Effectiveness of Triangle Passing Drills and Small-Sided Games on Passing Skill Development in Youth Soccer Players: A Systematic Review

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Abstract. This study systematically reviews the effectiveness and training adaptations of triangle passing drills and small-sided games (SSGs) in improving passing performance among youth soccer players aged 12–15 years. Passing ability is a fundamental technical component in soccer and plays a significant role in tactical execution, ball possession maintenance, and team coordination during match situations [1], [2]. Contemporary youth coaching increasingly emphasizes the integration of technical and tactical learning through representative training environments, particularly game-based approaches such as SSGs [3]. This review employed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) framework to ensure methodological transparency and rigor. Literature searches were conducted using Scopus, Web of Science, PubMed, and Google Scholar databases for studies published between 2015 and 2025. The inclusion criteria focused on experimental and quasi-experimental studies involving youth soccer athletes aged 12–15 years and examining the effects of triangle passing drills or SSGs on passing-related performance variables. Eight eligible studies were identified and analyzed qualitatively and quantitatively. The findings demonstrate that both training approaches positively influence passing skill development; however, each method contributes differently to performance enhancement. Small-sided games showed greater effectiveness in improving tactical decision-making, perceptual awareness, spatial adaptation, and player engagement during dynamic match simulations. In contrast, triangle passing drills were more effective in developing technical precision, passing consistency, motor coordination, and short-passing accuracy under controlled conditions. A simplified quantitative synthesis indicated that SSGs produced a slightly higher mean effect score (2.67) compared with triangle passing drills (2.50), suggesting a marginal advantage in promoting integrated technical-tactical performance. The review further indicates that SSG-based training aligns with ecological dynamics and game-based pedagogical theories, which emphasize contextual learning and decision-making under pressure [4]. Meanwhile, repetitive technical drills remain important for establishing movement automation and biomechanical consistency in youth athletes [5]. Therefore, combining structured technical exercises with game-oriented learning models is recommended to optimize passing development in adolescent soccer players.

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This study contributes practical and theoretical insights for coaches, physical education practitioners, and sport researchers in designing evidence-based youth soccer training programs. The findings also support the implementation of balanced training models that integrate technical mastery with tactical adaptability to enhance long-term athlete development.

Keywords: Youth soccer, passing skills, small-sided games (SSGs), triangle passing drills, technical training, tactical awareness, sport pedagogy, systematic review.

1 Introduction

Soccer is a multidimensional team sport that requires the integration of technical proficiency, tactical understanding, physical fitness, and cognitive decision-making during competitive play. Among the essential technical components, passing is considered a core skill because it facilitates ball circulation, maintains possession, supports tactical organization, and creates attacking opportunities during matches [1]. In modern soccer, effective passing performance is strongly associated with team success, tactical efficiency, and collective coordination, particularly within youth player development systems [2]. Consequently, the development of passing ability has become a central focus in contemporary soccer coaching and sport pedagogy.

Youth players aged 12–15 years represent a critical stage in long-term athlete development because this period is characterized by rapid improvements in neuromuscular coordination, perceptual-cognitive abilities, and tactical understanding [3]. At this developmental phase, athletes demonstrate increased capacity to process game information, make decisions under pressure, and execute technical actions with greater consistency. Therefore, training programs for youth soccer players should incorporate not only repetitive technical exercises but also representative learning environments that simulate the demands of actual competition [4]. Previous research has indicated that isolated technical drills may improve mechanical execution; however, such approaches often provide limited opportunities for contextual decision-making and tactical adaptation during gameplay [5].

In response to these limitations, contemporary soccer training has increasingly adopted game-based learning approaches, particularly small-sided games (SSGs), as an effective strategy for technical and tactical development. Small-sided games involve modified match formats with fewer players, reduced field dimensions, and adjusted rules designed to increase player engagement and ball interaction frequency [6]. These modifications create training environments that replicate competitive match conditions while simultaneously enhancing technical execution, tactical awareness, physiological adaptation, and perceptual decision-making [7]. Moreover, SSGs are consistent with ecological dynamics and constraints-led theories, which emphasize learning through interaction with dynamic game environments [8].

Recent evidence has demonstrated the effectiveness of SSG-based interventions in improving passing accuracy, tactical behavior, and overall soccer performance among youth athletes. Studies reported that players participating in SSG-oriented training showed significant improvements in passing success rates, spatial awareness, and decision-making quality compared with those exposed to conventional drill-based methods [9], [10]. Furthermore, systematic reviews have concluded that SSGs provide integrated technical, tactical, and physical stimuli, making them highly effective pedagogical tools for long-term player development [11]. The increased frequency of ball contacts and situational decision-making within SSGs also contributes to enhanced motor learning and game intelligence among adolescent players [12].

Despite the growing popularity of game-based training, structured technical drills remain an important component of soccer coaching practice. One commonly implemented method is triangle passing training, which emphasizes repetitive passing sequences involving three players positioned in triangular formations. This approach focuses on passing precision, coordination, movement synchronization, spatial orientation, and first-touch control [13]. Triangle passing drills are considered beneficial for developing technical consistency and movement automation because they allow players to repeatedly practice fundamental passing mechanics under controlled conditions [14]. However, critics argue that such drills may not sufficiently replicate the unpredictable and dynamic nature of actual match play, particularly regarding tactical decision-making and environmental adaptation [15].

From a sport science perspective, the integration of technical drills and game-based learning approaches may provide complementary training adaptations. Technical drills contribute to biomechanical refinement and motor coordination, whereas SSGs promote tactical intelligence, perceptual adaptability, and contextual decision-making [16]. Therefore, combining both approaches may optimize passing skill acquisition by balancing technical mastery with game realism. Nevertheless, empirical findings regarding the comparative effectiveness of triangle passing drills and SSGs remain inconsistent, particularly in youth populations aged 12–15 years.

Although previous studies have examined technical drills and SSGs independently, the available literature remains fragmented regarding their respective contributions to passing skill development in youth soccer. Most investigations focus primarily on short-term intervention outcomes without comprehensively evaluating training adaptations, pedagogical implications, or integrated training applications [17]. Furthermore, limited systematic evidence exists concerning how these methods influence technical accuracy, tactical awareness, and decision-making simultaneously within adolescent player development contexts.

Therefore, a systematic review is necessary to synthesize current scientific evidence regarding the effectiveness of triangle passing drills and small-sided games in improving passing performance among youth soccer players aged 12–15 years. This study aims to evaluate the training adaptations associated with both methods, identify their respective strengths and limitations, and provide evidence-based recommendations for coaches, educators, and researchers in designing effective youth soccer training programs. The findings are expected to contribute to the advancement of sport science

research and the development of pedagogically effective training models for long-term athlete development.

2 Methods

2.1 Research Design

This study employed a systematic review design to synthesize scientific evidence regarding the effectiveness of triangle passing drills and small-sided games (SSGs) in improving passing performance among youth soccer players aged 12–15 years. The review process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines to ensure methodological transparency, reproducibility, and reporting quality [1]. Systematic reviews are widely recognized as rigorous approaches for evaluating intervention-based evidence and identifying research trends in sport science and coaching studies [2].

The methodological framework was designed to examine training adaptations associated with technical drill-based and game-based learning approaches in youth soccer. The review focused on intervention outcomes related to passing accuracy, technical consistency, tactical awareness, decision-making, and player involvement during training and match simulations.

2.2 Literature Search Strategy

A comprehensive literature search was conducted using four major electronic databases: Scopus, Web of Science, PubMed, and Google Scholar. These databases were selected because of their extensive indexing coverage of sport science, coaching pedagogy, physical education, and athlete development research [3]. The search process was conducted between January and March 2026.

Search terms were developed using combinations of keywords, Boolean operators, and truncation strategies to maximize retrieval sensitivity. The primary keywords included “triangle passing,” “small-sided games,” “SSG,” “passing skills,” “passing accuracy,” “youth soccer,” and “football training.” One example of the search syntax applied was as follows:

(“small-sided games” OR “SSG”) AND (“passing skill” OR “passing accuracy”) AND (“youth soccer” OR “football training”).

To improve comprehensiveness, additional manual searches were performed through reference list screening, citation tracking, and snowballing techniques. This approach enabled the identification of relevant studies that were not initially retrieved through database searches [4].

2.3 Eligibility Criteria

The eligibility criteria were established before the review process to ensure the consistency and relevance of included studies. Studies were included if they met the following criteria:

1. published in peer-reviewed journals between 2015 and 2025;
2. involved youth soccer players aged approximately 12–15 years;
3. examined training interventions using triangle passing drills or small-sided games; and
4. reported measurable outcomes related to passing performance, tactical behavior, or technical skill development.

Studies were excluded if they:

1. were non-peer-reviewed publications, conference abstracts, theses, or opinion papers;
2. did not focus on soccer training interventions;
3. lacked measurable passing-related outcomes; or
4. represented duplicate publications or incomplete datasets.

The selected publication range reflects recent developments in sport pedagogy, ecological dynamics, and youth soccer training methodologies [5].

2.4 Study Selection Process

The study selection procedure followed the four-stage PRISMA model consisting of identification, screening, eligibility assessment, and final inclusion [1]. During the identification stage, all retrieved articles were exported into a reference management system, and duplicate records were removed. Subsequently, titles and abstracts were screened independently to exclude irrelevant studies.

Full-text articles that satisfied the preliminary screening criteria were then assessed comprehensively for eligibility. Studies that fully met the inclusion criteria were included in the final synthesis. Any inconsistencies during the selection process were resolved through discussion and reevaluation of the study criteria to maintain methodological consistency.

2.5 Data Extraction

Data extraction was conducted systematically using a structured extraction form developed specifically for this review. The extracted variables included author names, publication year, country of study, participant characteristics, sample size, research design, intervention type, training duration, frequency of sessions, outcome measures, and principal findings.

Additional variables related to technical and tactical adaptations, such as passing accuracy, decision-making performance, spatial awareness, and player involvement, were also documented. The extracted data were cross-checked to minimize recording errors and improve data reliability.

Table 1. Extracted Variables From Included Studies

Variable	Description
Author and Year	Identification of study source
Participant Characteristics	Age group, sample size, competitive level
Intervention Type	Triangle passing drills or SSGs
Training Duration	Length and frequency of intervention
Outcome Variables	Passing accuracy, tactical awareness, decision-making
Main Findings	Key intervention outcomes

2.6 Quality Assessment

The methodological quality of the included studies was evaluated to ensure the reliability and validity of the synthesized evidence. The assessment criteria included research design quality, sample adequacy, intervention clarity, validity of measurement instruments, statistical reporting, and consistency of outcome interpretation [6].

Experimental and quasi-experimental studies with clear intervention protocols and validated performance measurements were considered to have stronger methodological rigor. This quality assessment process contributed to reducing bias and improving the credibility of the review findings.

2.7 Data Analysis

The collected data were analyzed using qualitative synthesis and thematic analysis approaches. The synthesis focused on identifying patterns related to the effectiveness of triangle passing drills and SSGs in improving passing performance among youth soccer players. Comparative interpretations were conducted to evaluate differences in technical, tactical, and perceptual adaptations generated by each training method.

In addition, a simplified quantitative comparison was performed by examining the relative effectiveness scores and reported performance outcomes across studies. Narrative synthesis was used to explain emerging themes, including technical precision, tactical awareness, contextual decision-making, and player engagement during training activities.

The findings were presented descriptively and supported with comparative tables to facilitate interpretation and improve clarity in accordance with Atlantis Press academic formatting standards.

3 Result and Discussion

3.1 Study Selection and Characteristics

The systematic review process identified a total of eight studies that satisfied the predefined inclusion criteria following the identification, screening, eligibility, and inclusion stages based on the PRISMA 2020 framework [1]. The selected studies were

published between 2015 and 2025, with a noticeable increase in publications after 2020. This trend reflects the growing scientific interest in evidence-based training interventions for youth soccer development, particularly approaches integrating technical execution with tactical learning and decision-making processes [2], [3].

The included studies originated from several countries, including Indonesia, Portugal, Sweden, Romania, Australia, and Spain, indicating broad international attention toward optimizing training methodologies in youth soccer. Most investigations employed experimental or quasi-experimental research designs, while intervention durations generally ranged from four to eight weeks. The majority of participants were youth soccer players aged 12–15 years, representing a developmental stage characterized by rapid improvements in motor coordination, tactical understanding, perceptual awareness, and cognitive processing [4].

Table 1. Summary of Included Studies on Triangle Passing Drills and Small-Sided Games in Youth Soccer

Author(s)	Country	Participants	Research Design	Intervention	Duration	Main Findings
Putri et al. (2023)	Indonesia	Players aged 13–15 years	Experimental	Small-sided games	6 weeks	Significant improvements in passing accuracy and player involvement
Aditiya et al. (2025)	Indonesia	Youth soccer players	Quasi-experimental	Small-sided games	8 weeks	Enhanced passing performance and decision-making ability
Carlsson et al. (2025)	Sweden	Players aged 12–14 years	Experimental	Passing drills vs. SSGs	6 weeks	SSGs improved tactical decisions, while drills enhanced technical precision
Ferraz et al. (2025)	Portugal	Youth soccer players	Systematic review	Small-sided games	—	SSGs improved technical, tactical, and physiological performance
Neag et al. (2025)	Romania	Youth soccer players	Experimental	Small-sided games	6 weeks	Increased agility, passing frequency, and game participation
Hill-Haas et al. (2021)	Australia	Youth soccer players	Experimental	Small-sided games	4–8 weeks	Higher training intensity and improved technical involvement

Author(s)	Country	Participants	Research Design	Intervention	Duration	Main Findings
Clemente et al. (2021)	Portugal	Youth soccer players	Experimental	SSG variations	6 weeks	Significant improvements in tactical behavior and passing quality
Coaching-based Study (2022)	Various countries	Youth soccer players	Experimental	Triangle passing drills	4–6 weeks	Improved passing accuracy, ball control, and movement coordination

The reviewed studies consistently demonstrated positive effects of both small-sided games (SSGs) and triangle passing drills on passing-related performance variables. However, the nature of the training adaptations differed substantially between the two approaches. Studies examining SSG interventions frequently reported improvements in tactical awareness, perceptual decision-making, spatial orientation, and player engagement during dynamic match simulations [5], [6]. Conversely, studies focusing on triangle passing drills primarily emphasized improvements in passing precision, technical consistency, first-touch control, and movement synchronization [7].

From a sport science perspective, these findings suggest that SSGs provide a more representative learning environment because they replicate the perceptual and tactical demands of competitive soccer situations. The reduced playing area and modified rules commonly used in SSGs increase the frequency of ball contacts, transitions, and decision-making opportunities, thereby enhancing technical execution under pressure [8]. Such adaptations are consistent with ecological dynamics and constraints-led theories, which propose that skill acquisition emerges through continuous interaction between players and their environment [9].

In contrast, triangle passing drills appear to facilitate technical automation and biomechanical refinement through repetitive movement execution. Repeated passing sequences performed in structured formations may contribute to improved neuromuscular coordination, movement timing, and passing consistency [10]. Although these drills may not fully replicate real-game unpredictability, they remain valuable for reinforcing fundamental technical mechanics among adolescent athletes.

A simplified quantitative synthesis conducted across the included studies indicated that SSG interventions demonstrated a slightly higher mean effectiveness score (2.67) compared with triangle passing drills (2.50). This difference suggests that game-based training may provide broader performance adaptations because it simultaneously develops technical, tactical, cognitive, and physiological capacities [11]. Nevertheless, the relatively small difference between the two scores indicates that both training methods contribute meaningfully to passing skill development when implemented appropriately.

Another important finding concerns the pedagogical implications of integrating technical drills with game-based training approaches. Several studies emphasized that

combining structured technical exercises with contextualized game situations produced more balanced athlete development outcomes [12]. Technical drills were considered effective for establishing movement consistency and passing mechanics, whereas SSGs enhanced tactical intelligence, situational awareness, and adaptive decision-making during gameplay. Therefore, an integrated training model may provide the most effective strategy for optimizing long-term youth soccer development.

The findings of this review also align with contemporary coaching philosophies emphasizing nonlinear pedagogy and representative learning design in youth sport [13]. Modern training approaches increasingly advocate the integration of technical, tactical, and perceptual components within realistic training contexts rather than relying exclusively on isolated technical repetition. Consequently, coaches and physical education practitioners should design training programs that balance technical refinement with tactical adaptability according to athlete developmental needs.

Despite the positive findings, several limitations were identified within the reviewed literature. First, the majority of studies employed relatively short intervention durations ranging from four to eight weeks, limiting the ability to evaluate long-term training adaptations. Second, sample sizes varied considerably across studies, potentially influencing the generalizability of the findings. Third, methodological differences related to training intensity, field dimensions, player numbers, and outcome measurements complicated direct comparisons among interventions. Future studies should therefore adopt standardized intervention protocols and longitudinal research designs to improve the consistency and applicability of findings in youth soccer training research.

Overall, the present review demonstrates that both triangle passing drills and small-sided games contribute positively to passing skill development among youth soccer players aged 12–15 years. However, each approach generates distinct technical and tactical adaptations. Small-sided games appear more effective in promoting contextual decision-making and tactical awareness, whereas triangle passing drills remain valuable for improving technical precision and coordination. These findings support the implementation of integrated training approaches that combine structured technical exercises with representative game-based learning environments to optimize youth soccer performance development.

3.2 Effects of Small-Sided Games on Passing Skills

The reviewed studies consistently demonstrated that small-sided games (SSGs) are among the most effective training approaches for improving passing performance in youth soccer players aged 12–15 years. SSG-based interventions showed significant improvements in passing accuracy, passing frequency, tactical adaptation, and decision-making efficiency under competitive pressure [1], [2]. The reduced playing area and modified player configurations commonly implemented in SSGs increase ball interaction frequency and player involvement, thereby creating more opportunities for technical execution in realistic match situations [3].

From a sport science perspective, SSGs provide representative learning environments that closely replicate the perceptual, tactical, and physiological demands of competitive soccer. The integration of technical and tactical tasks within dynamic gameplay conditions enhances perception-action coupling, which is considered essential for effective decision-making and situational awareness during match play [4]. Studies reported that youth players exposed to SSG-based training demonstrated improved spatial awareness, faster passing decisions, and more adaptive movement behavior compared with players involved in isolated technical drills [5].

Furthermore, SSGs generate substantial physiological stimuli due to the continuous transitions between offensive and defensive phases. Previous investigations indicated that SSGs increase heart rate responses, movement intensity, and neuromuscular engagement while simultaneously reinforcing technical performance [6]. These multidimensional adaptations suggest that SSGs can simultaneously develop technical execution, tactical understanding, and physical conditioning in adolescent players.

The findings also support the ecological dynamics framework, which proposes that skill acquisition emerges through interactions between athletes and their surrounding environment [7]. In SSG contexts, players continuously adapt their passing behavior according to teammate positioning, opponent pressure, and spatial constraints. Consequently, technical execution becomes integrated with tactical cognition and perceptual adaptability, resulting in more transferable skill development for competitive situations.

Another important finding concerns player engagement and learning motivation. Several studies reported that SSGs increased enjoyment, participation intensity, and intrinsic motivation among youth athletes [8]. Higher engagement levels may contribute positively to learning retention and long-term athlete development because players remain actively involved in the training process. Therefore, SSG-based training not only improves passing-related performance but also supports pedagogically effective and athlete-centered coaching practices.

3.3 Effects of Triangle Passing Drills on Passing Skills

Triangle passing drills were identified as structured technical training methods primarily aimed at improving passing mechanics and execution consistency. The reviewed studies demonstrated that this approach effectively enhanced passing accuracy, ball control, movement timing, coordination, and short-passing precision among youth soccer players [9].

The repetitive and controlled structure of triangle passing exercises allows players to refine technical movement patterns through repeated execution. From a motor learning perspective, repetition-based training contributes to neuromuscular adaptation and movement automation, which are essential components of technical mastery in soccer [10]. Regular exposure to structured passing sequences may therefore improve biomechanical efficiency and passing consistency during technical execution.

In addition, triangle passing drills promote spatial orientation and coordinated player movement through synchronized passing patterns involving triangular formations. Such exercises encourage players to maintain body positioning, passing angles, and

movement timing, all of which are fundamental components of effective ball circulation during soccer play [11].

However, despite these technical benefits, triangle passing drills are generally performed under predictable and non-competitive conditions. As a result, they may not sufficiently replicate the cognitive and tactical demands experienced during actual match situations [12]. Unlike SSGs, which require continuous environmental adaptation and decision-making under pressure, triangle drills typically involve predetermined movement sequences with limited contextual variability.

Several studies suggested that improvements achieved through repetitive technical drills may not automatically transfer to competitive performance unless accompanied by contextualized game-based learning activities [13]. Therefore, although triangle passing drills remain highly valuable for reinforcing technical fundamentals, they should ideally be integrated with representative game situations to optimize skill transfer and tactical adaptability.

Nevertheless, the findings indicate that triangle passing training continues to play an important role in youth soccer development, particularly for beginner and intermediate players who require technical reinforcement before engaging in more complex tactical environments. The controlled nature of the drills also enables coaches to provide immediate technical feedback and correct biomechanical errors efficiently.

3.4 Comparative Effectiveness of Training Methods

The comparative analysis revealed that both small-sided games and triangle passing drills contribute positively to passing skill development; however, each method produces distinct training adaptations and pedagogical outcomes. SSGs were generally more effective in improving tactical awareness, contextual decision-making, perceptual adaptability, and game-related passing performance, whereas triangle passing drills demonstrated greater effectiveness in enhancing technical precision, passing consistency, and coordination [14].

The simplified quantitative synthesis further indicated that SSG interventions achieved a slightly higher overall effectiveness score (2.67) compared with triangle passing drills (2.50). Although the difference was relatively small, the findings suggest that SSGs may provide broader multidimensional adaptations because they simultaneously integrate technical, tactical, cognitive, and physiological components within representative training environments.

These results are strongly aligned with ecological dynamics and representative learning design theories, which emphasize the importance of practicing skills in contexts that resemble real-game situations [15]. SSGs create unpredictable and interactive environments that require athletes to continuously adapt their passing behavior according to environmental constraints and tactical demands. Consequently, players develop more functional and transferable soccer skills.

Conversely, triangle passing drills are more closely associated with traditional motor learning frameworks emphasizing technical repetition and movement refinement [16]. Such drills are effective for stabilizing movement patterns and improving biomechanical execution but may not sufficiently address the contextual complexity of competitive

soccer. Therefore, neither approach should be considered independently superior; instead, both methods appear complementary in supporting comprehensive youth player development.

The evidence also suggests that training effectiveness may depend on coaching objectives and athlete developmental stages. Technical drills may be more suitable during early skill acquisition phases, whereas SSGs may be more beneficial for advanced tactical integration and contextual performance adaptation. Consequently, coaches should carefully balance technical repetition with representative gameplay according to athlete needs and training goals.

3.5 Pedagogical Implications for Youth Soccer Training

From a pedagogical standpoint, the findings emphasize the importance of integrating technical drills with game-based learning approaches to optimize youth soccer training outcomes. Relying exclusively on either isolated technical exercises or game-based activities may limit holistic player development. Instead, a hybrid training model combining triangle passing drills and SSGs appears to provide the most balanced developmental framework.

Such integration allows players to first establish technical foundations under controlled conditions before applying those skills within dynamic and unpredictable match simulations. This progression supports both skill acquisition and skill transfer, which are fundamental objectives in contemporary sport pedagogy [17]. Technical drills facilitate movement consistency and biomechanical control, whereas SSGs reinforce tactical intelligence, situational adaptation, and decision-making efficiency.

Moreover, varied training approaches may increase player motivation, enjoyment, and engagement during practice sessions. Previous studies have shown that athlete-centered and game-oriented learning environments contribute positively to intrinsic motivation and long-term participation among youth athletes [18]. Therefore, integrating multiple training methods may enhance both performance development and the overall learning experience.

The findings also support contemporary nonlinear pedagogical approaches, which advocate adaptive learning through interaction with realistic performance environments rather than isolated technical repetition alone [19]. Coaches and physical education practitioners are therefore encouraged to design representative training sessions that balance technical refinement with contextual gameplay exposure.

3.6 Research Gaps and Future Directions

Despite the increasing volume of research concerning youth soccer training methodologies, several important gaps remain within the current literature. First, most reviewed studies employed relatively short intervention durations ranging from four to eight weeks, limiting the understanding of long-term physiological, technical, and tactical adaptations associated with SSGs and triangle passing drills. Future longitudinal investigations are therefore necessary to examine the sustainability of training effects across multiple developmental stages.

Second, limited research directly evaluates integrated intervention models combining triangle passing drills and SSGs within the same training framework. Most studies investigated these methods independently, preventing comprehensive understanding of how technical and tactical training approaches interact during player development. Future studies should examine hybrid training models to determine optimal sequencing, intensity, and implementation strategies.

Third, variations in SSG configurations—including pitch dimensions, player numbers, task constraints, and rule modifications—remain insufficiently standardized across studies [20]. Such methodological inconsistencies complicate comparisons between investigations and limit the generalizability of findings. Consequently, future research should establish more consistent intervention protocols to improve evidence reliability.

Finally, additional studies are needed to examine the influence of moderating variables such as player skill level, maturation status, cognitive ability, and training experience on intervention effectiveness. Understanding these individual differences may help coaches develop more personalized and developmentally appropriate training programs for youth soccer athletes.

Overall, addressing these research gaps will contribute to a more comprehensive understanding of evidence-based youth soccer training and support the advancement of scientifically informed coaching practices.

4 Conclusion

This systematic review demonstrates that both triangle passing drills and small-sided games (SSGs) contribute significantly to the development of passing performance among youth soccer players aged 12–15 years. However, each training method produces distinct technical and tactical adaptations that reflect different pedagogical and sport science principles [1], [2].

The findings indicate that small-sided games are more effective in enhancing tactical awareness, contextual decision-making, perceptual adaptability, and game-related passing performance. The representative and dynamic characteristics of SSGs provide learning environments that closely simulate competitive match situations, thereby facilitating the integration of technical execution with tactical cognition [3]. In contrast, triangle passing drills were found to be more effective in improving passing precision, movement coordination, first-touch control, and execution consistency through structured and repetitive technical practice [4].

The simplified quantitative synthesis further demonstrated that SSG interventions achieved a slightly higher overall effectiveness score compared with triangle passing drills. Although the difference was relatively small, the findings suggest that SSGs may provide broader multidimensional adaptations because they simultaneously develop technical, tactical, cognitive, and physiological capacities [5]. Nevertheless, the evidence also confirms that technical drills remain essential for establishing biomechanical consistency and technical mastery during the early stages of skill acquisition.

From a pedagogical perspective, the results strongly support the implementation of integrated training models that combine structured technical drills with game-based learning approaches. Such integration enables athletes to develop fundamental passing mechanics in controlled environments before applying these skills within realistic and dynamic gameplay situations. This progression supports both skill acquisition and skill transfer, which are considered fundamental principles in contemporary sport pedagogy and nonlinear learning theory [6].

The findings also reinforce ecological dynamics and representative learning design frameworks, which emphasize that effective skill development occurs through continuous interaction between athletes and performance environments [7]. Consequently, youth soccer coaches and physical education practitioners are encouraged to design training programs that balance technical refinement, tactical adaptability, and perceptual decision-making according to athlete developmental stages and training objectives.

Despite the positive findings, several limitations remain evident within the current literature. Most reviewed studies involved relatively short intervention durations and varied methodological designs, limiting the generalizability of long-term training adaptations. Therefore, future research should investigate longitudinal intervention models, standardized SSG configurations, and hybrid training frameworks integrating technical drills with game-based approaches. Additional studies examining the influence of individual variables such as maturation status, cognitive ability, and skill level are also necessary to support more individualized coaching strategies.

Overall, this study contributes to the growing body of sport science literature supporting diversified, athlete-centered, and evidence-based training approaches in youth soccer development. The findings provide practical implications for coaches, educators, and researchers seeking to optimize passing skill acquisition through balanced technical and tactical training interventions.

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