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Comparative Impact of Command and Exploratory Training Methods on Sunback Spike Skills in Sepaktakraw: A Case Study of PPLP West Sumatera Athletes

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Abstract: *This study investigates the comparative impact of command and exploratory training methods on the effectiveness of sunback spike skills in sepaktakraw athletes at the PPLP West Sumatra. Using an experimental design, 30 male athletes were selected and homogeneously grouped based on a pre-test of their sunback spike skills. The athletes were divided into two groups using matched subject ordinal pairing, where Group 1 (K1) received command-based training, and Group 2 (K2) received exploratory-based training. Both methods were found to improve the athletes' sunback spike performance significantly. Statistical analysis revealed that the command training method had a more substantial effect, with a t-value of 7.56, compared to the exploratory method's t-value of 5.03, both exceeding the critical value (1.76). Additionally, command training demonstrated superior efficacy in enhancing sunback spike ability, as indicated by a t-value of 8.92, which surpassed the threshold value (1.734). The findings recommend that coaches integrate both methods into training programs, emphasizing the command approach for optimal skill development. Future research should address limitations such as sample size to validate these findings further and expand their applicability.*
Keywords: *Sepaktakraw, Sunback Spike, Command Training, Exploratory Training, Athlete Development*

Introduction

Exercise improves a person's spirit, physical ability, and fitness (Afrizal et al., 2024; Pagliaro et al., 2024; Paillard, 2023). In the era of globalization, sports have become a vital social interaction platform, including the sport of sepaktakraw, which has social value and can encourage community involvement as one of the traditional cultural identities. A study shows that participation in sports such as sepaktakraw improves physical health, psychological well-being, and social relationshipsb(Crevenna, 2020; Tokarski et al., 2023). In addition, the accessibility and popularity of the sport of sepaktakraw highlight its significance as a means of social integration, transcending economic barriers, and promoting inclusivity (Guspita & Febrina Harahap, 2022; Opstoel et al., 2020).

Sepaktakraw is a popular sport in ASEAN countries, including Malaysia, Thailand and Indonesia (Hassan et al., 2023). In Indonesia, particularly in West Sumatra, the sport is also known as Sepak Rago, a traditional game part of the rich Malay culture. Sepak Rago is similar to modern Sepaktakraw but is more straightforward and relaxed, focusing on togetherness and entertainment. Nonetheless, Sepaktakraw has now evolved into an achievement sport that competes nationally and internationally (Muazu Musa et al., 2020). Sepaktakraw has experienced tremendous progress in West Sumatra, as evidenced by athletes' success in various competitions, especially for young athletes. Long-term coaching strategies are very effective in improving athlete performance, thus acquiring significant regional, national and international achievements (Granacher et al., 2016; Lloyd et al., 2015; Myers et al., 2017; Suchomel et al., 2016).

The development of the ability of Sepaktakraw athletes as an achievement sport depends on several important factors, including physical condition (strength, endurance, flexibility), technique (smash, serve, pass), match tactics, and mental (confidence, focus, and emotional control) (Issurin, 2017; Kovács & Szakál, 2024; Sarkar et al., 2014). These factors are the basis for creating athletes who excel physically and have strong mental and social readiness. Sepaktakraw athletes must master basic techniques such as serving, spike (smash), and heading, as well as special skills such as feints and blocking.

Smash or spike is a vital technique that requires acrobatic skills, strategic placement, and consistent execution (Bais et al., 2023). There are three main types of spike techniques: roll spike (RS), sunback spike (SS), and half-roll

spike (HRS). Sunback spike is a vital attack technique in sepaktakraw that involves a hard kick using the foot from the back of the body to place the ball in an area complex for the opponent to reach. The success of this technique depends on timing, team coordination, and player strength, agility, and flexibility, which require high skill and reasonable body control to execute effectively in competition.

Sunback spike is a challenging technique that involves acrobatic movements in sepaktakraw. Teams that master this technique tend to have higher win rates and emphasise the importance of strategy in competitive play. Failure in its execution can provide opportunities for the opponent to score points, which can change the momentum of the game (Afonso et al., 2021; Oliveira et al., 2020). However, the complexity of this movement requires extensive practice and skill development, which can be an obstacle for less experienced players.

PPLP West Sumatra players' explosiveness has not produced maximum results, as reported by the team coach. In addition to failing to execute substantial and precise sunback spikes, players often make mistakes in attempts to perform sunback spikes. This is due to several factors that affect sunback spike ability, including coordination, strength, speed, flexibility, explosivity, training programs, and training methods that do not run as they should. In addition, research (Etxebarria & Mujika, 2019) highlighted that the lack of an appropriate training program can exacerbate this problem, resulting in suboptimal results in a competitive environment.

Various training styles have been implemented, such as the reciprocal method, which encourages interaction and feedback between coaches and athletes, and the coach-centered command training method, where players follow and imitate the coach's instructions (Ginciene et al., 2023). In this method, the coach gives clear and specific directions on what to do and the athlete is expected to follow the orders, as well as exploratory methods that provide space for athletes to explore and find solutions to challenges in training. The exploratory training method is an approach that focuses more on engaging athletes in the learning process through self-discovery and problem-solving (Chalmers et al., 2014; Moullin et al., 2019). In this method, the coach provides a specific challenge or situation and lets the athlete figure out the solution or the best way to deal with it rather than giving direct instructions.

In this study, researchers focused on problems related to sunback spike ability in sepaktakraw athletes at the West Sumatra Student Sports Education and Training Center (PPLP) to support the development of athletes' skills and improve their achievements. In coaching this sport, it is necessary to emphasize scientifically and ensure that training methodologies are based on evidence-based practices. They can contribute by using command training methods and exploratory methods in the training process to see which is better for achieving training goals.

Materials and Methods

Research Participants

The method used in this study is experimental and focuses on the command training method (X1) and the exploration training method (X2) as independent variables. The ability to sunback spike (Y) is a dependent variable. The sample for this study comprised 30 homogeneous male athletes. The training was conducted over 6 weeks with 16 sessions, beginning with an initial test to assess lending smash ability.

Research Variable

The sample underwent a pretest of sunback spike ability before treatment, and the test results were sorted from highest to lowest score. Subsequently, the sample was divided into two groups (K1 and K2) using the matching subject ordinal pairing method (Chang & Little, 2018; Subiza-pérez et al., 2018). After forming the two groups, Group 1 was assigned to the command training method. In contrast, Group 2 was assigned to the exploratory training method to determine the effect on sunback spike ability.

Table 1. *Research design*

Pre-Test	Treatment (Exercise)	Post-Test
T_1	Command Method	T_2
	Exploration Method	

Table 2. *Commando Training Programme*

	Aerobics
Number of Meetings	16 Sessions
Duration of each meeting	60-90 Minutes
Training Intensity	60-80%
Recovery	1-2 minutes

Table 3. *Exploratory Exercise Programme*

	Aerobics
Number of Meetings	16 Meetings
Duration of each meeting	60-90 Minutes
Training Intensity	60-80%
Recovery	1-2 minutes

Research Methods

The instrument used to measure the sunback spike in this study is the test of the results of the sunback spike, which has a validity of 0.99 and a reliability of 0.78. The purpose of the test is to measure smash skills. The data analysis focused on testing whether the training method (command vs exploration) significantly influenced the athlete's smash ability, considering the normality test as the initial step of the analysis. This study conducted a normality test using Liliefors test statistics with a significance level (α) set at 0.05 using SPPS software. This threshold is the basis for determining whether the data is usually distributed.

Results

Following data collection, the writers processed and evaluated the information before displaying the findings in a table.

Table 2. *Normality Test*

Data	**n**	**L_O**	**L_{tabel}**	**Description**
Command Practice Method (Pre test)	15	0.1832	0.22	Normal
Exploratory Exercise Method (Pre test)	15	0.1881	0.22	Normal
Command Practice Method (Post test)	15	0.1667	0.22	Normal
Practice method Exploration (Post test)	15	0.1224	0.22	Normal

The result of the pre-test data of the command training method group was 0.1832, which was smaller than the value (L table) of 0.22 at the significance level of α = 0.05. The results of the pre-test data of the exploratory exercise method group were 0.1881, also smaller than the value (L table) of 0.22 at the significance level of α = 0.05.

The result of the post-test data of the command training method group was 0.1667, smaller than the value (L table) of 0.22 at the significance level of α = 0.05. The results of the post-test data of the exploratory exercise method group were 0.1224, smaller than the value (L table) of 0.22 at the significance level of α = 0.05. From the above result data, it can be concluded that the data is usually distributed.

The t-test results with a significance level of 0.05 above were used to test the effect in the same group. In the group with the command training method consisting of 15 samples, the maximum score was 12, and the minimum score was 5, with an average of 8.47 and a standard deviation (SD) of 2.20. Meanwhile, in the post-test, they got a maximum score of 16 and a minimum score of 12, with an average of 14.00 and a standard deviation of 1.41 for Kedeng's smash ability. The results of the hypothesis test are presented in Table 5.

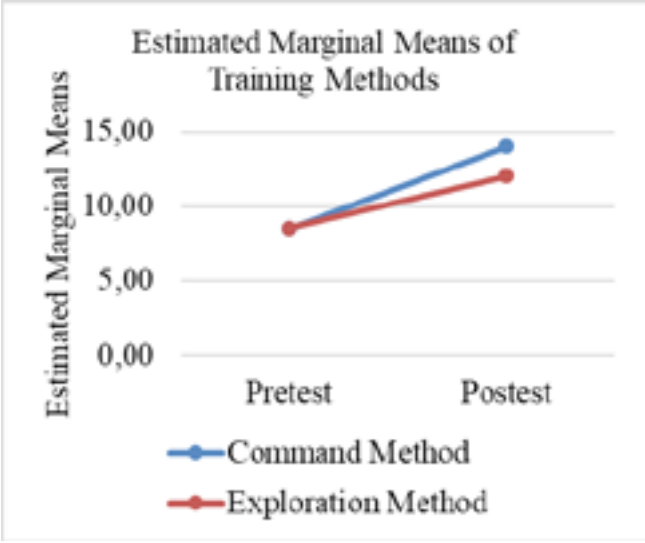

Figure 1. *The Data normality test for each group (cell) was analyzed using Kolmogorov-Smirnov with SPSS*

Table 3. *Command Training Method*

	Mean	SD	t-count	α	t-tabel	Test results
Pre Test	8.53	2.10	7.56	0.05	1.76	Significant
Post Test	14.00	1.41				

From the table, it can be seen that the t-count is (7.56) ≥ t-table (1.76), which means that the research hypothesis is accepted. Therefore, it can be concluded that the command training approach significantly influences Kedeng's smash ability. The average score of the sunback spike ability increased from 8.47 at the time of the pre-test to 14.00 at the time of the post-test, indicating a significant improvement in skill.

The results of the pre-test of smash ability in the exploration exercise method group with a sample of 15 people showed that the maximum score was 12, the minimum was 6, the average was 8.53, and the standard deviation (SD) was 1.92. Meanwhile, the post-test results showed that the sunback spike ability ranged from a score of 9 to 15, with an average of 12.00 and a standard deviation (SD) of 1.69. Table 6 presents the findings from the hypothesis test.

Table 4. *Exploratory Exercise Method*

	Mean	SD	t-count	a	t-tabel	Test results
Pre Test	8.53	1.92	5.03	0.05	1.76	Significant
Post Test	12.00	1.69				

From the table, it can be seen that the t-count value (5.03) ≥ t-table (1.76) shows that the research hypothesis is acceptable. It can be concluded that the exploration training method influences Kedeng's smash ability. The average score of the sunback spike ability increased from 8.53 in the pre-test to 12.00 in the post-test, indicating a significant improvement in the ability.

With a sample of 15 athletes, the final test results (post-test) for the command training method group had a maximum score of 16, a minimum score of 12, an average of 14.00, and a standard deviation (SD) of 1.41 in the ability to sunback spike. Meanwhile, the results of the exploratory training method group's final test (post-test) showed a maximum score of 15, a minimum score of 9, an average of 12.00, and a standard deviation (SD) of 1.69 in the ability to sunback spike. The results of the hypothesis testing of this study can be seen in Table 7.

Table 5. *Hypothesis Testing of Effectiveness Between Command Training Method and Exploratory Training Method*

	Mean	SD	t-count	a	t-tabel	Test results
Command	5.47	2.79	2.00	0.05	1.77	Significant
Exploration	3.47	2.66				

From the table, it can be seen that t-count (2.00) ≥ t-table (1.77). This indicates that the research hypothesis is acceptable. Therefore, it can be concluded that the command training approach has a more significant impact on the sunback spike ability than the exploration training approach.

Discussion

The problem that often occurs is that the training technique does not change or is not in harmony with the information provided, making it difficult to achieve the training goals and making it difficult for athletes to understand the training concept (Bahtra et al., 2020; Deal et al., 2018; Jia et al., 2021; Kannan et al., 2021). Studies on training plans and methods to improve players' skills have been carried out by experts in the field of sepaktakraw (Tewari et al., 2023; Wang et al., 2024). The command training method is characterized by a top-down approach, where the coach maintains complete control over the training process, directing athletes to follow specific instructions with limited autonomy (Rababa & Mahyar, 2023). This method can result in efficient skill acquisition, but it can limit the athlete's ability to think critically and adapt to dynamic situations.

In contrast, exploratory techniques foster a more autonomous learning environment, encouraging athletes to engage in problem-solving activities and collaborate with their peers. This approach promotes critical thinking and encourages a sense of belonging to the learning process as athletes share findings and insights (Marsuki, 2023). Research shows that although command exercises are more effective for developing basic skills, exploratory techniques are more beneficial for developing adaptability and decision-making skills in competitive scenarios (Hirwana et al., 2023).

The smash skills of athletes from the command training method group at the Student Sports Education and Training Center (PPLP) sepaktakraw West Sumatra increased from an average score of 8.47 in the initial test (pretest) to 14.00 in the final test (post-test). This supports the research hypothesis that the command training approach significantly impacts the smash ability of athletes in the Sports Education and Training Center Pelajar (PPLP) West Sumatra. Command techniques are effective for mastering simple tasks that do not require quick decision-making, as they provide clear and structured guidance for athletes. However, this approach has limitations, especially in developing the various movements necessary to execute complex playing skills.

Command techniques facilitate rapid skill acquisition. They often limit learners to a narrow set of movements and are defined by task structure, potentially inhibiting their ability to adapt to varied situations in the future. In addition, the study also shows that dependence on coaches can lead to a lack of creativity and flexibility in applying skills. Therefore, while command techniques benefit early learning, it is important to incorporate methods that encourage adaptability and broader skill mastery for the long-term development of play skills.

The results of the post-test from the exploratory training method group showed that the average score of athletes' ability to perform sunback spike at the Student Sports Education and Training Center (PPLP) of Sepaktakraw West Sumatra increased from 8.53 in the preliminary test (pretest) to 12.00 in the final test (post-test). This indicates that the research hypothesis that the exploratory training approach significantly positively impacts the ability of PPLP West Sumatra sepaktakraw athletes to perform sunback spike is acceptable. This increase is likely due to athletes adopting strategies from an exploratory training approach, where they take the initiative and find solutions independently.

Exploration exercises aim to explore athletes' ideas, arguments, and methods through open-ended questions and directions, facilitating their understanding of concepts and problem-solving (Newell & Rovegno, 2021). All training decisions are made by the athletes themselves, who provide feedback in the post-session meeting. The coach's goal is to give the athlete enough time to carry out the movement tasks and play skills as instructed so that they can make decisions based on their understanding of the training results (Bennie & O'Connor, 2012; MacLellan et al., 2018; Selimi et al., 2023; Trninić et al., 2009). These strategies have advantages and disadvantages, which theoretically depend on the context. With this method, the coach acts as a guide and facilitator for the athlete, while the athlete acts as an active explorer.

A solution will emerge when the problem reaches a saturation point due to this activity, providing helpful information regarding the next steps needed to resolve the issue. This process shows how athletes improve their character values as they face challenges. The average score of 14.00 in the command training method and 12.00 in the exploration training method, as well as the results of the hypothesis calculation that showed the t-count value (2.021) ≥ t-table (1.771), indicate that the hypothesis is accepted. Thus, the command training method group outperformed the exploratory training method group in the final test results (post-test). The athletes were judged based on their ability to do sunback spike at the Student Sports Education and Training Center (PPLP) sepaktakraw West Sumatra. Therefore, the research hypothesis that the command training approach is superior to the exploratory training approach is correct and significantly influences West Sumatra students' smash ability of sepaktakraw athletes (PPLP).

Overall, the command training approach yielded a higher value than the exploratory training strategy, as evidenced by the hypothesis test results. Compared with the exploration training method, the command training method performs better. The statistical analysis results confirm this. The average difference between the exploratory training method, which is 12.00, and the command training method, which is 14.00, indicates that the command training method has a more significant exercise effect than the exploratory training method.

The study results identified that the command training method outperformed the exploration training method. In the command training method, the trainer determines all the training content. Athletes only imitate and follow the coach's orders and instructions. Every aspect, from planning to execution, depends on the direction of the coach (Cushion et al., 2012; Isoard-Gautheur et al., 2016; Jackson et al., 2009; Jowett, 2017; Smith et al., 2023). This means that the athletes imitate the coach's actions and only listen to the explanations. Therefore, the coach's role includes making all decisions from beginning to end each exercise. The role of athletes is to implement, obey, and obey these instructions. The trainer demonstrates each movement, making decisions about location, posture, start time, cadence, shape, stop time, duration, and intervals (Cranmer et al., 2017; Davis & Jowett, 2014; Erickson et al., 2011; Fouraki et al., 2020; Jones & Turner, 2006). Using the command training method is a strategy to improve sunback spike ability. It is highly recommended that athletes develop their smash skills through this type of training to become as proficient as possible.

Conclusion

Based on the research results, both the exploration exercise approach and the command training method are equally beneficial when used with players. However, the command exercise approach outperforms the exploratory exercise method regarding sunback surge capability.

Based on the study's findings, the recommendation is that coaches should use command and exploration training methods to improve sunback spike ability because both methods have proven to be effective. Given that the command training method improves the smash ability, coaches and players should prioritize using this method in training sessions. Researchers interested in further exploring this topic should consider addressing research limitations, such as sample size limitations, to improve the findings' applicability.

Etichal Consideration

The study was authorized by the Universitas Negeri Padang Research Ethics Committee, which oversees research ethics. Several changes were proposed and implemented by the committee. Following these amendments, the researcher made the necessary adjustments to obtain ethical approval. Ethical approval was granted on December 11, 2024, after the required changes and revisions were made.

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