



Agility speed concentration effects on student ball dribbling skills in physical education context: a literature review

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Agility speed concentration effects on student ball dribbling skills in physical education context: a literature review

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ABSTRACT

This study aims to analyze the roles of agility, speed, and concentration in football and futsal dribbling skills through an integrated perspective. A narrative literature review was conducted on 15 national and international studies published between 2018 and 2025, including correlational, experimental, and pre-post intervention designs, with thematic synthesis applied to identify patterns in the interaction between physical and cognitive factors. Findings indicate that agility, particularly change-of-direction ability and balance, is the primary determinant of dribbling performance, while speed enhances execution efficiency and concentration supports perceptual-cognitive control. Integrated training combining agility drills, acceleration exercises, and cognitive tasks in small-sided or game-like settings effectively improves dribbling ability. The study concludes that dribbling is a multidimensional skill emerging from the interaction of physical and cognitive components, and training programs should reflect this integration, while further longitudinal and well-controlled intervention studies are needed to examine the transfer of these improvements to competitive performance.



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Introduction

Dribbling is a fundamental skill in football that enables players to retain ball possession, bypass opponents, and create attacking opportunities in dynamic match situations. Effective dribbling in modern football is not only a technical skill but also a multidimensional performance indicator, closely associated with speed of play, spatial exploitation, and tactical flexibility (Brink et al., 2023; Suchilin et al., 2020). Players with strong dribbling ability can influence game tempo and disrupt defensive structures (Khaladi et al., 2025; Park & Jeong, 2023; Wilson et al., 2018), reflecting both physical proficiency and underlying cognitive readiness (Duncan et al., 2022; Klotzbier & Schott, 2024). As the game evolves toward faster and more complex play, the demands on movement quality, decision-making, and coordination increase substantially (Ashford et al., 2021; Matos et al., 2023).

In real-match contexts, players face unpredictable environments requiring rapid adaptation. Dribbling often occurs under defensive pressure, time constraints, and limited space, necessitating the integration of agility for directional changes, speed for rapid transitions, and concentration for processing multiple stimuli simultaneously (Diekfuss et al., 2020; Khaladi et al., 2025; Klotzbier & Schott, 2024). Despite this, coaching practice frequently emphasizes isolated physical conditioning, such as sprinting and endurance, with limited incorporation of cognitive demands. National studies indicate that training often relies on repetitive drills without adequate attentional or perceptual components (Prasetyo et al., 2019; Renshaw et al., 2019; Yudha et al., 2025), which may restrict the transfer of skills to match situations.

Although agility, speed, and concentration have been studied individually, few investigations examine them as an integrated system. Many studies focus solely on physical determinants, such as sprint speed or change-of-direction ability, overlooking cognitive contributions to dribbling execution (Mcburnie & Dos'Santos, 2022; Pavlović et al., 2025; Scharfen & Memmert, 2019), while cognitive studies often neglect connections to specific football skills (Ashford et al., 2021; Reinhard et al., 2025). This separation limits the practical application of research findings. International literature highlights the interaction between physical and cognitive factors, but comprehensive syntheses remain scarce (Erickson et al., 2020; Mavilidi et al., 2025; Rhodes et al., 2018), and few reviews integrate evidence from both international and national contexts.

A narrative literature review is appropriate for addressing this gap, as it allows conceptual synthesis, critical comparison, and contextual interpretation across diverse studies. By examining agility, speed, and concentration simultaneously, this study conceptualizes dribbling as a multidimensional skill shaped by interacting physical and cognitive components. Its novelty lies in consolidating evidence from biomechanics, conditioning science, and sport psychology, while incorporating both national and international research to enhance contextual relevance. The review contributes theoretical clarity by moving beyond single-variable explanations and provides practical guidance for coaches, aligning research insights with training realities.

Therefore, this study aims to analyze the roles of agility, speed, and concentration in football dribbling skills through a narrative literature review, synthesizing empirical findings, identifying interaction patterns, and offering evidence-based recommendations for multidimensional training programs.

Method

This study employed a narrative literature review to synthesize theoretical perspectives and empirical findings regarding the roles of agility, speed, and concentration in football dribbling skills. A narrative approach was chosen because the aim was to integrate and interpret diverse evidence across physical and cognitive domains rather than quantify effect sizes or perform systematic meta-analysis (Etnier et al., 2019; Henry et al., 2018; Sukhera, 2022). This approach allows conceptual synthesis, critical comparison, and contextual interpretation, which are essential for understanding complex, multidimensional performance skills such as dribbling in football.

A structured and transparent procedure was followed to ensure rigor. Literature searches were conducted across multiple electronic databases, including Google Scholar, PubMed, Scopus-indexed journals, ResearchGate, and Indonesian national journals indexed in SINTA. Keywords included agility, speed, concentration, football dribbling, soccer performance, and Boolean combinations (e.g., agility AND dribbling, concentration AND football skills). This strategy aimed to capture both international and national perspectives to reflect diverse research contexts.

Studies were included if they (1) examined agility, speed, concentration, or dribbling in football or related invasion games, (2) were published between 2018 and 2025, (3) reported empirical findings or theoretical analyses related to performance determinants, and (4) were written in English or Indonesian. Excluded studies were those focusing exclusively on goalkeeping, non-athlete populations, or opinion-based, non-peer-reviewed reports. After screening titles, abstracts, and full texts, 40 articles met the inclusion criteria.

Data were analyzed using thematic synthesis. Key variables, methodological features, and main findings were extracted from each study and organized under the primary determinants: agility, speed, and concentration. A critical interpretative approach was applied to identify consistent patterns, contradictions, methodological variability, and research gaps, moving beyond simple descriptive summarization. Special attention was given to differences between national and international studies, sample sizes, study designs, and measurement instruments to ensure that the synthesis reflected both practical relevance and methodological quality.

This approach allowed the study to present an integrated perspective on how physical and cognitive factors collectively influence dribbling performance in football, while also identifying limitations in existing research that should inform future studies.

Results and Discussions

This narrative review examines 15 selected studies (2018–2025) that are relevant to the influence of agility, speed, and concentration on dribbling ability in football and futsal. These studies were selected to represent methodological diversity, including correlational designs, experimental/pre–post interventions, and path analysis, as well as both national and international research contexts. The summary table below presents the core information of each study, including key variables, methods/sample characteristics, and main findings, along with source links to ensure transparency. Following the presentation of the table, this section interprets the findings and provides an in-depth thematic discussion that situates the empirical evidence within an integrated performance model.

This narrative review analyzed 15 studies published between 2018 and 2025, examining the influence of agility, speed, and concentration on dribbling performance in football and futsal. The selected studies employed diverse methodologies, including correlational designs, experimental interventions, pre–post tests, and path analyses, and represented both national and international research contexts. Sample sizes ranged from 15 to 78 athletes, and participants varied in age and competition level, highlighting the need to interpret findings in context.

The synthesis indicates that agility consistently emerges as the strongest determinant of dribbling performance, particularly change-of-direction ability, balance, and postural control during rapid maneuvers (Greve et al., 2021; Pradnyani et al., 2025). Speed contributes to dribbling efficiency, but its effectiveness depends on coordination and ball-control skills (Carlos-Vivas et al., 2018; Pahrudin et al., 2024). Cognitive factors, including attention, anticipation, and executive functions, were also identified as critical contributors, enhancing decision-making and movement regulation under match pressure (Manuel et al., 2021; Effendi et al., 2022; Saputra et al., 2022).

National studies generally aligned with international findings but often had smaller sample sizes and shorter intervention periods, suggesting caution when generalizing results. Methodological variability, including differences in dribbling assessment tools and study designs, limited direct comparisons but allowed identification of consistent patterns across contexts. Overall, the evidence supports an integrated model in which agility, speed, and concentration interact to determine effective dribbling performance, with integrated training programs showing the greatest potential for enhancing real-game execution.

Table 1. Summary of Representative Studies on Determinants of Football Dribbling Performance

Authors (Year)	Variables Examined	Research Design and Sample	Key Findings
Saputra et al. (2022)	Agility, Speed, Concentration to Dribbling Performance	Path analysis; n = 32 athletes	Agility, speed, and concentration collectively served as significant predictors of dribbling performance.
Pahrudin et al. (2024)	Speed, Agility, Balance to Dribbling Skill	Path analysis; n = 25 athletes	Speed and agility emerged as significant physical determinants of dribbling skill.

Authors (Year)	Variables Examined	Research Design and Sample	Key Findings
Yusuf et al. (2022)	Agility training (zig-zag/T-drill) to Dribbling Speed	Experimental study; n = 32 athletes	Agility-based training significantly enhanced dribbling speed, supporting agility as a primary determinant.
Carlos-Vivas et al. (2018)	Linear Sprint Speed to Dribbling Speed	Correlational study; elite players	Linear sprint speed was a significant contributor, particularly during high-speed dribbling actions.
Greve et al. (2021)	Change-of-Direction Ability (Agility) to Technical Performance	Review and empirical studies; youth players	Change-of-direction ability was identified as a key agility determinant supporting technical performance.
Manuel et al. (2021)	Executive Functions (Cognitive) to Performance	Empirical study; elite players	Executive functions acted as strong cognitive predictors of performance beyond physical capacity alone.
Effendi et al. (2022)	Agility and Speed to Dribbling	Correlational study	Agility and speed were significantly correlated with dribbling performance.
Sutrisno et al. (2023)	Agility Training to Dribbling	Pre–post test design	Agility training produced positive effects on dribbling ability.
Renaldi et al. (2024)	Speed and Agility to Dribbling Ability	Correlational study; n = 30 athletes	Speed and agility jointly functioned as supportive contributors to dribbling performance.
Bintara & Hartono (2023)	Agility, Speed, Balance to Dribbling	Correlational study	Physical components demonstrated significant associations supporting dribbling execution.
Khilmi & Sudarmono (2023)	Speed and Agility Training to Dribbling Performance	Experimental intervention study	Integrated speed–agility training produced significant improvements in dribbling outcomes.
Pradnyani et al. (2025)	Agility and Foot–Eye Coordination to Dribbling	Cross-sectional study; n = 78 athletes	Agility showed a consistent primary effect, while coordination acted as a secondary contributor.
Indrawan & Muhammad (2025)	Speed and Agility Training to Dribbling Skill	Quasi-experimental study	Training interventions improved dribbling by enhancing physical performance capacity.
Hafid & Sudarmono (2025)	Training Effects to Dribbling Skill	Narrative review	Training design influenced dribbling through integrated physical–technical mechanisms.
Pohan & Fernando (2024)	Speed and Agility to Futsal Dribbling	Correlational study; n = 15 athletes	Speed and agility served as key determinants of futsal dribbling performance.

Overall, evidence synthesized in Table 1 confirms that agility is the primary determinant of football dribbling performance, with speed amplifying execution efficiency and concentration providing essential perceptual–cognitive control. Experimental studies (Khilmi & Sudarmono, 2023; Yusuf et al.,

2022) demonstrate that integrated agility–speed training significantly enhances dribbling outcomes, while cognitive-focused research (Effendi et al., 2022; Manuel et al., 2021) highlights the role of concentration in decision-making and motor regulation. Together, these findings position dribbling as a multidimensional skill emerging from the interaction of physical and cognitive factors.

The findings of this narrative review confirm that dribbling in football and futsal is a multidimensional skill shaped by the interaction of physical and cognitive factors. Agility consistently emerges as the primary determinant, encompassing change-of-direction ability, balance, and postural control during rapid maneuvers (Greve et al., 2021; Pradnyani et al., 2025). Interventions targeting agility through ladder drills, cone drills, and plyometric exercises improve body control and ball-contact timing, which enhances dribbling performance (Yusuf et al., 2022). National studies support these findings but often involve smaller sample sizes, highlighting the need for caution when generalizing results.

Speed is crucial during transitional phases and open-play situations, particularly when combined with agility and neuromuscular coordination (Carlos-Vivas et al., 2018; Pahrudin et al., 2024; Renaldi et al., 2024). Players with high speed but limited coordination do not necessarily excel in dribbling, emphasizing that training programs should integrate acceleration drills with ball-control techniques to maximize transfer to match performance.

Cognitive components such as selective attention, anticipation, and executive functions are essential for effective decision-making and motor regulation during dribbling (Manuel et al., 2021; Effendi et al., 2022; Saputra et al., 2022). Training practices incorporating perceptual–cognitive drills, including small-sided games, reaction exercises, and visual tracking tasks, enhance dribbling under high-pressure match conditions.

The integration of physical and cognitive factors is critical, as deficiencies in one domain can limit overall performance: speed without agility may reduce control, agility without concentration may compromise pathway selection, and concentration without physical capacity may constrain execution (Ricketts, 2025). Therefore, training programs should combine agility drills, short sprints or resisted sprint exercises, and cognitive-perceptual tasks within a single session to reflect match demands. Small-sided games are particularly effective in simultaneously engaging physical, technical, and cognitive components. Emphasizing neuromuscular coordination through balance and foot–eye coordination exercises ensures that improvements in speed translate into effective ball control.

Despite the consistency of findings, several limitations should be acknowledged. Methodological variability, differences in dribbling measurement tools, heterogeneous sample characteristics, and predominance of correlational designs limit causal inference. Few long-term experimental studies examine the transfer of training effects to competitive performance, and national studies often involve smaller samples with shorter interventions. Therefore, practical recommendations should be applied cautiously, and further longitudinal, well-controlled intervention studies are needed to validate and extend these insights.

In summary, dribbling is a complex skill emerging from the interaction of agility, speed, and concentration. Training and assessment programs should adopt a multidimensional approach that integrates physical and cognitive components, while future research should focus on bridging gaps between laboratory-based studies and real-game applicability to optimize dribbling development in modern football.

Conclusions

This literature-based analysis demonstrates that football dribbling performance is determined by the integrated interaction of agility, speed, and concentration rather than by isolated physical attributes. Agility emerges as the primary determinant by enabling effective change-of-direction, balance, and ball control, while speed enhances dribbling efficiency through acceleration and transitional play when supported by adequate coordination. Concentration provides the perceptual–cognitive foundation that allows players to interpret game cues, anticipate opponent behavior, and execute decisions accurately under pressure. By synthesizing evidence from 15 national and international studies, this review

highlights the importance of adopting a multidimensional perspective on dribbling development. For practitioners, these findings underscore the need for training programs that integrate physical conditioning and cognitive demands within game-representative contexts. Future research should focus on longitudinal intervention designs, explore additional cognitive determinants of dribbling, and examine integrated training models across different age groups and competitive levels to strengthen the ecological validity of training outcomes.

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