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The effect of paired passing training on sepak sila ability: a quasi-experimental study with sepaktakraw athletes

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ABSTRACT

Sepak sila, the technique of controlling and passing the ball with the inner side of the foot, is a foundational skill in sepaktakraw that underlies ball control, passing accuracy, and offensive continuity. Preliminary observation of sepaktakraw athletes at Balai Baru Padang indicated inconsistent ball control and passing accuracy, suggesting that the training methods applied were not yet optimal. Purpose: This quasi-experimental study examined the effect of paired passing training on sepak sila ability among sepaktakraw athletes at Balai Baru Padang. Methods: A One-Group Pretest-Posttest design was employed. Ten male sepaktakraw athletes were recruited through purposive (total) sampling. Sepak sila ability was assessed with a validated 1-minute sepak sila frequency test administered before and after a 16-session paired passing training program (four sessions per week over four weeks). Data were analyzed using the Liliefors test for normality, the Bartlett test for homogeneity, and a paired-samples t-test at $\alpha = 0.05$. Results: The mean sepak sila score increased from 132.3 (SD = 39.11) at pre-test to 160.9 (SD = 31.84) at post-test, a mean gain of 28.6 points. Both pre-test and post-test data were normally distributed ($L_o = 0.128$ and 0.138 , respectively; $L_t = 0.258$). The paired t-test yielded t (calculated) = 5.31, exceeding t (table) = 1.83 at $\alpha = 0.05$, indicating a statistically significant improvement. Conclusion: A structured, sixteen-session paired passing training program significantly improved sepak sila ability in sepaktakraw athletes. The findings support the use of paired passing drills as a practical, low-cost training method for coaches seeking to develop ball-control and passing accuracy in sepaktakraw athletes, while also underscoring the need for larger, controlled trials to confirm generalizability.



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Introduction

Sepaktakraw is a traditional Southeast Asian team sport combining elements of football, volleyball, and badminton, in which three players per team aim to send a rattan ball over a net without allowing it to touch the ground on their own side of the court. The sport demands agility, precision, strength, and inter-player coordination, and has progressively evolved from an informal village pastime into a competitive discipline contested at the SEA Games, Asian Games, and world championships (Zarei & Ramkissoon, 2021; Musa, Majeed, Kosni, & Abdullah, 2020; Eigenschenk et al., 2019).

Among the fundamental techniques of sepaktakraw, sepak sila kicking and controlling the ball with the inner side of the foot is considered the most critical, since it underlies ball reception, passing, and the construction of

attacking sequences; a team's overall performance is therefore closely tied to the quality of this single technique. Accuracy and consistency in sepak sila directly influence passing quality and, by extension, a team's offensive and defensive effectiveness (Bais, Padli, Arwandi, Iyakrus, Martha, Rudyanto, & Arifan, 2023).

Preliminary observations of sepak takraw athletes training at Balai Baru Padang revealed uneven mastery of sepak sila: several athletes struggled to control the direction and force of their kicks, resulting in inaccurate passes and balls that were easily intercepted by opponents. This pattern suggested that the training methods used at the time had not yet been optimized to develop this specific skill, and pointed to the need for a structured, targeted intervention.

Paired passing training in which two athletes face each other at a fixed distance and repeatedly exchange the ball using the sepak sila technique has been proposed as an effective method for developing ball control, passing accuracy, and inter-player coordination. Progressive variation in distance and task complexity is thought to promote motor learning while also fostering cooperation, concentration, and adaptability to a training partner's tempo. While previous studies have shown that paired training drills can improve basic passing skills across a range of team sports, including sepak takraw (Mardela & Rahman, 2017; Iskandar & Haris, 2020; Akbaruddin & Hasanuddin, 2023), empirical evidence on the specific effect of paired passing training on sepak sila ability among athletes at the community/club level in Balai Baru Padang remains limited. This study was therefore designed to provide such evidence by examining, empirically, the effect of a structured paired passing training program on sepak sila ability.

Based on this background, this study aimed to determine the effect of paired passing training on sepak sila ability among sepak takraw athletes at Balai Baru Padang. It was hypothesized that a structured program of paired passing training would produce a statistically significant improvement in sepak sila ability.

Method

Research Design

This study used a quasi-experimental approach with a One-Group Pretest-Posttest design, in which a single sample was measured before (pretest) and after (posttest) exposure to an experimental treatment, allowing within-subject comparison of the outcome variable before and after the intervention. The independent variable was paired passing training (X); the dependent variable was sepak sila ability (Y).

Participants

Participants were recruited from the population of sepak takraw athletes training at Balai Baru Padang (all male). A purposive (total) sampling technique was used, in which the entire eligible population was included as the study sample, yielding a final sample of ten male athletes.

Setting and Duration

The study was conducted on the sepak takraw court at Balai Baru, Padang City, Indonesia. The intervention program ran for four weeks, with training sessions held four times per week, for a total of sixteen training sessions.

Instrument

Sepak sila ability was assessed using a 1-minute sepak sila frequency test, in which each athlete's task was to perform as many correct, continuous sepak sila touches as possible within one minute; the first touch of each trial was not counted, and the athlete was permitted to continue the attempt (with the count resuming after the next successful touch) if the ball was dropped before time expired. Each athlete completed three trials of one minute each, with rest between trials, and the number of correct touches per trial was recorded by a dedicated counter and an independent recorder using a stopwatch. A higher error-free sepak sila frequency was taken to indicate higher sepak sila ability. Consistent with recommendations for age- and skill-appropriate sepak takraw equipment, a regulation-standard sepak takraw ball was used throughout testing and training (Syafii, Karo-Karo, Sari, Aditya, Helmi, & Simangunsong, 2022). This frequency-based protocol has been used in prior sepak takraw research linking foot-eye coordination to sepak sila performance, supporting its suitability as an indicator of sepak sila ability (Hernanzoni, 2019).

Procedure

Following baseline (pretest) assessment, athletes completed a 16-session paired passing training program (four sessions/week over four weeks). Each session followed a standard structure: (a) warm-up, comprising lower-limb stretching and light sepak takraw movement drills to reduce injury risk; (b) main training, consisting of individual ball-control drills followed by paired passing at progressively increasing distances (beginning at 3–5 m and advancing to longer distances and target-based and combination-movement variations), performed for a set number of repetitions and sets with rest intervals between sets; and (c) cool-down, comprising light stretching

and a brief session evaluation. Athletes' technique (foot position, ball contact, and balance) was monitored and corrected throughout the program. After completing all sixteen sessions, athletes underwent the identical sepak sila test procedure as the posttest. This progressive, distance- and target-based structuring of technical drills mirrors exercise-model approaches shown to improve accuracy in other sepaktakraw techniques (Marpaung, Suryansah, & Siregar, 2022). To minimize threats to internal validity during the four-week intervention, all sessions were led by the same coach following a standardized session protocol, and athlete attendance was recorded at every session.

Data Analysis

Prior to hypothesis testing, the normality of the pretest and posttest distributions was assessed using the Liliefors test, and homogeneity of variance was assessed using the Bartlett test, both at $\alpha = 0.05$. The research hypothesis was then tested using a paired-samples t-test at a significance level of $\alpha = 0.05$, comparing pretest and posttest means; the calculated t-value (t-hitung) was compared against the critical t-value (t-tabel) to determine statistical significance.

Results and Discussions

Descriptive Statistic

Descriptive statistics for sepak sila ability at pretest and posttest are summarized in Table 1. At pretest, sepak sila scores ranged from 58 to 183 ($M = 132.3$, $SD = 39.11$), reflecting considerable between-athlete variability. At posttest, following the paired passing training program, scores ranged from 110 to 205 ($M = 160.9$, $SD = 31.84$), representing a substantial upward shift in both central tendency and the lower bound of performance, alongside a reduction in variability (lower SD). At pretest, the frequency distribution showed that 50% of athletes ($n = 5$) fell in the lowest performance category (< 130), while only 10% ($n = 1$) reached the maximal category (≥ 180). At posttest, the proportion of athletes in the maximal category rose to 30% ($n = 3$), while the proportion in the lowest category fell to 20% ($n = 2$), indicating an overall rightward shift in the performance distribution following the intervention.

Table 1. Descriptive Statistics of Sepak Sila Ability

Statistic	Pre-test	Post-test
Mean	132.3	160.9
SD	39.11	31.84
Maximum	183	205
Minimum	58	110

Assumption Testing.

Normality of the pretest and posttest data was examined using the Liliefors test (Table 2). For both distributions, the observed Lo value was smaller than the critical Lt value at $\alpha = 0.05$, indicating that both datasets were normally distributed and therefore suitable for parametric analysis.

Table 2. Normality Test (Liliefors)

Variable	n	Lo	Lt ($\alpha=.05$)	Distribution
Sepak sila (pre-test)	10	0.128	0.258	Normal
Sepak sila (post-test)	10	0.138	0.258	Normal

Hypothesis Testing.

The paired-samples t-test comparing pretest and posttest sepak sila scores is summarized in Table 3. The analysis yielded a calculated t-value of 5.31, which exceeded the critical t-value of 1.83 at $\alpha = 0.05$ ($df = 9$). Because $t(\text{calculated}) > t(\text{table})$, the null hypothesis was rejected and the alternative hypothesis was accepted, indicating that the improvement in sepak sila ability following the paired passing training program was statistically significant.

Table 3. Paired-Samples t-Test

Variable	Mean	n	t-calc	t-table	Result
Pre-test	132.3	10	5.31	1.83	Significant
Post-test	160.9				

The present findings demonstrate that a structured, 16-session program of paired passing training produced a statistically significant improvement in sepak sila ability among sepaktakraw athletes at Balai Baru Padang, with mean scores rising by 28.6 points from pretest to posttest. This result is consistent with the broader motor

learning principle that repeated, task-specific practice promotes technical adaptation: the repetitive, paired nature of the drill required athletes to continuously coordinate foot position, gaze, and postural balance while receiving and redirecting the ball, which likely contributed to gains in motor consistency, touch accuracy, and neuromuscular coordination, consistent with evidence that repeated, task-specific practice enhances the performance and retention of discrete sport skills (Panchuk, Spittle, Johnston, & Spittle, 2013). This magnitude of improvement is comparable to that reported for paired/umpan berpasangan passing interventions in other sepak takraw settings (Akbaruddin & Hasanuddin, 2023; Mardela & Rahman, 2017), and reinforces evidence that structured, repeated technical drills incorporating dynamic coordination demands enhance sepak takraw-specific skills such as sepak sila (Arifin, 2020).

These results align with prior research indicating that mastery of fundamental techniques particularly sepak sila is a key determinant of playing success in sepak takraw, since this technique underlies ball reception, control, and passing during both attacking and defensive sequences. They are also consistent with findings that structured, repeated technical practice can meaningfully improve fundamental skill performance in sepak takraw and related sports, and with the principle that training effects are maximized when practice is specific to the movement pattern being trained. This is further supported by evidence that structured physical education and game-based training programs produce measurable gains in both physical performance and game-related outcomes among youth and student athletes (Kliziene, Cizauskas, Sipaviciene, Aleksandraviciene, & Zaicenkoviene, 2021; Arias-Estero, Jaquero, Martínez-López, & Morales-Belando, 2020).

From an applied perspective, the reduction in outcome variability observed from pretest ($SD = 39.11$) to posttest ($SD = 31.84$), together with the near-elimination of very-low scorers, suggests that paired passing training may be particularly valuable for narrowing the performance gap between less-skilled and more-skilled athletes within a squad an outcome of practical relevance for coaches managing athletes with heterogeneous technical backgrounds, and echoes findings that well-structured, assistance-based training designs can effectively support learners with varying baseline ability (Pitnawati, Damrah, Handayani, Putra, Sasmitha, Nelson, Wulandari, Angelia, Ningsih, & Ockta, 2023).

Several limitations should be considered when interpreting these findings. First, the sample was small ($n = 10$) and drawn from a single club, which limits statistical power and the generalizability of results to the broader sepak takraw athlete population. Second, the One-Group Pretest-Posttest design lacked a control or comparison group, so the observed improvement cannot be unambiguously attributed to the paired passing intervention alone; maturation, familiarization with the test, or concurrent training activities may have contributed. Third, attendance and individual physical/technical baselines were not fully uniform across athletes, and environmental factors (facilities, weather) were not standardized. Future studies should employ larger, multi-site samples, randomized controlled designs with an active comparison group, and longer intervention periods to strengthen causal inference and external validity.

Conclusions

A 16-session program of paired passing training produced a statistically significant improvement in sepak sila ability among sepak takraw athletes at Balai Baru Padang, with mean scores increasing from 132.3 to 160.9 ($t = 5.31 > t\text{-table} = 1.83$, $\alpha = 0.05$). This finding directly answers the study's objective and confirms the hypothesis that a structured program of paired passing training would produce a statistically significant improvement in sepak sila ability. These findings support paired passing training as a practical, resource-light method that coaches can incorporate into technical training programs to develop ball control and passing accuracy. Future research using larger samples, controlled designs, and extended training periods is recommended to confirm and extend these findings. Coaches working with developing sepak takraw athletes may consider incorporating progressive paired passing drills beginning at short distances and advancing in distance and complexity—as a structured component of technical training, particularly for athletes showing inconsistent ball control or passing accuracy.

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