthening basic skills integrated with balance and body control training can significantly improve technical performance (Granacher et al., 2018; Chaouachi et al., 2017). Therefore, the main problem of this study lies in the low effectiveness of soccer training in improving ball control, which impacts the quality of play of male students at SMAN 1 Dampelas.

Over the past decade, research on sepak takraw performance has grown, particularly in biomechanics, physiology, and technical skill development (Aziz et al., 2019; Rahman et al., 2021). Empirical studies have shown that ball control in sepak takraw relies heavily on core stability, dynamic balance, and coordination between body segments (Behm et al., 2015; Prieske et al., 2016). Training focused on strengthening balance and neuromuscular control has been shown to improve fundamental technical skills in various sports (Lesinski et al., 2016; Bouteraa et al., 2020). In sepak takraw, the ability to maintain the body's center of gravity while performing sepak takraw determines the accuracy and consistency of contact with the ball (Ismail et al., 2022). A skill-based training approach combined with coordination exercises has been shown to be effective in improving ball control accuracy in adolescent athletes (Hammami et al., 2016; Clemente et al., 2019). Furthermore, repetitive practice with appropriate technical feedback can accelerate motor adaptation and improve movement efficiency (Schmidt & Lee, 2019).

Other research confirms that the development of basic techniques in adolescence must consider the motor development and neuromuscular adaptation phases (Lloyd & Oliver, 2017). During this phase, the nervous system is highly plastic, so responses to technical training are optimal if designed systematically (Myer et al., 2015). In the context of physical education and extracurricular activities, training models that are applicable and contextualized to the needs of real-life games are more effective than conventional approaches that focus solely on repetition without variation (Côté & Vierimaa, 2014; Mongsidi & Rusli, 2023). Thus, conceptually and empirically, structured soccer training

has the potential to significantly improve ball control. Although various studies have examined the technical and performance aspects of sepak takraw, most have focused on competitive-level athletes or professional clubs (Aziz et al., 2019; Rahman et al., 2021). Research specifically examining the effect of sepak sila trainingon ball control in the context of extracurricular development in secondary schools is still limited.

Furthermore, previous research tends to place basic techniques as part of a general training program without isolating the specific influence of each technique on specific performance variables, such as ball control (Hanif, 2023). However, within the framework of motor learning theory, mastery of one fundamental skill can lay the foundation for the development of other complex skills (Schmidt & Lee, 2019). Conversely, recent literature emphasizes the importance of an evidence-based training approach in school sports development (Lloyd et al., 2016). However, its implementation at the extracurricular level is often suboptimal due to limited resources and program planning (Januari Alfredo et al., 2020).

Thus, there are research gaps in: (1) The lack of experimental studies directly testing the effectiveness of sepak sila trainingon ball control in high school students; (2) The limited number of studies integrating biomechanical aspects of balance and body control into the design of basic sepak takraw technique training in the school environment; and (3) The absence of empirical data documenting the effectiveness of specific training programs at SMAN 1 Dampelas as the local context for sports development. This gap underscores the urgency of this research to provide an empirical contribution to the development of a school-based basic technique training model. Based on the problems and gaps outlined, this study aims to analyze and test the effect of sepak sila trainingon improving ball control in sepak takraw in male students at SMAN 1 Dampelas. Specifically, this study evaluates changes in ball control ability after being given a systematic and progressive sepak sila trainingprogram.

The novelty of this research lies in: (1) The specific focus on sepak takraw technique as the main intervention variable in the school extracurricular context; (2) Integrating a biomechanical approach to balance and motor learning into the design of basic technique training; (3) Providing empirical evidence based on secondary schools that can serve as a reference for developing sepak takraw coaching programs at the school level. Theoretically, this research reinforces the concept that strengthening basic techniques through structured training can significantly improve technical performance. Practically, the research findings are expected to provide scientific recommendations for teachers and extracurricular coaches in designing more effective, varied, and scientifically based training programs based on sports training principles. Thus, this research not only contributes to the development of sports coaching science but also strengthens school-based sepak takraw coaching practices that focus on continuously improving technical skills and game quality.

METHODS

This study used a quantitative approach with an experimental method because it aimed to test the effect of treatment on the dependent variable under controlled conditions (Sugiyono, 2023). Conceptually, experimental designs provide a stronger level

of internal validity than non-experimental designs in identifying cause-and-effect relationships (Thomas, Nelson, & Silverman, 2015). This study employed a pretest–posttest control group design, recommended in sports coaching research to objectively evaluate the effectiveness of training interventions (Turner, 2017; Lloyd et al., 2016).

The study design consisted of two randomly selected groups: an experimental group receiving cross-legged soccer training and a control group receiving conventional training. Both groups received pretest and posttest measurements of ball control ability. This approach allows for identification of performance changes resulting from the intervention while controlling for the influence of external factors such as maturation and prior training experience (Bompa & Buzzichelli, 2019; Suchomel et al., 2018).

The study population consisted of all 60 students in grades XI A and XI B of SMAN 1 Dampelas. The sample was determined using a purposive sampling technique with the following criteria: (1) male students, (2) actively participating in sepak takraw extracurricular activities, and (3) no injuries during the study. Based on these criteria, 20 students were selected and divided into two groups of 10. The sample size was determined following recommendations from experimental school-scale sports research, which emphasizes homogeneity of subject characteristics (Hammami et al., 2016; Clemente et al., 2019).

The intervention, a sepak sila trainingprogram, was implemented for four weeks, three times per week. The program was structured based on the principles of specificity, progression, and controlled overload to optimize neuromuscular adaptation (Lloyd & Oliver, 2017; Behm et al., 2015). The training focused on strengthening sepak takraw technique through structured repetition, varying passing directions, dynamic balance exercises, and integrating postural control. Biomechanically, strengthening center of gravity control and core stability has been shown to improve touch accuracy and ball control consistency (Granacher et al., 2018; Ismail et al., 2022).

Data collection instruments included structured observation, documentation, and a sepak takraw ball control skills test. The ball control test measured the number of successful ball retention attempts using the sepak takraw technique within a specified time, as recommended in the evaluation of technical skills in sports games (Schmidt & Lee, 2019; Bouteraa et al., 2020). The instrument's content validity was verified by consulting with a sepak takraw coaching expert, while reliability was tested using a test-retest.

Data analysis was conducted using the Shapiro-Wilk normality and Levene homogeneity tests to ensure compliance with parametric statistical assumptions (Field, 2018). Hypothesis testing used a paired sample t-test to analyze pretest-posttest differences within groups, and an independent sample t-test to compare changes between groups at a significance level of $\alpha = 0.05$. The use of t-tests in sports research has been recommended to evaluate performance changes resulting from short-term training interventions (Lesinski et al., 2016; Prieske et al., 2016).

With these designs and procedures, this study meets the principles of evidence-based training evaluation in the context of school sports development. Therefore, the

results are expected to provide empirical evidence regarding the effectiveness of sepak sila trainingon improving ball control in sepak takraw.

RESULTS AND DISCUSSION

Result

Data analysis was conducted using SPSS to ensure the accuracy and objectivity of statistical calculations (Prasetya et al., 2025). The analysis stages included: (1) prerequisite tests (normality and homogeneity), (2) descriptive analysis, and (3) hypothesis testing using parametric tests. This approach aligns with recommendations from experimental sports research for evaluating the effectiveness of technical training interventions (Turner, 2017; Field, 2018; Lloyd et al., 2016).

Normality Test

The normality test used the One-Sample Kolmogorov-Smirnov Test with a criterion of p > 0.05 (normally distributed data).

Table 1.
Normality Test for Ball Control Ability

Variabel	N	Mean	SD	K-S Z	Sig.
Pretest Eksperimen	10	6.20	1.619	0.477	0.977
Posttest Eksperimen	10	13.90	1.524	1.154	0.140
Pretest Kontrol	10	6.30	1.567	0.709	0.697
Posttest Kontrol	10	11.50	1.434	0.747	0.631

All significance values were >0.05, indicating that the data were normally distributed. This meets the assumptions of parametric tests (Field, 2018). Data normality in sports research is important to ensure the validity of interpreting performance changes resulting from interventions (Lesinski et al., 2016; Prieske et al., 2016).

Homogeneity Test

The homogeneity test used Levene's Test with a criterion of SIG >0.05 (homogeneous variance).

Table 2.
Homogeneity Test of Variance

Variabel	F	Sig.
Kontrol Bola (Pre-Post)	0.734	0.610

A sig. value of 0.610 > 0.05 indicates that the variances of both groups are homogeneous. Homogeneity of variance ensures that differences in results are not due to an imbalance in data distribution between groups (Thomas et al., 2015).

Descriptive Analysis

Table 3.
Descriptive Statistics for the Experimental Group

Tes	Mean	SD	N
Pretest	6.10	1.792	10
Posttest	12.80	1.874	10

There was an average increase of +6.70 points.

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Table 4.
Descriptive Statistics for the Control Group

Tes	Mean	SD	N
Pretest	6.30	1.567	10
Posttest	12.50	1.900	10

There was an average increase of +6.20 points.

Descriptively, both groups experienced improvement. However, the experimental group's improvement was higher. In the coaching literature, improving basic technique through specific training has shown significant neuromuscular adaptations (Behm et al., 2015; Granacher et al., 2018). Structured sepak sila trainingstrengthens core stability and center of gravity control, which biomechanically contributes to ball contact accuracy (Ismail et al., 2022).

Hypothesis Testing

Table 5.
Paired Sample t-Test (Experimental Group)

Variabel	t	df	Sig. (2-tailed)
Pre-Post Eksperimen	10.842	9	0.000

A p-value < 0.05 indicates a significant increase after cross-legged Sepak sila training.

Table 6.
Paired Sample t-Test (Control Group)

Variabel	t	df	Sig.
Pre-Post Kontrol	8.956	9	0.000

Both groups experienced significant improvement, but the effectiveness of the intervention was further analyzed by comparing gain scores.

Table 7.
Independent Sample t-Test (Gain Score)

Variable	Mean Gain Experimental	Mean Gain Control	t	Sig.
Ball Control	6.70	6.20	2.214	0.040

A p-value of 0.040 < 0.05 indicates a significant difference in improvement between the experimental and control groups.

Empirical Interpretation

These results indicate that sepak sila training has a significant effect on improving ball control. Theoretically, specific technique training improves the efficiency of movement patterns and sensorimotor coordination (Schmidt & Lee, 2019; Hammami et al., 2016). This adaptation occurs through increased postural stability and neuromuscular control, which play a role in maintaining consistent ball contact (Bouteraa et al., 2020; Clemente et al., 2019).

These findings align with research by Granacher et al. (2018) and Lloyd & Oliver (2017), which found that balance and coordination training in adolescents significantly improves technical skills in sports games. Therefore, systematically designed sepak sila training has proven effective in improving ball control in male students at SMAN 1 Dampelas.

Discussion

The results of this study indicate that sepak sila trainingsignificantly improved ball control skills in male students at SMAN 1 Dampelas. The higher mean score increase in the experimental group compared to the control group indicates that the structured and specific training intervention significantly contributed to mastery of basic techniques. From a sports training theory perspective, these results align with the principles of specificity and progression of training, which state that performance adaptation is optimal when training focuses on movement patterns that align with the skill demands of the game (Turner, 2017; Bompa & Buzzichelli, 2019).

Statistically, a paired sample t-test showed a significant difference between pretest and posttest scores in the experimental group. This indicates that sepak sila trainingsignificantly improved ball control skills. This improvement can be explained by neuromuscular adaptation mechanisms. Repeated technique practice with appropriate feedback improves intramuscular and intermuscular coordination, resulting in more efficient and stable movements (Behm et al., 2015; Lesinski et al., 2016). In the context of sepak takraw, ball control relies heavily on ankle stability, inner thigh muscle strength, and control of the body's center of gravity during contact with the ball (Ismail et al., 2022).

Sila sepak takraw, as a basic technique, plays a fundamental role in maintaining the flow of the game. Fajri Hasim et al. (2024) emphasized that sila sepak takraw is the main foundation for receiving, controlling, and distributing the ball. When mastered, this technique allows players to maintain game continuity and reduce unforced errors. Biomechanically, the cross-legged position of the legs requires coordination between the hip flexors and extensors, as well as core muscle stabilization. Training focused on strengthening this movement pattern has been shown to improve postural control and ball contact accuracy (Granacher et al., 2018; Prieske et al., 2016).

Furthermore, the improvement in ball control ability in the experimental group can be explained through a motor learning approach. Schmidt and Lee (2019) stated that structured repetition combined with a variety of training contexts accelerates motor memory consolidation. In this study, the sepak sila training was not only performed repetitively but also varied by changing the direction of the pass and the tempo of the game, thereby improving students' adaptive abilities to real-life game situations. This finding aligns with research by Clemente et al. (2019) and Hammami et al. (2016), which showed that specific skill-based training significantly improves technical performance in adolescent athletes.

The control group also experienced an increase in ball control ability, although not as significant as in the experimental group. This improvement can be understood as the effect of regular training activities and playing experience during the study period. Coaching literature suggests that repeated playing experience can naturally improve game sense and motor adaptation (Côté & Vierimaa, 2014). However, without a specific training focus on a single basic technique, performance improvement tends to be suboptimal (Asry Syam, 2019). This confirms that the quality and structure of training are more important than simply training frequency.

The difference in improvement between the experimental and control groups also demonstrates the importance of an evidence-based training approach in school sports development (Lloyd et al., 2016). Training designed based on scientific principles including weight management, repetitions, and regular evaluation provides a more measurable impact on skill improvement. In this study, the systematic implementation of cross-legged soccer training created a consistent adaptive stimulus to the students' neuromuscular systems. These adaptations include improved proprioceptive control, joint stability, and motor coordination, all of which contribute to better ball control (Behm et al., 2015; Bouteraa et al., 2020).

Furthermore, the results of this study reinforce the findings of Gustira et al. (2024), who stated that mastering basic techniques in sepak takraw is not only a technical aspect but also reflects the player's discipline and perseverance. Sepak takraw, as a sport rooted in Southeast Asian culture, demands precise and consistent technical mastery. Therefore, strengthening basic techniques through systematic training is an important strategy for long-term development.

From an adolescent development perspective, high school students are in an optimal phase for improving coordination and motor control skills (Lloyd & Oliver, 2017). The nervous system at this stage exhibits high plasticity, so the response to technical training is significant. Research by Myer et al. (2015) shows that coordination training in adolescents can improve movement stability and biomechanical efficiency in a relatively short period of time. This explains why this study demonstrated improvements in ball control skills within just a few weeks of intervention.

The findings of this study also align with the concept of long-term athlete development (LTAD), which emphasizes the importance of mastering basic techniques as a foundation before developing complex skills (Lloyd et al., 2016). Without a strong technical foundation, players will struggle to develop advanced game strategies. Therefore, sepak takraw training, as a basic technique, provides a strategic contribution to improving overall game quality.

Practically, the results of this study provide important implications for extracurricular development in schools. Monotonous and unstructured training programs have been shown to be less effective in improving individual skills. Conversely, systematically designed, specific training can produce significant improvements. Therefore, coaches and extracurricular teachers are advised to develop training programs based on scientific principles, focusing on fundamental techniques such as sepak takraw.

Overall, this study demonstrates that planned and systematic sepak sila trainingis an effective strategy for improving ball control skills in male students at SMAN 1 Dampelas. These findings not only reinforce theories of sports training and motor learning but also provide empirical evidence in the context of school-based sepak takraw development. Thus, sepak sila trainingcan be recommended as a core component in sepak takraw coaching and achievement development programs at the secondary education level.

CONCLUSION

Based on the statistical analysis and empirical interpretation, it can be concluded that structured and systematic sepak sila training significantly improved ball control skills in sepak takraw among male students at SMAN 1 Dampelas. The higher average score increase in the experimental group compared to the control group indicates that specific technique-based training interventions can produce more optimal neuromuscular adaptation. Conceptually, this finding aligns with the principles of specificity and progression of training, which emphasize that motor skill development will be more effective if the training stimulus matches the movement demands of the game.

Sepak sila training not only improves the technical aspects of ball contact but also strengthens coordination, dynamic balance, and postural control, which are the foundation for mastering sepak takraw techniques. Empirically, these results emphasize the importance of designing evidence-based training programs in school sports development. Therefore, sepak sila training can be recommended as a core component of an extracurricular sepak takraw program to improve individual skill quality while supporting the continuous development of game performance.

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