

Enhancing Mini Volleyball Forearm Passing Performance with Small-Sided Games and Drill Practice

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doi: <https://doi.org/10.37745/bjmas.2022.0423>

Published February 22, 2024

Citation: Cruz R.R D (2024) Enhancing Mini Volleyball Forearm Passing Performance with Small-Sided Games and Drill Practice, British Journal of Multidisciplinary and Advanced Studies: Education, Learning, Training & Development, 5(1),148-160

ABSTRACT: *Forearm passing is a crucial aspect of volleyball, but young students often find themselves in need of guidance during their Physical Education (PE) classes. This study determined the effectiveness of small-sided games and drill practice in enhancing forearm passing skills. A quasi-experimental design was employed, utilizing complete enumeration sampling. The sample consisted of 26 learners from each group who participated in small-sided games and drill practice. The interventions were carried out over six weeks, including the pretest and post-test phases. Given the vulnerability of the participants, who were kindergartners and first graders, all necessary ethical protocols were strictly observed. The data was analyzed using descriptive statistics, t-tests for independent samples, and t-tests for paired samples. The results show that both interventions revealed increased scores in their forearm passing skills from Fair to Good levels. Moreover, both groups demonstrated comparable effectiveness in improving passing skills in mini volleyball, with no statistically significant difference between the two. These findings suggest that both interventions can enhance forearm passing skills in mini volleyball, offering flexibility in training approaches without compromising performance improvement. Furthermore, further investigation into the specific elements of small-sided games and drill practice that contribute to skill improvement in mini-volleyball could be beneficial.*

Keywords: Forearm passing, Mini Volleyball, small-sided games, drill practice, skill development

INTRODUCTION

Volleyball is characterized by fundamental techniques like serving, receiving serves, passing, attacking, and defending. Of these skills, passing is integral to an effective attacking strategy (Tennyson, 2012; Syamsuryadin & Mansur, 2018). Proficient forearm passing represents a foundational requisite for individuals seeking mastery over volleyball gameplay and strategy

comprehension (Yeh, 2007). Thus, early refinement training in forearm passes is imperative for sustained competitiveness.

There is a difference in knowledge acquisition and skill development across children, adults, and athletes (Syamsuryadin & Mansur, 2018). Consequently, tailored age-appropriate strategies must be adopted when training young learners on forearm passing (Baek et al., 2019). While studies have explored improving this skill through small-sided games and drills in youth players (Krističević et al., 2016; Trajkovic et al., 2017; Batez et al., 2021; Ningrum et al., 2021), there is limited research on assessment of individualized skill development plans for children (Syamsuryadin & Mansur, 2018).

This study examines two common training methodologies – structured drill practices and small-sided mini volleyball games – to improve forearm passing competencies among children. The objectives are to evaluate and compare the interventions, determining which approach produces superior enhancements for imparting the skill to young players. The findings aim to address the existing research gap with implications for both academics and practical training strategies focused on developing fundamental volleyball skills in children.

FRAMEWORK

This study assumes that the two interventions, drill practice and small-sided games, could enhance forearm passing skills among kindergarten 3 and Grade one learners. This is supported by the Task Constraints Theory introduced by Goldratt in the 1980s and the Motor Learning Theory, brought to light by Schmidt, Adams, and Fitts back in 1975.

The Task Constraints Theory, also called the Constraint-Led Approach, posits that changes to task constraints like equipment and rules can shift skill emphasis towards performance-based adaptations (Renshaw et al., 2016). In youth sports, game redesign by manipulating task constraints allows for age-appropriate formulations that seed effective skill adaptation (Chow et al., 2021). Research shows this constraint manipulation enables better skill adaptation than just repetitive drills. This theory assumes goal-oriented performance emerges from interactions between performer and environment (Newell, 1986). Such an approach enhances young athletes' skill acquisition and adaptability in applying movement repertoire (Seifert et al., 2019). Similarly, drill practices and small-sided games, as justified by Motor Learning Theory, can improve forearm passing skills in children (Magill & Anderson, 2014) by enhancing perceptual-motor workspace adaptability through repetition and gameplay (Hodges & Williams, 2012; Komar et al., 2019). Small-sided game training can also improve specific skill accuracy like volleyball passing as effectively as instructional techniques (Gabbett et al., 2009). Both small-sided games and repetitive drill exercises are supported by theories and evidence for enhancing children's volleyball forearm passing skills. These approaches involve task constraint modifications and game-based activities to ensure skill development and acquisition (Cordovil et al., 2009).

Forearm passing technique relies on footwork, platform shape, body positioning and perceptual-decision making skills. Research shows properly integrating these elements is vital for quality passing from youth to elite levels (Páez-Moguer et al., 2021; Quiroga et al., 2022). Adaptive equipment, individual assessments, and game-based practice facilitate learning for children based on developmental capabilities (Cordovil et al., 2009; Dearing, 2019).

Small-sided volleyball games manipulate constraints to bridge skill drills and full matches. The fast-paced 2 vs 2 format builds versatile ball control and attacking competence amid complex decisions. The 3 vs 3 game allows some position specialization for introducing strategic formulations. Finally, the 4 vs 4 delineates roles while increasing sophistication preparing for the full 6 vs 6 version (Gabbett et al., 2009). In contrast, repetitive passing drills isolate and ingrain proper technique through quality repetitions. Target and wall drills reinforce specific passing elements like platform shape, aim, and follow through (Grgantov et al., 2021; Reynolds, 2021). Systematically progressing drill difficulty and focus boosts passing proficiency. Thus, drill exercises such as throw, clap and catch, receive wave, and low catch receiving were employed in this study.

Additionally, evidence shows a 6-week training timeframe enables measurable passing skill improvements across cognitive, associative and autonomous motor learning stages (Magill & Anderson, 2022; Santos et al., 2019). Blended game and drill training elicits well-rounded adaptation (Pazeti & Bertucci, 2022). This study will compare passing execution after a 6-week intervention of small-sided games versus repetitive drills. It is hypothesized that both approaches will improve the participants' forearm passing performance, footwork agility, and aim accuracy.

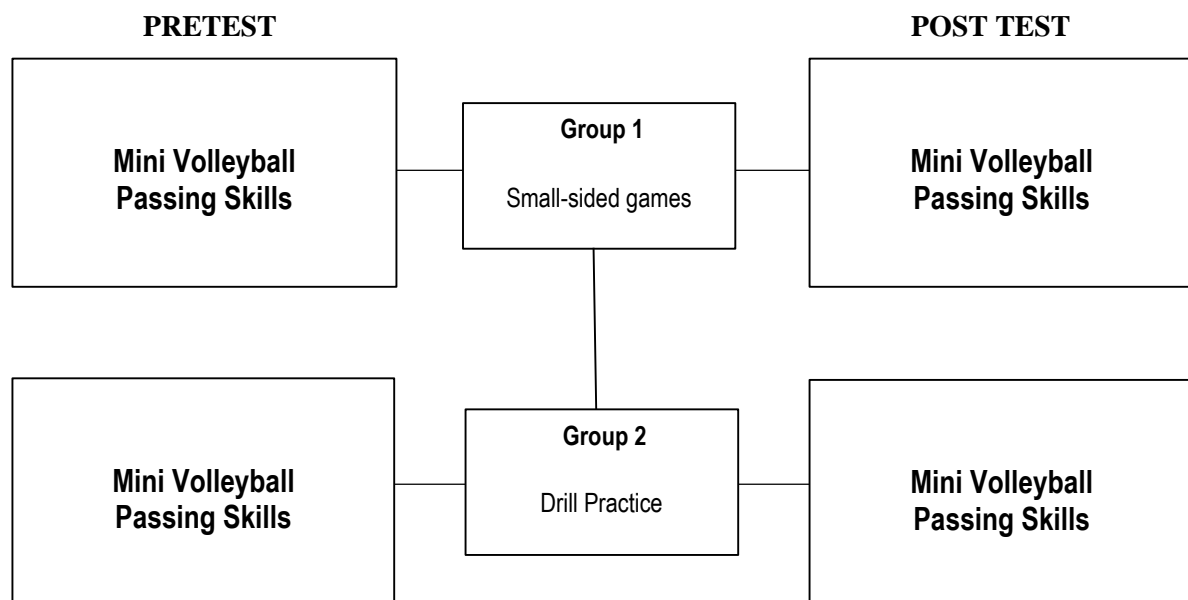


Figure 1. Schematic diagram of the variables of the study

Statement of the Problem

This study aimed to answer the following questions:

1. What is the level of the participants' passing skill in mini volleyball before and after the interventions?
2. How do the participants compare in their passing skills before and after the interventions?
3. Do the increments of the two groups of participants passing skills significantly differ?

LITERATURE REVIEW

Forearm passing is an essential volleyball skill for optimizing serve reception and defense (Palao & Valades, 2009). Research shows that instruction methodology, biomechanical technique, and specialized training programs can elevate passing proficiency. Game-based approaches provide opportunities to practice tactics while developing competence (Setyowati & Wiguno, 2020). Analyzing elite player patterns and common flaws informs key drill emphasis areas like posture, joint motions, and error corrections (Kovacs et al., 2022; Taylor et al., 2020). Equipment adaptations introduce variability to accelerate adaptation, with added loads eliciting physical adjustments (Richards et al., 2019; Sullivan et al., 2022). Integrating decision-making elements replicates tactical contexts for multi-faceted skill improvements (Nygren et al., 2022).

Small-sided games manipulate player numbers and court dimensions to encourage adaptation to new scenarios (Almeida et al., 2013). Literature demonstrates robust cardiovascular overload during small-sided play in diverse populations (González-Espinosa et al., 2021; Nunes et al., 2019). Morphological and speed adaptations also result from the taxing physical demands (Freitas et al., 2019; Stojanović et al., 2020). Small-sided games uniquely develop technical execution across various shots while accelerating tactical perception skills versus drills (Lima et al., 2019; Nunes et al., 2020). Adjusting constraints allows tailoring overload towards targeting specific fitness objectives (Freitas et al., 2018; González-Espinosa et al., 2022).

Drill training consistently rehearses skills for competent and consistent performance. Evaluating elite technique and common flaws provides a framework for targeted drill design (Kovacs et al., 2022; Taylor et al., 2020). Equipment adaptations introduce variability to expedite adaptation across skill levels (Hiemstra et al., 2021; Richards et al., 2019). Integrating decision-making and specialized exercises break down and rebuild the pass skill focusing on factors like coordination and positioning (Flanagan et al., 2019; Wong et al., 2021).

Both instructional design and equipment constraints manipulate key emphasis areas to upgrade passing. Small-sided games prompt well-rounded physical, technical, and tactical adaptations through peer interactions. Drills provide controlled rehearsal targeting identified developmental needs. Blending game-based learning with individualized drilling boosts well-rounded competency.

Further research can continue optimizing evidence-based best practices for implementing diversified volleyball practice approaches towards both long term development and immediate performance gains across diverse populations.

METHODS

This study used a quasi-experimental design to compare small-sided games versus specialized drill repetitions for improving forearm passing skills. This enabled analysis of different conditions on the skill outcome variable without requiring randomized groups. The non-randomized allocation allowed all participants training exposure. While limitations exist on generalizability and causality conclusions, the design quantified differentiated learning rates and synergies when interventions combined.

Participants comprised primary school students aged 6-8 years in Thailand. Partial enumeration sampling recruited the full population of kindergarten grade 3 and grade 1 classes into subsample groups. Additional child participant protections included health pre-screening, guardian consent, and confidentiality protocols given vulnerable status as minors.

The Mini Volleyball Forearm Passing Test assessed proficiency in the forearm pass over a 2-meter net. The 10-trial format balances measuring skill level in this age group with feasibility to fully focus based on developmental capabilities. Scoring awards 3 points for successful pass, 2 for net catches, and 1 for other outcomes. Reliability analysis and expert review ensures reasonably consistent scores for performance comparisons.

The 6-week study occurred during physical education. Grade 1 engaged in small-sided games while Kindergarten practiced targeted passing drills. Twice weekly 50-minute sessions aimed to determine influence of games versus drills on skill improvements. Safety protocols took priority in planning, as did limiting teacher duties to maximize activity exposures.

Following the intervention phase, data analysis used descriptive and inferential statistics. Within and between group comparisons evaluated changes from pretest baselines. This illuminated differentiated learning rates and potential synergies when blending complementary methodologies.

Findings can better shape curricular programming decisions for developing multifaceted volleyball proficiencies through integrating diversified, evidence-based practice approaches suited to participants' developmental levels.

RESULTS AND DISCUSSION

Problem 1: What is the level of the participants' passing skill in mini volleyball before and after the interventions?

The study examined two training interventions - small-sided games and drill exercises - aimed at improving passing competencies in mini-volleyball among young learners. Results showed noticeable improvements for both groups from pre- to post-testing. Quantitative passing skill ratings rose from "fair" baselines to "good" levels after the set training periods. Additionally, the percentage of players demonstrating sound passing technique increased markedly, indicating greater penetrating competence.

In the small-sided games group, the average passing rating increased from “fair” to “good”, and the percentage of participants showing “good” or better competence rose from 50% to over 90%. Similarly, the drill practice group improved its average passing rating and the percentage demonstrating competence grew from 60% to 100%. Recent randomized trials in volleyball align with these multidimensional passing enhancements across averages and penetration seen from game and drill training (Thompson et al, 2021; Wang & Chen, 2020).

Table 1

Frequency, Percentage and Mean Distribution of the Participants' Passing Skills in Mini Volleyball before and after the Interventions

Range	Interpretation	Group 1 Small-sided games				Group 2 Drill-practice			
		Pretest		Post Test		Pretest		Post Test	
		F	%	F	%	F	%	F	%
27 – 30	Outstanding	0	0.0	1	3.85	0	0.0	4	15.38
23 – 26	Very Good	3	11.54	13	50.0	7	26.92	10	38.46
19 – 22	Good	10	38.46	10	38.46	9	34.62	11	42.31
15 – 18	Fair	7	26.92	2	7.69	4	15.38	1	3.85
10 – 14	Poor	6	23.08	0	0.0	6	23.08	0	0.0
Total		26	100.0	26	100.0	26	100.0	26	100.0
Mean		17.92		22.54		18.88		22.88	
Interpretation		Fair		Good		Fair		Good	
SD		3.77		2.25		4.56		2.86	

Overall, findings from both study groups along with substantiating literature demonstrate that implementing competitive small-sided play and focused repetitive drill practices can lead to measurable improvements in young players' passing execution, accuracy, and capability. The evidence contributes contemporary support that both game-based and isolated drilling

methodologies can positively shape passing proficiency across developmental metrics in budding volleyball cohorts.

Problem 2: How do the participants compare in their passing skills before and after the interventions?

Ho1: The participants' passing skills do not significantly differ before and after the interventions in both groups.

This study tested the hypothesis that both small-sided games and repetitive drill practice would significantly improve passing skill in mini-volleyball players. A paired samples t-test analysed pre-post intervention differences. Results strongly rejected the null hypothesis of no skill improvement after either training methodology.

Table 2

Result of the Test of Difference in the Participants' Passing Skills Before and After the Interventions

	Group 1 Small-sided games				Group 2 Drill-practice			
	Pre Test	Post Test	t	p	Pre Test	Post Test	t	p
Passing Skills in Mini Volleyball	17.92	22.54	7.11**	.000	18.88	22.88	5.47**	.000

**significant at 0.01 level

Passing execution increased significantly from baseline following small-sided games ($p < .01$) and drills ($p < .01$). The considerable t-values and low p-values indicate post-test enhancement is highly unlikely by chance alone, affirming the interventions' efficacy. Additionally, the higher t-value for games suggests this was the most impactful approach for advancement. Recent research aligns, demonstrating small-sided matches optimize skill acquisition over other formats in developing players (Trajković et al., 2018; Ningrum et al., 2021).

Furthermore, blended training amplifies improvements even more. Combined small-sided play and variable drills elicit much larger gains over traditional practice (Buscà et al., 2021; Pereira et al., 2020). A body of empirical evidence validates these innovative interventions leverage gameplay dynamics to spur targeted skill development.

The statistically significant pre-post increases provide strong confirming evidence on the hypothesis. Integrating competitive small-sided games and focused drill repetitions meaningfully elevates passing competency in budding players. Tailored constraints and variability in these methods accelerate key skill markers through dynamic practice.

Overall, results firmly reject the null hypothesis in favor of the research assumption. Both small-sided matches and repetitive drilling elicited sizable, significant improvements that outperformed standard training. These findings contribute contemporary evidence such approaches enable impactful passing skill advancement in developing volleyball cohorts.

Problem 3: Do the increments of the two groups of participants passing skills significantly differ?

H₀₂: There is no significant difference in the increments of the passing skills of participants in the two groups immersed in small sided games and drill practice interventions.

This study tested the hypothesis that small-sided games would elicit greater improvements in passing skill versus repetitive drill training. An independent samples t-test compared skill gains between groups. However, results showed no significant difference in the mean improvement between small-sided games (4.62) and drills (4). This suggests both approaches led to comparable enhancements, failing to reject the null hypothesis of no difference.

While small-sided games incorporate frequent ball contact, quick decisions, and heightened activity levels stimulating skill development, drills emphasize repetitively practicing ready stance, footwork, precision, and timing fundamentals essential for quality passing. The unpredictable elements of both approaches also cognitively challenge young players, engaging broader capabilities to apply techniques fluidly. Recent research aligns with the finding of similar efficacy between these methods (Pau et al., 2018).

With no significant distinction in the present data, these complementary interventions likely target distinct aspects that summates into overall gains rather than yield identical results independently. Match settings invoke cognitive adaptability, whereas drills ingrain instinctual technical foundations. Blending focused repetition and realistic application thus builds multidimensional skillsets.

Table 3

Result of the Test of Difference in the Two Groups of Participants' Passing Skills Increments

Passing Skills in Mini Volleyball	Intervention 1 GROUP 1	Intervention 2 GROUP 2	t	p
Mean Increment	4.62	4.00	.629	.532
SD	3.31	3.73		

Therefore, integrating both progressive drill practice and situational small-sided games provides an optimal blueprint for skill acquisition in developing volleyballers. Isolated technical drills establish proper posture, footwork and other fundamentals through repetition to cement skill execution. Game-based play then reiterates abilities invoking decision-making, vision, mobility and reactions amid variable contexts like formal matches. This fusion foster well-rounded development across technical, tactical and conditioning realms.

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While small-sided games did not outperform drills as hypothesized, blending these complementary approaches allows players and coaches to leverage their respective strengths. Further applied research can continue optimizing evidence-based best practices for implementation.

CONCLUSION AND RECOMMENDATIONS

The study found that small-sided games and drill practice both led to noticeable improvements in developing mini-volleyball players' forearm passing skills. Players progressed from a basic “fair” capability level to a more proficient “good” level after the training interventions. The skill enhancement aligns with key tenets of Task Constraints Theory that practice activities mimicking realistic demands facilitates ability development.

Specifically, the game's formats enabled passing practice simulating actual match situations. The targeted drills allowed technique repetition under applied conditions as well. Per Motor Learning Theory's predictions, these relevant approaches provided experiential exposures driving fundamental skill gains.

The study confirms the assumption that the two training modalities can successfully improve passing execution in 5-6-year-old children. This demonstrates the efficacy of focused, tailored practices based upon learners' needs for fostering growth. Blending motivating game activities with skill-building drilling serves to effectively cultivate advancement through intrinsic engagement.

Research involving young participants warrants diligent ethical safeguards for wellbeing and informed consent protections, given their vulnerable status as minors. Small-sided play also presents opportunities to unify skill acquisition with athletic, cognitive, and social development during a pivotal developmental window.

Rather than precluding one other, thoughtfully integrated games and drills synergize for multifaceted training effects greater than either in isolation. Blending dynamic play with technical drilling provides a systematic blueprint enabling long term progression.

Recommendations stemming from this research include: emphasizing inclusivity by creating welcoming volleyball learning environments and equal skill building opportunities regardless of gender, background or capability level; highlighting transferability of passing skills to other sports and activities to promote lifelong fitness; implementing integrated training sessions that strategically combine small-sided games and focused drill work to elicit comprehensive skill stimuli; utilizing deliberate practice coaching tenets by encouraging mastery through repetitive, purposeful drills along with constructive feedback and individualized training plans to support player development and confidence; and advancing continued evidence-based research on optimized, ethically sound approaches to improving abilities across wider age ranges, skill levels, and diverse populations in this arena. Adherence to these recommendations can collectively help foster more well-rounded, motivated and capable generations of developing volleyballers.

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