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Muscle explosive power and foot-eye coordination of leg were studied as direct and concentration-mediated effects on shooting ability of young soccer players

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ABSTRACT

This study examined the direct and indirect effects of leg muscle explosive power, eye-foot coordination, and concentration on the shooting ability of young soccer players. A correlational design with path analysis was employed. The participants were U-13 to U-17 players from SSB Binhar FC in Kerinci Regency, Indonesia. From a population of 55 players, 37 were selected through convenience sampling, and complete data were obtained from 28 players. Leg muscle power was measured using the Standing Broad Jump, eye-foot coordination with the Soccer Wall Volley Test, concentration through the Concentration Grid Test, and shooting ability using the Shooting Accuracy Test. Data were analyzed using SPSS 26 after normality, linearity, and multicollinearity assumptions were confirmed. The results showed that leg muscle explosive power ($\beta = 0.067$; $p = 0.006$), eye-foot coordination ($\beta = 0.331$; $p = 0.046$), and concentration ($\beta = 0.196$; $p = 0.048$) had significant positive effects on shooting ability. Concentration also partially mediated the relationship between leg power and shooting ability, as well as between eye-foot coordination and shooting ability, with an indirect effect of 0.121 for each path. Collectively, the three predictors significantly explained the variance in shooting performance ($p < 0.001$). In conclusion, shooting performance in junior soccer players is influenced by the integrated contribution of physical, coordinative, and psychological factors. Concentration plays a mediating role by directing physical and coordination abilities toward more accurate shooting execution. These findings support the implementation of integrated training programs combining physical conditioning, coordination drills, and concentration exercises to improve shooting performance in youth soccer players.

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Introduction

Soccer remains the most widely followed sport in the world, engaging billions of participants and spectators across cultures and, in many nations, functioning as a vehicle of national and community identity (Ardianto, 2013). Among the technical skills that determine competitive outcomes, shooting occupies a central position because it directly converts attacking play into goals (Sukirno, 2010). Effective shooting requires the coordinated expression of several biomotor and psychological qualities: sufficient explosive force in the kicking leg to generate ball velocity, precise coordination between visual perception and lower-limb action to ensure

directional accuracy, and the attentional control needed to execute the skill correctly under the time pressure and distraction typical of match play (Bompa, 1994; Habibie et al., 2019).

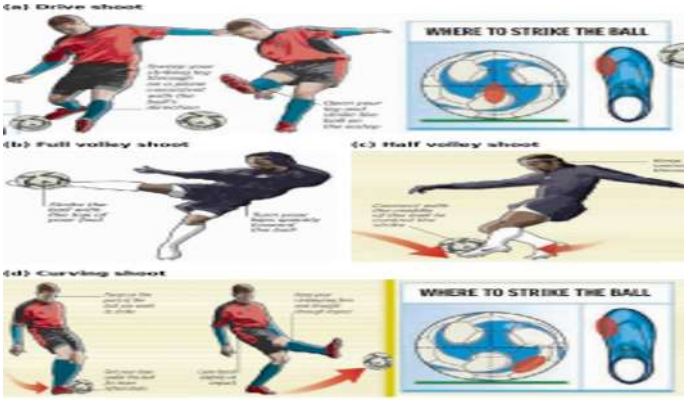

Figure 1 <Common Soccer Shooting Techniques examined in the Underlying Operational Definition of Shooting Ability: (a) Drive Shoot, (b) Full Volley Shoot, (c) Half Volley Shoot, and (d) Curving Shoot, this is in accordance with the Biomechanical Category of Shooting Techniques given by Lees and Nolan (1998)>

A considerable number of studies have looked at physical, coordinative, and psychological factors as determinants of kicking performance, but they have usually concentrated on one factor at a time. For example, leg muscle power has been the main subject of studies that have demonstrated how it helps athletes achieve kicking velocity and jump-related actions (Aminudin et al., 2020; Deprez et al., 2021), meanwhile, research has suggested an important role of eye-foot coordination in relation to ball-control and shooting accuracy (Diwa et al., 2016; Millard et al., 2022). Besides that, another strand of research concerns primarily with psychological aspects, showing that concentration and focus of attention are critical factors that govern target-directed actions in different sports (Mashuri et al., 2023; Milley & Ouellette, 2021; Moeinirad et al., 2022; Najib & Priambodo, 2019). A big question that still lacks clear answer, however, is whether these physical factors, coordinative factors, and psychological factors act independently or interact with one another and whether the effect of concentration is direct or it is rather the mechanism for the effect of physical and coordinative characteristics that lead to better kicking scores. Most previous work on football kicking predictors were from partial correlation or simple regression designs involving senior or professional players so we can see how grassroots youth-academy situations where technical skills are mainly formed are almost neglected within the existing international literature (Balyi et al., 2013; Gallahue et al., 2019).

This gap is basically a big deal. Youth development approaches like Long-Term Athlete Development (Balyi et al., 2013) highlight that between about 12 to 17 years the training age-band (Learning to Train and Training to Train stages) is when technical and physical aspects are most easily learned so it is vital to figure out how physical power, coordination, and concentration together influence technical outcomes like shooting during this age stage, not only in adult or senior players.

This paper is the first to explore football shooting in Indonesia using data collected from the youth players of SSB Binhar FC, Kerinci Regency, Indonesia who have had the issue of low scoring capability and a lack of tournament success over the past five years, a matter of concern for the coaching staff. Based on the theory connecting physical ability, coordination, and mental state with technical skill (Bompa, 1994; Effendi, 2016), this paper presents results of an investigation of the causal mechanism in the model where leg muscle xplosive power (X1), eye-foot coordination (X2), shooting skill (Y), concentration (X3) are variables and X1, X2, have direct effect on Y while indirect effects are through concentration (X3) that is a mediating factor.

This study's novelty lies in three aspects. First, it combines physical, coordinative, and psychological shooting ability predictors in one path analytical model which doesn't only look at them as separate characteristics but, in this way, the framework of biomotor skills of Bompa (1994) is further developed by introducing an explicit psychological-cognitive mediational pathway. Second, it selects in accordance with development, and the sampling is age-banded so that it complies with Long-Term Athlete Development principles (Balyi et al., 2013; Gallahue et al., 2019), and the U-10 age group that is likely younger is kept out to keep sampling uniformity. Third, it provides actual data from the grassroots youth academies in Indonesia that were not previously represented in literature so it fills the gap and complements a predominantly senior, professional, or Western oriented literature (Deprez et al., 2021; Millard et al., 2022).

This study accordingly tries to address these questions: (1) Do leg muscle explosive power directly determine shooting ability? (2) Does eye-foot coordination directly influence shooting ability? (3) Is concentration a direct contributor to the level of shooting skill among young soccer players? (4) Can one explain an effect via concentration when looking at an effect of leg muscle explosive power on shooting ability? (5) Is there a possible route where eye-foot coordination could affect shooting through the lens of concentration?

The operational and quantitative study of this paper tests the following six hypotheses: (H1) the power of the legs directly and positively predicts the ability to shoot; (H2) eye-foot coordination directly and positively predicts shooting ability; (H3) concentration directly and positively predicts shooting ability; (H4) leg muscle explosive power has an indirect effect on shooting ability through concentration; (H5) eye-foot coordination has an indirect effect on shooting ability through concentration; and (H6) a combination of leg muscle explosive power, eye-foot coordination, and concentration explains a statistically significant proportion of variance. Based on the theoretical premise that physical and coordinative qualities are translated into technical skills mainly via the attentional control mechanism that enables a player to cope with pressure situations, the indirect effect of concentration (H4, H5) on the factors of leg muscle explosive power and eyeFoot Coordination can be reasonably anticipated (Bompa, 1994; Habibie et al., 2019).

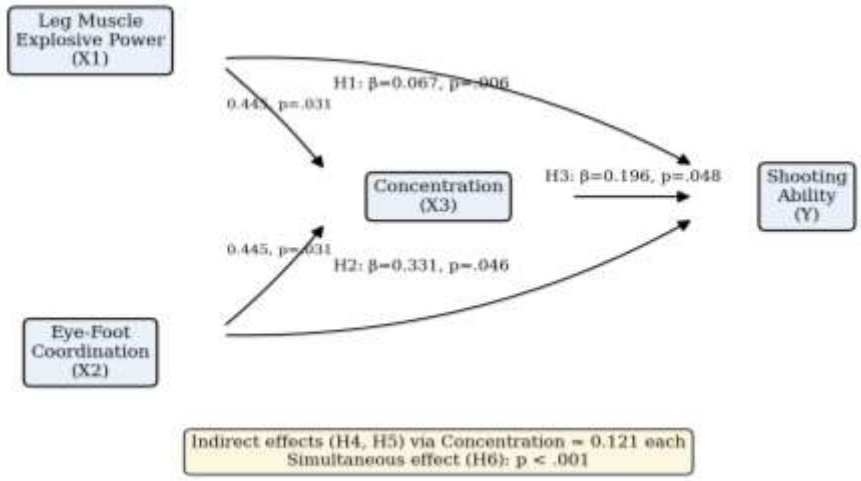

Figure 2 <Hypothesized Path Model Linking Leg Muscle Explosive Power (X1) and Eye-foot Coordination (X2) to Shooting Ability (Y), Directly and Indirectly through Concentration (X3), with Path Coefficients and Significance Values as Tested in Hypotheses H1–H6>

Method

Research Design

The research in question employed a quantitative correlational model combined with an application of path analysis to identify not only the immediate but also the mediated impacts of several key factors: lower body explosive power, hand-eye coordination, and concentration level on one's ability to shoot a soccer ball accurately and effectively, in line with Ridwan & Putra's (2021) work on soccer kicking. All of the measurements for leg muscle explosive power, eye-hand coordination, and concentration were obtained simultaneously at one time to determine the current state of relations between these three variables and the shooting ability in footballers through a correlational design. This was a cross-sectional design since all variables were measured at one point only, and data collected at that time was used to identify correlations among these variables.

Participants, Setting, and Sampling

Data gathering was done on 13 June 2026 at the SSB Binhar FC training ground in Tebat Ijuk Village, Kerinci Regency, Indonesia. The population comprises 55 SSB Binhar FC registered players. Purposive sampling was employed to select the U-13, U-15, and U-17 age categories, while the U-10 category that was a developmental stage according to Balyi et al., 2013 where players were at the FUNdamentals stage of motor development was excluded. Also, Gallahue et al., 2019 mentioned the fundamental movement-pattern refinement stage of the U-10 players and so by including them would have made developmental heterogeneity incompatible with the intention of the study. Therefore, 37 players through purposive sampling were obtained. Not all sampled players were present for each testing day so data complete across all four measurements of 28 players was collected which made up the final analytic sample. Nine from the original 37 players (24.3%) who were removed were missing full data for reasons of absenteeism on one or more testing days, as opposed to a voluntary withdrawal

or performance related dropout, and records that were available did not show that the players absence was related to age group, playing position, or the baseline ability; Nevertheless since no formal comparison of those who completed the study and those who did not could be carried out based on baseline characteristics, we cannot rule out the possibility of an unidentified attrition bias, which we mention again in the Limitations. p> To be honest, the three predictors entering the path model meant that our actual sample of n = 28 is lower than the commonly cited guideline figures for path analysis (e.g., approximately ten cases per predictor); therefore, we only consider the current results as a first, tentative approximation of the proposed model instead of an exact validation and this constraint on sample size will also be discussed in more detail under the Section Limitations.

Operational Definitions of Variables

Leg explosive power (X1) refers to the leg muscles' ability to produce the greatest amount of force in the briefest period of time to enable the player's shooting movement and the shot itself. The indicator used to measure leg explosive power was the distance (in centimeters) measured on the Standing Broad Jump. Eye-foot coordination (X2) is the process of combining visual cues with quick, accurate and precisely directed foot work during shoot, measured by a controlled kicking-and-receiving task. Concentration (X3) is the ability to focus completely on shooting execution without being hindered by internal or external disturbances; in the present model, concentration is considered as an intermediary (mediating) factor within the path analysis. Shooting power (Y) is the dependent variable and is described as the capacity to kick the ball towards a goal accurately, very fast and hard.

Instruments and Procedures

Prior validated field-based assessments of soccer physical demands were used as data collection tools. Standing Broad Jump. The Standing Broad Jump was employed to measure leg muscle explosive power through the horizontal explosive power of the lower limbs. In their study on soccer skills like acceleration, tackling, and shooting power, the authors of this paper cited by Deprez et al., 2021) identified explosive power as one of the decisive physical qualities in soccer. Participants had to stand behind the line with their feet shoulder-width apart and hands on their hips (no arm swing), then jump forward as far as possible and land simultaneously on both feet while maintaining balance for approximately 3 seconds. They jumped forward as far as possible and landed on both feet, with hands on hips, at the same time and kept balance for approximately 3 seconds. The nearest point at the heel was the measurement spot with distances from the start line to there being the record. Each participant made three tries in this test having a 60-second break after each jump, and the average distance (in cm) was used as the result, and the score was compared to the normative categories presented by Deprez et al. (2021).

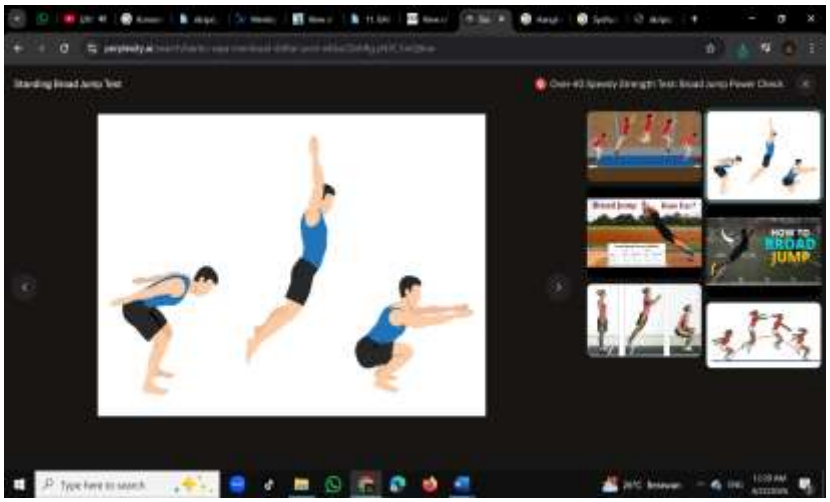

Figure 3 <Standing Broad Jump Test Procedure used to Assess Leg Muscle Explosive Power>

Soccer Wall Volley Test The Soccer Wall Volley Test (Wisesa & Siswantoyo, 2021) was used to measure participants' ability in controlling and reacting to a ball that comes quickly towards you and the eyes guide the legs. In this test, participants were allowed to kick the ball towards a target wall marked in front of them that was 2.44 m wide and 1.22 m high. From the kicking zone located behind the wall, 1.83 m away from it, ickers controlled/stepped around the ball with their non kicking feet before each shot. Three trials of only 20 seconds each will be carried out: each kick that actually reaches/lands the target area without ouching/control issues of ball, gets one point. The overall sum over all tries was the final score of the player's coordination. All trials were evaluated by a single trained rater who followed the standardized protocol of Wisesa and Siswantoyo (2021); however, a formal inter-rater reliability check was not done for this study, which is recognized as a limitation.

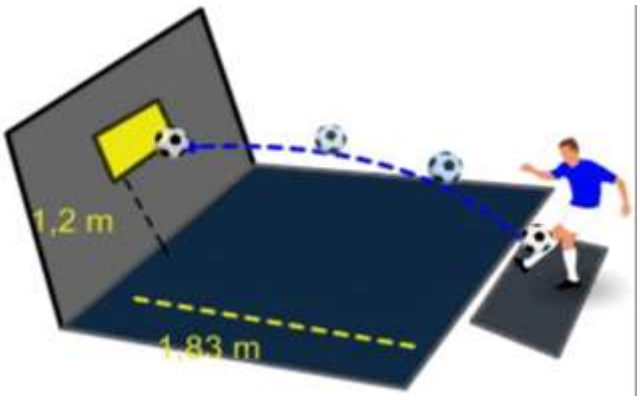

Figure 4 <Soccer Wall Volley Test Procedure used to Assess Eye-foot Coordination (Wisesa & Siswantoyo, 2021)>

Convergence Concentration Grid Task (C-CGT) Participants' concentration level was evaluated through the Concentration Grid Task (Convergence version; The well, 2006) which is extensively used and has shown good psychometric results in sports-related assessment of focused attention. The concentration score was efined as the number of correctly sequenced numbers that participants managed to find within a minute. The Concentration Grid Task has indeed proved to have good psychometric features, as a prior validation study reported it's validity coefficient at 0.912, $p < 0.001$; reliability 0.803. This supports the use of the instrument in the current sample.

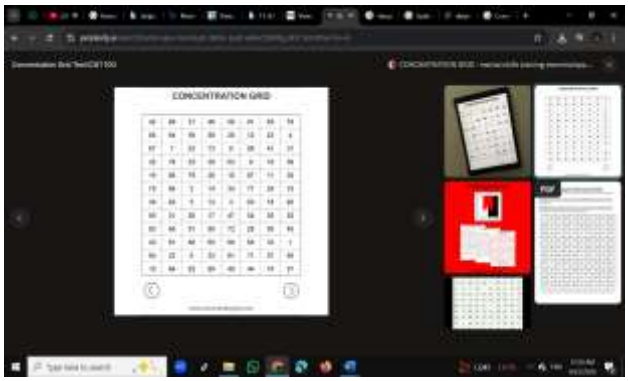

Figure 5 <Concentration Grid Test sheet used to assess sustained attention (Thelwell, 2006)>

Shooting Accuracy Test Participants shooting ability was measured with a shooting accuracy test (Nurhasan, 2001) based on a target. Subjects took shots at a goal that was split up into scoring zones of different widths. A shooters accuracy was determined as to which zone the shot reached over three consecutive shots; if a shot landed on the line separating two zones, it was given the score of the one with the larger value. Dating of the fossil remains was done according to the zone system set by Nurhasan (2001). Likewise, a single scorer determined the score, no formal inter-observer reliability check carried out, as was, it should be mentioned, the case with that coordination task too. Nevertheless, one should not forget that this was an obvious drawback of the measurement method, which the text deals with Figure 5.

Figure 6 <Shooting Accuracy Test Target Layout used to Assess Shooting Ability (Nurhasan, 2001)>

Data Analysis
Data were analytically examined via a path analysis method to distinguish the independent variables' direct from indirect impacts on the dependent variable. We calculated the four variables' descriptive statistics such as mean, standard deviation, minimum, and maximum values. There were three main checks for the assumption of the test. First, the normality of the data was checked through the Shapiro-Wilk test. For a sample of this size, the Shapiro-Wilk test was the most suitable test. Linear assumption was validated by using deviation-from-linearity test and the presence of a moderate to severe collinearity between variables was tested by looking at variation inflation factor (VIF) and tolerance. VIF values below 10 and tolerance values above 0.10 were considered as the indicators that a multicollinearity problem was not there anymore (Ghozali, 2018). Path coefficients were determined for two structural sub-models: $Y = pYX1 + pYX2 + pYX3 + \varepsilon 1$ and $X3 = pX3X1 + pX3X2 + \varepsilon 2$. Correlation and path coefficients estimates were carried out in SPSS, version 26. A hypothesis was accepted if the probability was below 0.05, i.e., $p < 0.05$.

Results and Discussions

Descriptive Statistics
Descriptive statistics of the four study variables based on the final analytic sample (n = 28) were summarized in Table 1. We found that the reliability and validity coefficients of the task (0.803 and 0.912) are very high for Concentration Grid Task. Other physical- and skill-performance tests were scored by a single-rater using a standardized scoring protocol, without being checked for inter-rater reliability. The collected sample, n=28, is actually smaller than usually recommended for a path model with three predictors.

Table 1 <Descriptive Statistics>

Variable	M	SD	Min	Max
Leg muscle explosive power (cm)	191.00	19.66	163	231
Eye-foot coordination (score)	11.00	2.82	5	16
Concentration (score)	11.00	4.32	4	19
Shooting ability (score)	11.00	2.80	6	15

On average, participants achieved a Standing Broad Jump distance of 191.00 cm (SD = 19.66; range = 163–231), an eye-foot coordination score of 11.00 (SD = 2.82; range = 5–16), a concentration score of 11.00 (SD = 4.32; range = 4–19), and a shooting-ability score of 11.00 (SD = 2.80; range = 6–15). For all four variables the standard deviation was smaller than the mean, indicating a moderate and not excessive spread of scores; concentration showed comparatively the greatest relative variability among participants, while eye-foot coordination and shooting ability showed comparatively more homogeneous distributions.

Assumption Tests

Table 2 <Results of the Normality, Linearity, and Multicollinearity>

Test / Relationship	Statistic (Sig.)	Status of the Assumption
Normality (Shapiro-Wilk), all four variables	$p > .05$	Normal
Linearity: Leg power → Shooting ability	0.311	Linear
Linearity: Eye-foot coordination → Shooting ability	0.055	Linear
Linearity: Concentration → Shooting ability	0.074	Linear
Linearity: Leg power → Concentration	0.306	Linear
Linearity: Eye-foot coordination → Concentration	0.889	Linear
Multicollinearity (VIF range across paths)	6.397–8.062	No multicollinearity (VIF < 10)

All four variables met the normality assumption (Shapiro-Wilk, $p > .05$). The deviation-from-linearity tests for all five relevant paths were non-significant ($p > .05$), supporting the linearity assumption required for path analysis. Variance Inflation Factor values across the model's paths ranged from 6.397 to 8.062, remaining below the conventional threshold of 10, indicating the model was free of problematic multicollinearity. These results confirmed that the data satisfied the statistical assumptions required to proceed with path analysis.

Path Analysis and Hypothesis Testing
Leg muscle explosive power significantly and directly influence shooting accuracy ($\beta = 0.067$, $p = 0.006$), the finding supported H1. Eye-foot coordination significantly and directly affected shooting accuracy ($\beta = 0.331$, $p = 0.046$), supporting H2. Concentration significantly, directly influenced shooting ability ($\beta = 0.196$, $p = 0.048$), supporting H3.

For the mediated pathways, through leg muscle explosive power, the coefficient of the relationship with the mediator (concentration) was 0.445 ($p = 0.031$), while the effect of the mediator (concentration on the outcome

(shooting ability) was 0.272 (p =.048); multiplying the two coefficients gave a total indirect effect of 0.121 which is the measure of a significant indirect effect of the predictor through the mediator onto the outcome (therefore, concentration is a significant mediator for the relation between leg muscle explosive power and shooting ability and this also supports H4). Eye-foot coordination exhibited a similar pattern; the effect of eye-foot coordination on concentration was also 0.445 (p =0.031). Adding the effect of concentration on shooting ability, which was 0.272 (p =0.048), a direct product of the two was 0.121 implying again that concentration acts in a significant way as a mediator for the link between eye-foot coordination and shooting ability and this also supports H5.

Table 3 <Summarizes the Path Coefficients and Significance Values for Each Hypothesized Relationship>

Hypothesized path	β / effect	p	α	Decision
H1: Leg power → Shooting ability	0.067	0.006	0.05	Supported
H2: Eye-foot coordination → Shooting ability	0.331	0.046	0.05	Supported
H3: Concentration → Shooting ability	0.196	0.048	0.05	Supported
H4: Leg power → Concentration → Shooting (indirect)	0.121	0.031 / 0.048*	0.05	Supported
H5: Eye-foot coordination → Concentration → Shooting (indirect)	0.121	0.031 / 0.048*	0.05	Supported
H6: Leg power, eye-foot coordination, concentration → Shooting (simultaneous, F test)	—	< 0.001	0.05	Supported

*Note. * Significance values for the two component regressions of the mediated (indirect) path, respectively the predictor→concentration link and the concentration→shooting ability link, as reported in the original path-analysis output.*

In the end the omnibus F-test (simultaneous) revealed that the three variables, namely explosive power of leg muscles, eye-foot coordination, and concentration, together, significantly predicted shooting ability (p <0.001), hence H6 was supported.

Discussion

We found evidence from multiple research studies (Aminudin et al., 2020; Khairon, 2025; Norgeot & Foué, 2024; Sammoud, 2024) that the greater the explosive strength of leg muscles, the more effectively one shoots a football or a ball in a soccer field. Biomatically speaking, the speed of the ball at the moment of kicking is greatly determined by how fast the kicker leg muscle works. Players with more explosive energy in their lower limbs are the ones who can generate higher propulsive forces and thus deliver much faster and deeper penetration shots that goalkeepers hardly able to block, while players possessing lesser explosive power would probably come up with weaker, goalkeepers-easier-to-save efforts. We are quite convinced in light of these findings that a higher leg explosive power is the key to the shooting of higher caliber. This pattern matches very strongly previous Indonesian studies of associations between leg muscle qualities and outcomes of shooting/kicking actions (Aminudin et al., 2020; Khairon, 2025) and fits very neatly into the wider biomotor-abilities approach in which strength and power provide the basis for sport-specific skill performances (Bompa, 1994). In addition, it is in full agreement with the recent line of research on the effect of plyometric/power training on youth soccer players which has consistently found such training to be effective in improving lower-explosive capacity as a factor of performance in matches (Norgeot & Fué, 2024; Sammoud, 2024).

Eye-foot coordination also significantly and positively predicted shooting ability (p = .046), corroborating evidence that visually guided control of foot movement is a determinant of shooting and passing accuracy in soccer (Diwa et al., 2016; Habibie et al., 2019). Because shooting requires a player to perceive the position of the ball, the target, and defenders while directing the foot with precision, players with superior eye-foot coordination can better synchronize visual input with motor output, producing more accurate strikes on goal. This finding is consistent with recent reviews emphasizing that visuomotor and foot-eye coordination skills are among the core visual-perceptual abilities underlying technical execution in soccer (Millard et al., 2022 It reflects very similarly the combination predictor evidence reported by Ridwan and Putra (2021). These authors discovered that lower limb strength, eye-foot coordination, and standing balance are three factors that together influence shooting ability in soccer.

Concentration also predicted shooting capability significantly and favorably (p =.048). It thus validates the previously mentioned findings where mental focus was found as an influential factor in contributing shooting performance in soccer At the moment a shooting action takes place, the player is required to track the ball, the goalkeeper, and the selected target at the same time while keeping out the distractions. This aligns with Mashuri et al.'s (2023) as well as Najib and Priambodo's (2019) research, in accordance with which players' degree of focus significantly determined soccer shooting accuracy; in addition, this is in agreement with attention-focus intervention studies conducted in other target-based sports demonstrating that changing the focus of attention from internal/externally instructed can be a way to enhance hitting performance under pressure (Milley & Ouellette, 2021; Moeinirad et al., 2022).

Concentration was also found to have a mediating effect such that the influence of explosive power in the leg muscles and eye-foot coordination on shooting capability passed mainly through concentration (indirect effect=0.121 for each of the two routes). This result implies that although physical and coordinative abilities provide a mechanical basis for shooting, players with high levels of explosive power and coordination would likely be more capable of directing their mental focus during performance for example, they would feel more sure of their own bodies and as a consequence would have fewer distractions caused by physical uncertainties and thus they can achieve greater precision in their shooting. This conclusion supports a different integration than the traditional biomotor-ability framework (Bompa, 1994) by introducing a cognitive-psychological factor along the physical-coordinative-pathway to technical execution, and at the same time the result is in line with modern bio-psycho-motor conceptions of skill execution, where physical readiness and attentional control are viewed as factors that affect sport performance in an interactive rather than exclusive way.

Finally, the simultaneous effect of leg muscle explosive power ($p<.001$), eye-foot coordination, and concentration on shooting ability suggests that shooting performance of a youth soccer player results from a combination of physical, coordinative, and psychological attributes that all work in parallel rather than be a single factor alone. This is a point that has practical coaching implications as training sessions that only focus on technical skills repetition or physical conditioning might be limited while integrating plyometric power, coordination, and concentration or attentional training into a unified training program might be youth-development-wise a better option. Still there are several limitations to the study, such as a small sample that was quite underpowered for the very complicated path model, cross-sectional one-time data collection, and the use of a single rater for scoring performance-based measures.

Conclusions

This study found that leg muscle explosive power, eye-foot coordination, and concentration each exert significant positive direct effects on shooting ability among youth soccer players, that concentration significantly mediates the effects of leg muscle explosive power and eye-foot coordination on shooting ability, and that the three predictors jointly and significantly explain shooting ability. These findings support an integrated view of shooting performance as a product of physical, coordinative, and psychological factors operating in concert, with concentration serving as a mechanism that channels physical and coordinative capability into accurate technical execution. Collectively, the results address the five research questions introduced in the first section and confirm Hypotheses H1, H6: leg muscle explosive power, eye-foot coordination and concentration each have a direct predictive relationship to shooting ability; the physical components are also working indirectly through concentration; and when considered together, these three variables contribute significantly to the explanation of shooting ability. In terms of theory, this approach is an advancement of Bompa's (1994) biomotor-ability system as concentration is considered to be an explicit psychological mediator and, instead, the physical, coordinative and mental qualities are seen as separate, additive influences.

For coaches, the findings suggest that youth training programs should combine plyometric exercises to develop leg muscle explosive power, coordination drills (e.g., wall-volley or target-kicking tasks) to develop eye-foot coordination, and structured concentration training to develop attentional control, rather than treating these as separate or optional components. For players, deliberately maintaining physical conditioning alongside attentional and coordinative practice may yield more consistent gains in shooting accuracy and power than technical repetition alone. For SSB Binhar FC and comparable grassroots academies, these results offer an evidence base for designing developmentally appropriate training curricula that balance physical, technical, and psychological preparation for players in the Learning to Train and Training to Train stages.

Several limitations should be considered when interpreting these findings. First, although the purposive sample targeted 37 players across the U-13, U-15, and U-17 categories, complete testing data were obtained from only 28 players because of absenteeism during data collection, limiting the generalizability of the findings to the wider population of youth soccer players. Second, the cross-sectional, correlational path-analysis design can quantify the magnitude of direct and indirect associations among variables but cannot establish definitive causal relationships. Third, because data were collected at a single time point, the design cannot capture how leg muscle explosive power, eye-foot coordination, concentration, or shooting ability may change over the course of training and competition. Fourth, the model examined only three predictors of shooting ability; other plausible contributors — including general leg strength, balance, flexibility, playing experience, motivation, self-confidence, and fatigue — were not included and may account for additional variance in shooting performance.

Further research should use bigger and better-represented participant pool from different academies, age groups, and levels of play to enhance generalizability of the results. Research with longitudinal or experimental (training-intervention) designs will allow for causal relationships between the physical, coordinative, and

psychological factors on the one hand, and shooting performance on the other to be determined. Adding variables such as leg strength, balance, agility, motivation, self-confidence, and competitive anxiety would enrich the understanding of the factors influencing shooting skill and would also shed light on the conditions that need to be met for concentration to act as a mediating variable between the physical qualities and technical skill in soccer.

References

Aminudin, Sugiyanto, & Liskustyawati, H. (2020). Kontribusi kekuatan otot tungkai dan koordinasi mata kaki terhadap ketepatan shooting sepak bola. Prosiding Senantias, 1(1), 411–418. [DOI not indexed in Scopus/Crossref at time of writing]

Ardianto, D. (2013). Sepak bola di Indonesia. Gramedia.

Balyi, I., Way, R., & Higgs, C. (2013). Long-term athlete development. Human Kinetics. [Book — no DOI]

Bompa, T. O. (1994). Periodization: Theory and methodology of training (2nd ed.). Kendall/Hunt Publishing Company.

Deprez, D., Fransen, J., Lenoir, M., Philippaerts, R. M., & Vaeyens, R. (2021). A longitudinal study of the growth in maturity-related physical performance in elite U-17 soccer players. Journal of Sports Sciences, 39(12), 1423–1432. https://doi.org/10.1080/02640414.2021.1881294

Diwa, Bustamam, & Saifuddin. (2016). Hubungan koordinasi mata-kaki dengan kemampuan shooting dalam permainan sepakbola pada klub sepakbola Himadirga tahun 2013. Jurnal Ilmiah Mahasiswa Pendidikan Jasmani, Kesehatan dan Rekreasi, 2(3), 235–244. https://media.neliti.com/media/publications/188338-ID-hubungan-koordinasi-mata-kaki-dengan-kem.pdf [DOI not indexed]

Effendi, H. (2016). Peranan psikologi olahraga dalam meningkatkan prestasi atlet. Nusantara (Jurnal Ilmu Pengetahuan Sosial), 1.

Gallahue, D. L., Ozmun, J. C., & Goodway, J. D. (2019). Understanding motor development: Infants, children, adolescents, adults (8th ed.). Jones & Bartlett Learning. [Book — no DOI]

Ghozali, I. (2018). Aplikasi analisis multivariate dengan program IBM SPSS 25. Badan Penerbit Universitas Diponegoro.

Habibie, M., Widiastuti, W., & Nuriani, S. (2019). Pengaruh metode latihan dan koordinasi mata–kaki terhadap keterampilan shooting dalam sepakbola. Multilateral Jurnal Pendidikan Jasmani dan Olahraga, 18(1), 25–31. https://doi.org/10.20527/multilateral.v18i1.6564

Khairon, M. D. (2025). Hubungan daya ledak otot tungkai dan koordinasi mata kaki terhadap kemampuan shooting pemain sepak bola. Jural of JPDO, 8(6), 2983, 2992. https://doi.org/10.24036/JPDO.8.9.2025.23

Lees, A., & Nolan, L. (1998). The biomechanics of soccer: A review. Journal of Sports Sciences, 16(3), 211–234. https://doi.org/10.1080/026404198366714

Mashuri, S., Muhamad, M., & Suryawan, K. (2023). Pengaruh konsentrasi pemain terhadap ketepatan shooting dalam permainan sepakbola. Jurnal Ilmu Keolahragaan, 11(2), 123–132. https://jurnal.untan.ac.id/index.php/jilo/article/view/64967 [DOI not indexed]

Millard, L., Breukelman, G., Mathe, N., Shaw, I., & Shaw, B. (2022). A review of the essential visual skills required for soccer: Beyond 20–20 optometry. Frontiers in Sports and Active Living, 4, 965195. https://doi.org/10.3389/fspor.2022.965195

Milley, K. R., & Ouellette, G. P. (2021). Putting attention on the spot in coaching: Shifting to an external focus of attention with imagery techniques to improve basketball free-throw shooting performance. Frontiers in Psychology, 12, 645676. https://doi.org/10.3389/fpsyg.2021.645676

Moeinirad, S., Abdoli, B., Farsi, A., & Ahmadi, N. (2022). Training visual attention improves basketball three-point shot performance under pressure. Sport Sciences for Health, 18, 853–861. https://doi.org/10.1007/s11332-021-00866-0

Najib, M., & Priambodo, A. (2019). Hubungan tingkat konsentrasi siswa terhadap hasil ketepatan shooting sepakbola. Jurnal Pendidikan Olahraga dan Kesehatan, 07(3), 427–431. https://ejournal.unesa.ac.id/index.php/jurnal-pendidikan-jasmani/article/view/31274 [DOI not indexed]

Norgeot, F., & Foué, A. (2024). Effects of vertical and horizontal plyometric training on jump performances and sprint force-velocity profile in young elite soccer players. European Journal of Applied Physiology, 124(9), 2591–2601. https://doi.org/10.1007/s00421-024-05477-4

Nurhasan. (2001). Tes dan pengukuran dalam pendidikan jasmani: Prinsip-prinsip dan penerapannya. Direktorat Jendral Olahraga. [Book — no DOI]

Ridwan, M., & Putra, D. (2021). Leg muscle strength, eye-foot coordination and balance associated with soccer shooting skill. Advances in Health Sciences Research, 35(ICSSHT 2019), 11–16. https://doi.org/10.2991/ahsr.k.210130.003

Rizki, Y. M. (2021). Hubungan konsentrasi dan power otot tungkai terhadap ketepatan shooting futsal siswa ekstrakurikuler. Jurnal Score, 1(2), 29–34. [DOI not indexed]

Sammoud, S., Negra, Y., Bouguezzi, R., Ramirez-Campillo, R., Moran, J., Bishop, C., & Chaabene, H. (2024). Effects of plyometric jump training on measures of physical fitness and lower-limb asymmetries in prepubertal male soccer players: A randomized controlled trial. BMC Sports Science, Medicine and Rehabilitation, 16(1), 37. https://doi.org/10.1186/s13102-024-00821-9

Sukirno. (2010). Tujuan olahraga sepak bola. Erlangga.

Sunjoyo, Setiawan, R., Suharti, D. K., & Ashari. (2013). Aplikasi SPSS untuk smart riset. Alfabeta. [Book — no DOI]

Thelwell, R. (2006). Examining the efficacy of the concentration grid exercise as a concentration enhancement exercise. Journal Psychology of Sport and Exercise, 7, 29–39. https://doi.org/10.1016/j.psychsport.2005.02.001

Wisesa, D. A., & Siswantoyo, S. (2021). Perbedaan metode latihan dan tingkat koordinasi berpengaruh terhadap kemampuan dribbling pemain sepakbola U-12. Sepakbola, 1(1), 32–38. https://doi.org/10.33292/sepakbola.v1