THE EFFECT OF SPECIFIC EXERCISES ON AGILITY, MOTOR SPEED, AND SKILL PERFORMANCE OF UNDER-19 FOOTBALL PLAYERS

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ABSTRACT

Background. The applicability of the importance of this research is that the specific exercises are an imitation of the performance that is closer to the real one in football matches in terms of the difficulty of its execution. In addition, it is also performed in a competitive environment, so the player has the opportunity to express his competitiveness and make the most of the time and opportunity available to him to perform a fast and accurate response at the level of motor performance and skill performance to defeat his competitor and with fluidity and coordination and accuracy and perfection in technical execution. **Objectives.** The objectives of this research are: To determine the impact of specific exercises in developing agility, motor speed, and skill performance among under-19 players. **Method.** The researcher used the experimental method because it is the most appropriate method in light of the research problem. The research population included clubs of Wasit Governorate that participated in the Youth League for the season 2024–2025, and it included 127 players. The researcher designed and implemented specialized football-specific exercises for the experimental group and the control group in accordance with the program of the coach. **Results.** Each of the specific exercises included complete rest periods between repetitions, so that each athlete completely recovered his energy to be able to perform the next repetition without the fatigue that may not allow him to maintain the level of execution quality. So the results of the previous exercise, although they were still present, would not be a limiting factor in the next repetition or in the other exercises. After completing the pre-test and post-test, the researcher used the Statistical Package for the Social Sciences (SPSS) program to analyze the data and draw the results. **Conclusion.** The researcher concluded that the specific exercises were appropriate for the experimental group and can be applied to all the research population. The relationship between motor abilities and technical abilities improves actual performance on the ground. The specific exercises implemented by the experimental group, where it combined agility, balance and football skills had a huge impact in developing agility and motor speed.

Keywords; Specific exercises, agility, skill performance, football.

A. INTRODUCTION

Taking into account the interest, competitiveness, and team spirit that are typical of football as a team sport, over the past decades, the game has been developing at a high level in terms of physical, technical, and tactical aspects (Ciptadi et al., 2025; Harianto et al., 2023). For this reason, training means and methods have been gradually changing to keep pace with the requirements and conditions of modern football, both in terms of high performance and intense competitiveness (Yusroni, 2024; Zulnadila et al., 2025).

Because football is a game that requires very high physical, motor, technical, tactical, and even psychological performance, a football player is also expected to have a set of physical and technical abilities that allow him to perform in an efficient and effective manner (Ebrahim & Hussein, 2025; Ivanov, 2025). To possess these abilities, the player needs training that includes physical, motor, and technical components, either in the same exercise or as part of a complex of targeted exercises (Custodio et al., 2024; Hardinata et al., 2024). These are specific or composite exercises that represent a modern trend in sports training, due to the many benefits they offer. In this case, the training of young players is of particular importance, which requires complex and balanced development, such as those who have not yet reached the age of 19 years.

Specific exercises, which combine physical, motor, and skill components into a single training unit, are performed under the conditions most similar to competitive game situations on the field (Rubiyatno et al., 2023; Suryadi et al., 2023). They contribute to improving neuromuscular coordination, increasing the effectiveness of motor and technical performance at the same time, and increasing the level of motor abilities and skill execution. All of the above are also important in determining a team's success at certain phases of the game (Imka et al., 2025; Suryadi, Ivanov, et al., 2025). The most important motor abilities include speed, agility, balance, strength, and coordination, while the main technical abilities include passing, control, shooting, dribbling, and other technical elements (Ramadani & Jatra, 2025). The combination of all of the above in a harmonious and coordinated manner also contributes to the general improvement of a player's performance and to their ability to react effectively and competently to dynamic situations that occur during the game (Setiawan & Jatra, 2025).

In light of the above, the relevance of this study lies in the application of specific composite exercises as an effective means of training for the selected motor abilities. In the study, it is intended to train and improve speed, agility, balance, coordination, and the technical performance of young football players aged up to 19 years. The researcher is trying to verify the efficiency of this type of training in comparison with traditional training and to identify its influence on the complex and balanced development of players' performance (Ardian et al., 2025; Suryadi, Németh, et al., 2025; Zulnadila, 2025). The study's importance is also highlighted by the attempt to create and apply specific exercises simulating real conditions as closely as possible and increasing the difficulty level to make it as close as possible to the level of competitive pressure in the game (Lopategui et al., 2021; Mohr et al., 2020; Young & Rath, 2011). This makes it possible for the players to demonstrate their competitiveness and the ability to make quick and precise decisions during their motor and technical performance. This is necessary to get past the opponents in different phases of the game with smoothness, coordination, accuracy, and high performance in executing skills (González & Sánchez, 2018; Hardinata et al., 2023; Kaplan et al., 2005).

For young football players, the problems often come in developing the main motor abilities. Agility and motor speed are the ones that are the basis for proceeding to the level of competition of a more appropriate nature for the game. These are important abilities for improving technical performance on the field (García-López et al., 2020; Nambi et al., 2020; Sukhiyaji & Patel, 2020). The researcher has noted relative weakness of these motor abilities and a weak level of skill performance. The reason for this is, in many cases, the training programs and plans of their actions that are based on exercises or activities of a repetitive nature. They lack a sufficient variety of options, due to which there is adaptation to their movements and actions. At the same time, there is a lack of emphasis on the development of fine motor abilities. In other words, exercises are not functionally oriented to improve these abilities in combination and integration with the performance of the skills of the football player (Catikkas et al., 2013; Makhlouf et al., 2018).

In addition, there is a separation of technical and motor exercises, and therefore there is a very weak transfer of the effect of this training to the game during the match. Therefore, given the above, it is rational to include specific exercises in the training units for the development of agility and motor speed. Exercises that will have a direct effect on the

improvement of the technical performance of players in real game situations during matches. The study will look into the effect of specific exercises on the development of agility, motor speed, and technical performance of football players up to the age of 19.

Statistically significant differences in pre-test and post-test results in agility, motor speed, and skill performance among football players up to 19 years old, in favor of post-test results. Statistically significant differences in post-test results between the control and experimental groups, in favor of the experimental group.

B. METHOD

Participant

The research population consisted of clubs from Wasit Governorate participating in the Youth League for the 2025–2026 season, comprising a total of 127 players. The research sample was purposively selected, including two teams: Wasit and Al-Izza, with 16 players each (excluding goalkeepers). Wasit Club represented the experimental group, while Al-Izza Club represented the control group. The sample constituted 25.19% of the total research population.

The researcher examined the homogeneity of the research sample by using the variables: body mass, training age, chronological age, and height shown in Table (1). The homogeneity was examined by using skewness coefficient. All the results were in the range of ±3, therefore the research sample is homogeneous and normally distributed.

Table 1. Homogeneity of the Research Sample Members – Statistical Indicators

Variables	Unit	Mean	Standard Deviation	Median	Skewness	Homogeneity Type
Body Mass	kg	62.87	5.37	62.5	0.206	Homogeneous
Training Age	months	41.7	6.19	44.1	-1.163	Homogeneous
Chronological Age	years	17.62	1.63	17.55	0.128	Homogeneous
Height	cm	174.16	3.41	173.5	0.580	Homogeneous

Research Design

The researcher choose the experiment method as it is convenient with the problem. The research follows the pre-test and post-test equivalent group model.

Identification of Research Variables

The 2 factors and the skill performance of the players were extracted from the study. This choice was made with regard to the real research problem and on a survey of numerous similar sources or other studies within football domain. Accordingly, the following research variables were defined and referred at: agility, motor speed and football skill performance.

Test Name: Zigzag Run Test (Barrow Method) (Al-Hakim, 2004)

Purpose of the Test: To measure agility.

Equipment: (1) Rectangular running field on a hard surface, length: 4.75 m, width: 3 m

Stopwatch. (2) Five poles (each at least 30 cm in height). (3) Distance from the start line to the first pole: 75 cm.

The participant assumes a high-start position behind the starting line. Upon the signal, the participant runs in a zigzag pattern between the five poles and returns to the starting line. The time taken to complete the course from start to finish is recorded. Each player performs two trials, and the best time is considered for evaluation.

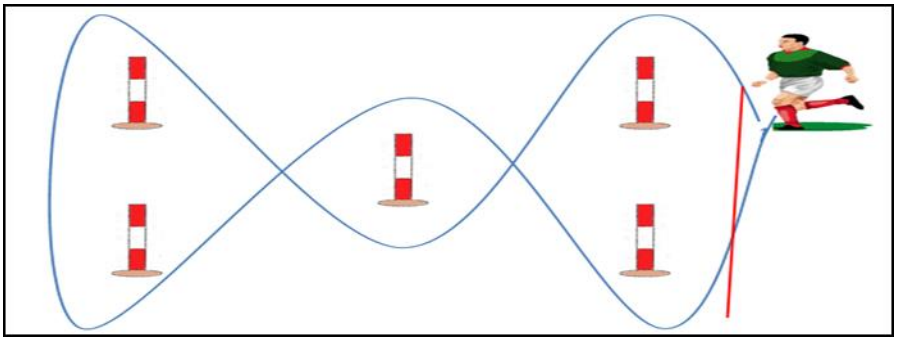

Figure 1. Zigzag Run Test

Motor Speed Test: Running in Place for 15 Seconds (Al-Mandilawi,1989)

Purpose of the Test: To measure motor speed.

Equipment: (1) Stopwatch. (2) High jump poles. (3) Elastic cord

The subject stands before the elastic band attached between two poles of the long jump bed. The elastic cord height is adjusted at the knee level of the subject in a half squat position (1 thigh parallel to the floor). On the sound signal, the subject begins to run on the spot as fast as possible and at each step his knee strikes the elastic cord. The evaluator counted the

number of steps in 15 seconds (only the right foot is counted). The number of right foot landings on the ground within 15 s is noted.

Judging of the skill was performed by 5 football specialists. The players were tested after being observed by the judges in a practice match, the recording of which was put on a CD and distributed to them. The experimental group Wasit Club was matched against Al-Shuhada Club. The same matches were used for pre and post-test. After watching the match, the judges scored each player by means of a standardized scoring form. The player received a score out of 10, depending on their performance of the technical and tactical indicators.

Pilot Experiment

The pilot experiment is a field training experience through which the researcher seeks to determine all strengths and weaknesses that may face it during the field experiment, so as to reach a solution to them in advance (Al-Mandalawi, 1989). The researcher performed the pilot experiment on (8) players of the research population at the Wasit Governorate clubs sports fields starting at 5/7/2025 (Saturday) 6:00 PM until 8/7/2025 (Tuesday).

The objectives of the pilot experiment were:

1. To identify potential problems that could arise during the main experiment and testing procedures.
2. To assess the suitability of the designed exercises for the research sample's level and determine the actual time required for each exercise.
3. To verify the appropriateness of the testing venue for the sample.
4. To establish a proper schedule for the tests, including the number of days, timing, and sequence of exercises.
5. To ensure the validity and functionality of all research equipment and tools.
6. To maintain the safety of the tested players.
7. To evaluate the number and efficiency of the assisting staff team.

Field Research Procedures

The pre-tests of the football motor abilities were held on Saturday (12/7/2025) for both experimental and control groups. The skill performance test was carried out the next day

(Sunday) by a practice match between the research teams: Wasit Youth Club (experimental group) versus Al-Shuhada Club (control group). All of the data were registered in the pre-prepared logs, and all the testing conditions were completely considered to ensure the consistency of conditions and accuracy in performing the post-test measurements.

The main experimental exercises were applied from Sunday (20/7/2025) until Saturday (20/9/2025). The researcher prepared specific exercises for the experimental group to be played, and the control group continued to do the exercises set by the coach.

Each specific exercise included full inter-repetition rest periods, and each set of exercises was repeated after a full recovery of the available energy, thus performing the repetitions of the exercise without any fatigue. This was to ensure that the last work out remained but did not prevent the repetition of the next set of the same exercise or that of other exercises. The experimental group performed the exercises within the established energy system with a work/rest ratio 1/4. This allows for full neuromuscular recovery of each repetition and to keep the level of performance at a high level for each repetition.

The exercises were applied during the special preparation period, with a total of 24 training units for 8 weeks at a frequency of 3 units per week (Sunday, Tuesday, and Thursday) for the experimental group. The exercises were performed at the shortest possible time to ensure the principle of speed of performance is met, and the intensity varied between 80 and 100% and the difficulty of the specific exercises was increased through increasing the number of opposing players in each exercise, and the focus was placed on speed, accuracy and precise performance. The specific exercises were carried out at an intensity calculated based on the best (shortest) time using the following equation: Best Achievement × 100 ÷ Required Intensity.

The researcher followed the principle of gradual training starting with 82% intensity and then increasing to 100% intensity, while all the exercises for the experimental group were performed by high-intensity interval training and repetitive training methods.

The post-tests were conducted after completing the application of the designed exercises for the experimental group. The tests of the football motor abilities (agility and motor speed) were performed on Tuesday 23/9/2025, and the skill performance test was

applied the following day (Wednesday) 24/9/2025 by the same method as that used for the pre-tests (practice match).

All the conditions in the pre-tests such as venue, time, circumstances, sequence of tests, the assisting staff, and the equipment were completely considered.

Statistical Methods

The Statistical Package for the Social Sciences (SPSS) was used to process the data and obtain the research results.

C. RESULTS AND DISCUSSION

Results

Table 2. Means, Standard Deviations, Mean Differences, Standard Deviation Differences, and Calculated t-Values for the Control Group in Pre- and Post-Tests

Variables	Unit	Pre-Test Mean		Post-Test Mean		Mean Diff	SD Diff	t	Significance Level	Significance
		(M)	SD	(M)	SD					
Motor Speed	Reps	19.76	2.1	23	1.32	24.3	0.78	4.83	0.001	Significant
Agility	Sec	27.42	3.29	21.90	3.26	5.52	0.03	5.21	0.000	Significant
Skill Performance	Points	5.61	1.58	6.81	1.41	1.2	0.17	3.12	0.002	Significant

Significant at 15 degrees of freedom and significance level 0.05.

Table 3. Shows the means, standard deviations, mean differences, standard deviation differences, and calculated t-values for the research variables of the experimental group in the pre- and post-tests

Variables	Unit	Pre-Test Mean		Post-Test Mean		Mean Diff	SD Diff	t	Significance Level	Significance
		(M)	SD	(M)	SD					
Motor Speed	Reps	18.36	3.4	30	1.32	11.64	2.08	4.76	0.000	Significant
Agility	Sec	25.42	2.51	19.89	3.26	5.53	0.75	7.45	0.000	Significant
Skill Performance	Points	5	1.16	8.74	0.94	3.73	0.22	6.66	0.000	Significant

Significant at 15 degrees of freedom and significance level 0.05

Table 4. Shows the means, standard deviations, and calculated t-values for the research variables of the experimental and control groups for the post-test results

Variables	Unit	Experimental Mean		Control Mean		t	Significance Level	Significance
		M	SD	M	SD			
Motor Speed	Reps	30	1.32	23	1.32	5.71	0.000	Significant
Agility	Sec	19.89	3.26	21.90	3.26	6.92	0.002	Significant
Skill Performance	Points	8.74	0.94	6.81	1.41	4.03	0.000	Significant

Significant at 30 degrees of freedom and significance level 0.05.

Discussion

Discussion of Results: Agility and Motor Speed

As shown in Tables (2) and (3) and Figure (1), there are statistically significant differences between the pre- and post-test results in agility and motor speed in favor of the post-test results. This implies that the specific exercises used in this study were efficient in increasing these two motor abilities, which, in the view of the researcher, can be attributed to the following: Agility was significantly improved in the experimental group, with the researcher directly linking this improvement to the nature of the specific exercises used. These exercises involved situations where the players were forced to repeatedly move in different directions in a small space in response to different performance situations (Chatterjee et al., 2025; Matlák et al., 2024). The movements performed by players in these specific exercises during the training units included combinations of speed, balance, and motor control, and quick transitions between the different motor situations in a short time, similar to the ones needed in contemporary football, contributed to improving actual match play performance (Rao & Kishore, 2014; Zwierko et al., 2023).

As for motor speed, the post-test result was better than the pre-test result, as seen in Table (3), and the researcher links this to the specific exercises used, which were characterized by the inclusion of situations that required quick reactions and rapid motor response. This is in the view of the researcher was important in improving the overall level of the central nervous system's efficiency in sending motor unit performance-related commands, such as neuromuscular coordination and leg muscle strength (Fekih et al., 2020). In this case, the researcher attributes the observed motor speed development in the experimental group to the inclusion of exercises that involved short, instantaneous sprints, and high acceleration, which the players had to repeatedly execute during the training units in the specific exercises. The result of this was that the effect of these exercises on the players was reflected in their performance during the post-test, with Abdul Abu Al-thar & Jabbar (2022) and Awaid, N. G., & Allawi, (2023) asserting that in the case of specific exercises, a player has to quickly decide when and how to execute skills, as team performance, in most cases, is more complex than individual performance. This places additional physical and technical demand on a player, which, to a large extent, is related to the repeated stimulation of the nervous system and the ability to quickly contract and coordinate a combination of different muscles in various parts of the body to improve a specific motor ability, in this case,

motor speed, and this is what directly improved the post-test result of the experimental group in a satisfactory way.

Drawing from the comparison of the post-test results between the two groups in the case of motor speed and agility (Table 4), it is evident that the post-test result of the experimental group was better than that of the control group in terms of improvement, and the researcher attributes this to the use of specific exercises with the experimental group, with an emphasis on how these exercises targeted the use of the same muscles as in real in-game performance situations. Agility and motor speed developed a higher level of control and overall efficiency in terms of control in the experimental group due to the specific exercises, which were more automatic than those of the control group as observed by AlHaddad et al. (2022); Jukic et al. (2012). In other words, since the specific exercises used were a replica of actual performance on the football field and were realistic in terms of its overall time, place, and application, this directly and efficiently contributed to the development of motor abilities that are more closely related to motor performance (Asgari et al., 2023; Karalejić et al., 2014). Agility and motor speed were directly linked to neuromuscular coordination, communication between the brain and the muscles, and the speed of neural system command transmission during motor actions and motor response (Fekih et al., 2020; Jukic et al., 2012).

Motor speed as a component of football motor skills was specific to all the skills used in this study, including dribbling, rolling, and shooting. The specific exercises in this study involved sudden changes in direction and high acceleration to the maximum, response requirements, speed changes, and body balance in case of directional changes, which enhanced motor efficiency. The ability of the experimental group players not only to run faster but also to receive and control the ball while running, and their confidence in integrating their speed and strength components in all skill movements that were close to match demands contributed to the group's high advantage in agility and motor speed over the control group (Matlák et al., 2024; Özkan & Kale, 2023).

Discussion of Skill Performance Results

Table (4) shows the experimental group's skill performance test result, with a clear significant difference between the pre-test and post-test results and superiority in terms of improvement for the post-test result. The researcher links this development to the nature of

the specific exercises, which involved the repeated execution of the same football skills, which are as close as possible to the actual situation during competition, along the same motor and skills pathway on which players find themselves during real matches in real time and under the pressure of opponents, and the ability to improve in terms of the required performance ability to be able to execute skills effectively and with the expected level of accuracy and efficiency under pressure.

Each of the specific exercises, especially the ones designed to replicate a real match situation, involves situations that needed quick motor responses and decision-making. The players involved had to circumvent the decisions of opponents in terms of defense to gain an advantage during the execution of specific exercises (Fekih et al., 2020; Jukic et al., 2012). This directly and clearly improved the speed of execution and quality of the execution of various skills, including dribbling and passing under limited space, and significantly enhanced the overall level of skill accuracy. As Saleh & Hassan (2013) put it, "skill performance requires continuous training to enable players to face opposing players effectively."

The specific exercises focused on performing skills not only with speed and accuracy but also at the right time and in the right direction, be it for passing, dribbling, or shooting, to make the skills more effective to the overall game plan (Asgari et al., 2023; Chatterjee et al., 2025). This helped in skill error reduction due to the players being well familiar with the right way of skill execution in terms of ball control, finishing, off-the-ball movement, and decision-making in different situations (Keiner et al., 2022; Vargas & Gallardo, 2023). This was made possible because the players adapted to performing and executing their skills and the team's game under conditions that simulated a high-pressure situation in training, which was later easily transferred to a match (competition). As Al-Hiti (2011) observed, "effective execution of skill performance enables players to control the ball and manage the flow of the game through accurate passing, dribbling past opponents, feints and shooting from different distances, including close-range shots, all of which require a high level of speed, strength, and accuracy developed only through continuous and consistent training."

In summary, the specific exercises used in this study enabled the experimental group players to improve their ability to execute football skills with efficiency, speed, and accuracy

and under competition, which gave them a clear edge over the control group in the performance of skills test.

D. CONCLUSION

The specific exercises were appropriate for the experimental group and, of course, were performed by the entire research population. The researcher found that connecting motor abilities to skill performance improved performance in the actual game on the pitch. The specific exercises performed by the experimental group in which agility, balance, and football skills were combined had a major impact on agility and motor speed development, resulting in players who were more able to respond quickly and accurately to changing game situations, as can also be seen in the skill performance. The researcher found that the exercises that simulate the pressure of a match, for example, the lack of time to complete a skill or the tight playing area to perform the skill, enhanced agility, increased reaction speed and motor speed, and made the skills more accurate to perform under higher pressure. The researcher advocates the inclusion of specific exercises in training units because they are highly likely to reproduce actual match performance, place the player under competitive pressure, and therefore allow them to develop motor, skill, and cognitive performance. It is important to include physical, motor, skill, and tactical performance in specific exercises to produce players who are more likely to adjust to the competitive environment both in training and in official matches. Coaches should choose specific tactical exercises in training so that players can respond to different and specific game situations

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F. AUTHOR CONTRIBUTION STATEMENT

Jaafar Abd Abu Althar Abd is fully responsible for the content of the article.

G. REFERENCE

AlHaddad, N. H., AlTaie, D. N., & Al-Yasiri, M. J. (2022). Efficiency of a predictive model for assessing the performance of the simple direct attack in terms of physical and motor

abilities of junior fencers. *Sport TK*, *11*(13). https://doi.org/10.6018/sportk.537151

Al-Hakim, S. A. (2004). *Tests, Measurement, and Statistics in the Sports Field.* Al-Qadisiyah: Al-Taif Printing.

Al-Hiti, M. A. (2011). *Football Tactics and Training.* Amman: Dar Dijlah.

Al-Mandilawi, Q. (1989). *Tests and Measurement in Physical Education (Vol. 1).* Mosul: Higher Education Press.

Al-thar, M. A. A., & Jabbar, A. H. (June 30, 2022). The effect of high-intensity interval training using different times within the phosphagen system on some physical abilities of futsal football players. *Wasit Journal for Human Sciences, 15*(3), 629. https://doi.org/10.31185/.Vol15.Iss44.305

Ardian, R., Szczepocki, M., & Ciptadi, Z. D. P. (2025). The impact of playing method for shooting ability: A study on female basketball athletes. *Journal of Applied Movement and Sport Science*, *1*(1), 34–41. https://doi.org/10.65575/jamss.v1i1.7

Asgari, M., Schmidt, M., Terschluse, B., Sueck, M., & Jaitner, T. (2023). Acute effects of the FIFA11+ and Football+ warm-ups on motor performance. A crossover randomized controlled trial. *PloS One*, *18*(4), e0284702. https://doi.org/10.1371/journal.pone.0284702

Awaid, N. G., & Allawi, H. M. (2023). The effect of anaerobic efficiency training on some of the bio-kinetic abilities of young players in futsal football. *International Journal of Physical Education, Sports and Health. 10*(2). 520-523. https://doi.org/10.22271/kheljournal.2023.v10.i2h.2906

Catikkas, F., Kurt, C., & Atalag, O. (2013). Kinanthropometric attributes of young male combat sports athletes. *Collegium Antropologicum*, *37*(4), 1365–1368.

Chatterjee, D., Dasgupta, S. R., & Dutta, A. (2025). Association between the attentional network efficiency and change of direction speed ability in young male Indian footballers. *Frontiers in Sports and Active Living*, *7*, 1529252. https://doi.org/10.3389/fspor.2025.1529252

Ciptadi, Z. D. P., Nugroho, S., Adriani, D., & Singh, L. T. (2025). The impact of teaching games for understanding and direct instruction models on volleyball passing skills based on arm strength. *Tanjungpura Journal of Coaching Research*, *3*(2), 102–111. https://doi.org/https://doi.org/10.26418/tajor.v3i2.89687

Custodio, J. M., Shukla, M., Tulyakul, S., & Taiar, R. (2024). How ladder drill V-pattern and snake jump exercises impact the agility of basketball players. *Tanjungpura Journal of Coaching Research*, *2*(1), 30–36. https://doi.org/10.26418/tajor.v2i1.72008

Ebrahim, T. Y., & Hussein, S. A.-H. J. A. (2025). The effectiveness of experiential learning strategy to developing some fixed-case football plans for students. *Tanjungpura Journal of Coaching Research*, *3*(2), 133–143. https://doi.org/10.26418/tajor.v3i2.90311

Fekih, S., Zguira, M. S., Koubaa, A., Ghariani, I., Zguira, H., Bragazzi, N. L., & Jarraya, M. (2020). The impact of a motor imagery-based training program on agility, speed, and reaction time in a sample of young tennis athletes during ramadan fasting: Insights and implications from a randomized, controlled experimental trial. *Nutrients*, *12*(11), 1–14. https://doi.org/10.3390/nu12113306

García-López, D., Maroto-Izquierdo, S., Zarzuela, R., Martín-Santana, E., Antón, S., & Sedano, S. (2020). The effects of unknown additional eccentric loading on bench-press kinematics and muscle activation in professional handball and rugby players. *European Journal of Sport Science*, *20*(8), 1042–1050. https://doi.org/10.1080/17461391.2019.1694587

González, J. R., & Sánchez, J. S. (2018). Strength training methods for improving actions in football. *Apunts. Educacion Fisica y Deportes*, *34*(132), 73–93. https://doi.org/10.5672/apunts.2014-0983.es.(2018/2).132.06

Hardinata, R., B, P. S., Okilanda, A., Tjahyanto, T., Prabowo, T. A., Rozi, M. F., Suganda, M. A., & Suryadi, D. (2023). Analysis of the physical condition of soccer athletes through the yo-yo test: a survey study on preparation for the provincial sports week. *Retos*, *50*, 1091–1097. https://doi.org/10.47197/retos.v50.100300

Hardinata, R., Rinto, R., Deski, D., Hartikasari, H., Nofita, T., Hendra, H., Pardi, P., & Cadiente,

D. S. A. (2024). Physical fitness analysis of elementary school students: a study to design an exercise program. *Tanjungpura Journal of Coaching Research*, *2*(1), 13–22. https://doi.org/10.26418/tajor.v2i1.76118

Harianto, E., Gustian, U., Supriatna, E., Shalaby, M. N., & Taiar, R. (2023). Stimulating game performance skills in students: experimental studies using net games. *Tanjungpura Journal of Coaching Research*, *1*(2), 63–70. https://doi.org/10.26418/tajor.v1i2.65009

Imka, A. J., Jatra, R., & Dafun JR, P. B. (2025). The contribution of leg muscle power and eye-foot coordination to the accuracy of futsal shooting of students. *Journal of Applied Movement and Sport Science*, *1*(3 SE-Research Articles), 20–29. https://doi.org/10.65575/jamss.v1i3.87

Ivanov, D. (2025). Comparative analysis of body composition in youth elite football players: Insights from professional academies. *Tanjungpura Journal of Coaching Research*, *3*(2), 122–132. https://doi.org/10.26418/tajor.v3i2.90501

Jukic, J., Katic, R., & Blazevic, S. (2012). Impact of morphological and motor dimensions on success of young male and female karateka. *Collegium Antropologicum*, *36*(4), 1247–1255. https://hrcak.srce.hr/94885

Kaplan, L. D., Flanigan, D. C., Norwig, J., Jost, P., & Bradley, J. (2005). Prevalence and variance of shoulder injuries in elite collegiate football players. *American Journal of Sports Medicine*. https://doi.org/10.1177/0363546505274718

Karalejić, S., Stojiljković, D., Stojanović, J., Andjelković, I., & Nikolić, D. (2014). Methodics of developing speed in young athletes. *Activities in Physical Education & Sport*, *4*(2), 158–161.

Keiner, M., Kadlubowski, B., Sander, A., Hartmann, H., & Wirth, K. (2022). Effects of 10 Months of Speed, Functional, and Traditional Strength Training on Strength, Linear Sprint, Change of Direction, and Jump Performance in Trained Adolescent Soccer Players. *Journal of Strength and Conditioning Research*. https://doi.org/10.1519/JSC.0000000000003807

Lopategui, I. G., Paulis, J. C., & Escudero, I. E. (2021). Physical demands and internal response

in football sessions according to tactical periodization. *International Journal of Sports Physiology and Performance*. https://doi.org/10.1123/ijspp.2019-0829

Makhlouf, I., Chaouachi, A., Chaouachi, M., Othman, A. Ben, Granacher, U., & Behm, D. G. (2018). Combination of agility and plyometric training provides similar training benefits as combined balance and plyometric training in young soccer players. *Frontiers in Physiology*. https://doi.org/10.3389/fphys.2018.01611

Matlák, J., Fridvalszki, M., Kóródi, V., Szamosszegi, G., Pólyán, E., Kovács, B., Kolozs, B., Langmár, G., & Rácz, L. (2024). Relationship Between Cognitive Functions and Agility Performance in Elite Young Male Soccer Players. *Journal of Strength and Conditioning Research*, *36*, 116–122. https://doi.org/10.1519/JSC.0000000000004644

Mohr, M., Nassis, G. P., Brito, J., Randers, M. B., Castagna, C., Parnell, D., & Krustrup, P. (2020). Return to elite football after the COVID-19 lockdown. In *Managing Sport and Leisure*. https://doi.org/10.1080/23750472.2020.1768635

Nambi, G., Abdelbasset, W. K., Alqahtani, B. A., Alrawaili, S. M., Abodonya, A. M., & Saleh, A. K. (2020). Isokinetic back training is more effective than core stabilization training on pain intensity and sports performances in football players with chronic low back pain: A randomized controlled trial. *Medicine*, *99*(21), e20418. https://doi.org/10.1097/MD.0000000000020418

Özkan, Z., & Kale, R. (2023). Investigation of the effects of physical education activities on motor skills and quality of life in children with intellectual disability. *International Journal of Developmental Disabilities*, *64*(4), 578–592. https://doi.org/10.1080/20473869.2021.1978267

Ramadani, M. F., & Jatra, R. (2025). The accuracy level of shooting using the instep and inside foot among extracurricular football students. *Journal of Applied Movement and Sport Science*, *1*(2 SE-Research Articles), 9–16. https://journals.khatec.id/index.php/jamss/article/view/50

Rao, C. V., & Kishore, Y. (2014). Combined effect of strength and plyometric training programme on selected motor fitness components of male kabaddi players.

International Journal of Recent Research and Applied Studies, *1*.

Rubiyatno, Perdana, R. P., Fallo, I. S., Arifin, Z., Nusri, A., Suryadi, D., Suganda, M. A., & Fauziah, E. (2023). Analysis of differences in physical fitness levels of extracurricular futsal students: Survey studies on urban and rural environments. *Pedagogy of Physical Culture and Sports*, *27*(3), 208–214. https://doi.org/10.15561/26649837.2023.0304

Saleh, M. G., & Hassan, H. Y. (2013). *Football – Skill Training (Vol. 1).* Amman: Arab Publishing Complex.

Sattler, T., Sekulić, D., Spasić, M., Perić, M., Krolo, A., & Uljević, O. (2015). Analysis of the association between motor and anthropometric variables with change of direction speed and reactive agility performance. *J. Hum. Kinet*, *47*, 137–145. https://doi.org/10.1515/hukin-2015-0069

Setiawan, Y. A., & Jatra, R. (2025). Contribution of leg muscle power and eye-foot coordination to football shooting results in PS UIR athletes. *Journal of Applied Movement and Sport Science*, *1*(2 SE-Research Articles), 24–32. https://journals.khatec.id/index.php/jamss/article/view/49

Sukhiyaji, R. B., & Patel, Z. (2020). To Compare the Skilled based Physical Fitness Such as Agility, Power and Speed between the Young College Male Basketball and Football Players. *Indian Journal of Physiotherapy and Occupational Therapy - An International Journal*, *14*(1), p190-195. https://doi.org/10.37506/ijpot.v14i1.3424

Suryadi, D., Ivanov, D., & Zulnadila, Z. (2025). Stimulation of physical fitness through traditional games in elementary school students: A systematic review in Indonesia. *Journal of Applied Movement and Sport Science*, *1*(3 SE-Research Articles), 12–19. https://doi.org/10.65575/jamss.v1i3.92

Suryadi, D., Németh, Z., Dewantara, J., Haidar, M. D., & Ilmah, N. K. (2025). The role of play in shaping early childhood character: A systematic literature review. *Journal of Applied Movement and Sport Science*, *1*(1). https://doi.org/10.65575/jamss.v1i1.3

Suryadi, D., Suganda, M. A., Samodra, Y. T. J., Wati, I. D. P., Rubiyatno, R., Haïdara, Y., Wahyudi, I., & Saputra, E. (2023). Eye-Hand Coordination and Agility with Basketball Lay-Up

Skills: A Correlation Study in Students. *JUMORA: Jurnal Moderasi Olahraga*, *3*(1), 60–71. https://doi.org/10.53863/mor.v3i1.681

Vargas, J. M. G., & Gallardo, J. (2023). Análisis descriptivo de variables de rendimiento físico en un equipo de fútbol de primera división chilena femenina (Descriptive analysis of physical performance variables in a Chilean women's first division football team). *Retos*, *48*, 657–666. https://doi.org/10.47197/retos.v48.95406

Young, W. B., & Rath, D. A. (2011). Enhancing foot velocity in football kicking: the role of strength training. In *Journal of Strength and Conditioning Research*. https://doi.org/10.1519/JSC.0b013e3181bf42eb

Yusroni, M. (2024). Game model to improve motor skills through traditional sports: Development study on elementary school students. *Tanjungpura Journal of Coaching Research*, *2*(2), 71–79. https://doi.org/10.26418/tajor.v2i2.79872

Zulnadila, Suharjana, Arjuna, F., Sriwahyuniati, C. F., Mappanyukki, A. A., Rahman, A., Agustina, D., & Szczepocki, M. (2025). Traditional games for physical fitness in primary school students: A systematic review in Indonesia. *Tanjungpura Journal of Coaching Research*, *3*(1), 76–86. https://doi.org/10.26418/tajor.v3i2.89690

Zulnadila, Z. (2025). Efforts to improve speed in non-professional athletes: An application of plyometric training in badminton. *Journal of Applied Movement and Sport Science*, *1*(2 SE-Research Articles), 33–37. https://journals.khatec.id/index.php/jamss/article/view/67

Zwierko, M., Jedziniak, W., Popowczak, M., & Rokita, A. (2023). Effects of in-situ stroboscopic training on visual, visuomotor and reactive agility in youth volleyball players. *PeerJ*, *11*, e15213. https://doi.org/10.7717/peerj.15213