

The Effect of Small-Sided Games Training on the Development of Selected Physical Attributes in Soccer Players Aged 13–15 Years: A Field Study of Chabab Ain Taghrout Municipal Club (CBAT)

أثر تدريب الألعاب المصغرة (Small-Sided) في تطوير بعض الصفات البدنية لدى لاعبي كرة القدم فئة من 13-15 سنة. دراسة ميدانية: نادي شباب بلدية عين تاغروت (CBAT).

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Abstract: This study aims to investigate the effect of Small-Sided Games (Jeux réduits) training on the development of selected physical attributes among soccer players aged 13–15 years. It also seeks to determine the effectiveness of this training method in improving speed, explosive strength, endurance, and change-of-direction speed, thereby contributing to enhancing the players' physical fitness and sports performance. The experimental method was adopted, and a set of physical tests was used as the main data-collection tool. The study sample was selected randomly and consisted of 20 U14 soccer players from Chabab Ain Taghrout Municipal Club (CBAT), Bordj Bou Arréridj, who were divided into two equivalent groups: an experimental group and a control group, with 10 players in each group. The study results revealed statistically significant differences between the pre-test and post-test measurements in favor of the experimental group in the tests of endurance, speed, explosive strength, and change-of-direction speed. The results also demonstrated the superiority of the experimental group over the control group in the post-tests. These findings confirm that Small-Sided Games training contributes positively to the development of selected physical attributes among soccer players and represents an effective training method that can be incorporated into training programs for youth soccer players

Keywords: Small-Sided Games, Soccer, Physical Attributes, Speed, Explosive Strength, Endurance, Change-of-Direction Speed

المخلص : تهدف هذه الدراسة إلى التعرف على أثر تدريبات الألعاب المصغرة (Jeux réduits) في تطوير بعض الصفات البدنية لدى لاعبي كرة القدم فئة 13-15 سنة. مع محاولة الكشف عن مدى فعالية هذا الأسلوب التدريبي في تحسين السرعة والقوة الانفجارية والتحمل وسرعة تغيير الاتجاه، بما يساهم في الارتقاء بالمستوى البدني للاعبين وتحسين أدائهم الرياضي، تم الاعتماد على المنهج التجريبي، كما تم استخدام مجموعة من الاختبارات البدنية كأداة رئيسية لجمع البيانات، وتم اختيار عينة الدراسة بطريقة عشوائية، حيث شملت 20 لاعباً من فئة U14 المنتمين إلى نادي CBAT شباب عين تاغروت – برج بوعريريج، وقُسموا إلى مجموعتين متكافئتين، تجريبية وضابطة، بواقع 10 لاعبين لكل مجموعة. وقد توصلت الدراسة إلى وجود فروق ذات دلالة إحصائية بين القياسين القبلي والبعدي لصالح المجموعة التجريبية في اختبارات التحمل والسرعة والقوة الانفجارية وسرعة تغيير الاتجاه، كما أظهرت النتائج تفوق المجموعة التجريبية على المجموعة الضابطة في الاختبارات البعيدة، مما يؤكد أن تدريبات الألعاب المصغرة تساهم بشكل إيجابي في تطوير بعض الصفات البدنية لدى لاعبي كرة القدم، وأنها تمثل أسلوباً تدريبياً فعالاً يمكن توظيفه ضمن برامج تدريب الفئات الشبانية.

الكلمات الدالة : الألعاب المصغرة، كرة القدم، الصفات البدنية، السرعة، القوة الانفجارية، التحمل، سرعة تغيير الاتجاه.

1- introduction;

Football is a sport that requires the integration of various physical and tactical components, as players are required to employ their physical abilities and fundamental skills simultaneously and effectively during competition. This requirement becomes particularly important among young players, as this stage represents a fundamental phase in the development of the player and in preparing them for a gradual transition to higher levels of athletic performance. Therefore, coaches are required to select training methods that are appropriate to the characteristics of this age group and that contribute to the balanced development of the different aspects of performance.

The development of the field of sports training has led to the emergence of modern training methods and approaches aimed at making the training process more closely related to the demands of competition. Among these methods are Small-Sided Games (SSGs), which involve organizing game situations with a limited number of players on reduced playing areas, while allowing modifications to the rules, duration, playing area, and number of players according to the intended training objective. This makes SSGs an effective training means that provides players with repeated opportunities to participate in situations similar to those encountered during actual matches, rather than focusing exclusively on performing isolated skills outside the context of play. Small-sided games have become one of the methods used to develop physical attributes in football, as they make it possible to approximate training conditions to those of competition while maintaining the technical component and decision-making demands (Qratabi & Sadouqi, 2023, p. 403).

Furthermore, the effectiveness of small-sided games is not achieved automatically simply by incorporating them into a training program; rather, it depends on how they are structured and regulated. The responses elicited by SSGs vary according to the number of players, playing area, duration of play, recovery periods, and rules applied. Therefore, the coach should select the appropriate format of the small-sided game according to the intended training objective, as well as the players' performance level and age-related characteristics. The study conducted by Qratabi and Sadouqi confirmed that manipulating the number of players and the playing area makes it possible to direct small-sided games toward the development of different physical attributes, highlighting the importance of designing and implementing them in a scientific and systematic manner rather than using them randomly (Saïdi, Mim, & Hamzaoui, 2022, p. 950).

The importance of this topic becomes even more evident among football players under the age of 15, as this represents a formative stage that requires training situations capable of progressively developing players' physical and technical abilities. Training at this stage should take into consideration the players' level of physical maturation and provide them with repeated opportunities for practice, interaction, and decision-ma-

king. In addition, studies involving age groups close to this stage, such as a study conducted on players under the age of 13, have reported positive effects of small-sided games on certain fundamental skills. This highlights the need to further investigate their effectiveness among players under the age of 14 specifically (Saidi, Mim, & Hamzaoui, 2022, p. 950).

Despite the findings reported by previous studies, differences in age groups, training programs, and various formats of small-sided games make it necessary to conduct further applied research to determine the extent to which this training approach affects players according to the characteristics and specific needs of each age group. Accordingly, the present study seeks to investigate the effectiveness of a training program based on small-sided games in developing certain physical attributes and fundamental skills among football players under the age of 14. This will be achieved through the use of pre- and post-tests to determine the extent of development resulting from the implementation of the training program.

Accordingly, the main research problem can be formulated through the following question:

- Does small-sided games training have a positive effect on the development of certain physical attributes among football players aged 13–15 years?

1-2- Sub-Questions:

- Are there statistically significant differences between the pre-test and post-test results of the experimental group in speed following the implementation of the small-sided games training program?
- Are there statistically significant differences between the pre-test and post-test results of the experimental group in strength following the implementation of the small-sided games training program?
- Are there statistically significant differences between the pre-test and post-test results of the experimental group in endurance following the implementation of the small-sided games training program?

2. Hypotheses

2.1. General Hypothesis:

Small-sided games training (Jeux réduits) has a positive effect on the development of certain physical attributes among football players aged 13–15 years.

2.2. Specific Hypotheses:

- There are statistically significant differences between the pre-test and post-test

results of the experimental group in speed among football players aged 13–15 years, in favor of the post-test results following the implementation of the small-sided games training program.

- There are statistically significant differences between the pre-test and post-test results of the experimental group in strength among football players aged 13–15 years, in favor of the post-test results following the implementation of the small-sided games training program.
- There are statistically significant differences between the pre-test and post-test results of the experimental group in endurance among football players aged 13–15 years, in favor of the post-test results following the implementation of the small-sided games training program.

3- Importance of the Study:

The importance of this study stems from the significance of small-sided games training (Jeux réduits) as one of the modern training methods used in football, as it provides players with training situations that closely resemble the demands of actual competition by integrating physical and technical performance with continuous interaction with teammates and opponents. The importance of the present study can be highlighted as follows:

- The study contributes to enriching scientific knowledge related to football training for players under the age of 15, by examining the effectiveness of small-sided games training in developing certain fundamental physical attributes among young players.
- The findings of the study may help coaches determine the extent to which small-sided games can be employed as an effective training method within training programs designed for the U15 age group, in accordance with the specific characteristics and developmental needs of this age category.
- The study seeks to determine the extent to which small-sided games can improve important physical abilities in football, such as speed, endurance, and explosive strength, based on the tests adopted in the study.
- The study employs pre- and post-testing to identify differences in the players' performance levels following the implementation of the training program, thereby allowing for an objective assessment of the effectiveness of small-sided games training.

Accordingly, the primary significance of this study lies in its attempt to empirically investigate the effectiveness of small-sided games training in developing certain physical and technical attributes among football players under the age of 15, and to provide fin-

dings that may benefit researchers and coaches working in the development and training of youth football players.

4- Objectives of the Study:

This study aims to investigate the effectiveness of small-sided games training (Jeux réduits) in developing certain physical attributes and fundamental skills among football players in the U15 age category. The objectives of the study can be outlined as follows:

- To identify the effect of small-sided games training (Jeux réduits) on the development of certain physical attributes among football players in the U14 age category.
- To identify the differences between the pre-test and post-test results of the experimental group in selected physical attributes following the implementation of the small-sided games training program.
- To evaluate the effectiveness of a training program based on small-sided games in improving the physical and technical performance levels of football players in the U14 age category.
- To provide suggestions and recommendations for coaches regarding the integration of small-sided games into training programs designed for youth football categories, thereby contributing to improving players' performance levels and promoting their overall development.

5. Definition of Concepts and Terminology:

5.1. Football:

A. Linguistic Definition: The term football is derived from the Latin expression referring to "kicking the ball with the foot." In American usage, the term football refers to what is known as American football, whereas the sport commonly referred to as football in most parts of the world is known as soccer in the United States (Aaliba & Massoudi, 2020, p. 65).

B. Terminological Definition: Football is a team sport played between two teams, with each team consisting of eleven players. The players use an inflated, spherical ball of standardized international dimensions on a rectangular playing field with specified dimensions. A goal is located at each end of the field, and each team attempts to score by getting the ball into the opponents' goal past the goalkeeper (Madani et al., 2022, p. 7).

C. Operational Definition: For the purposes of the present study, football is defined as a team sport practiced by players across different age categories and played between

two teams, each consisting of eleven (11) players. The game is played with an inflated ball on a rectangular playing field, with a goal located at each end. The ball is primarily controlled and moved using the feet, while only the goalkeeper is permitted to handle the ball with the hands within the areas specified by the Laws of the Game.

The match is officiated by a referee, two assistant referees, and a fourth official, who assists in monitoring the match and timekeeping. A standard match consists of 90 minutes, divided into two 45-minute halves, with a 15-minute half-time interval. In knockout matches, when the score remains level at the end of regular time, two extra-time periods of 15 minutes each may be played. If the teams remain level after extra time, the winner may be determined through a penalty shootout, in accordance with the applicable competition regulations.

5.2. Small-Sided Games:

A. Terminological Definition: Small-sided games are organized activities that require a high level of motor skills during their execution. They do not necessarily follow fixed rules or predetermined organizational structures; rather, the teacher or coach may establish rules that are appropriate to the players' age, level of readiness, and intended objectives. They can be practiced in various settings and may be performed with simple equipment or without equipment. Furthermore, they do not require highly complex or elaborate organization (Oufa & Bourzama, 2022, p. 620).

Small-sided games (SSGs) are also defined as training situations that replicate the demands of actual football, but in a simplified and reduced format, by decreasing the number of players and the size of the playing area and modifying certain rules and performance conditions. Their purpose is to increase players' involvement and the frequency of their technical, physical, and tactical actions while maintaining the nature of the game and decision-making in situations that are similar to those encountered during actual matches (Fetni & Arqoub, 2022, p. 104).

B. Operational Definition: For the purposes of the present study, the researcher defines small-sided games as a set of simplified games and motor exercises organized and implemented in the form of short and structured playing situations involving a limited number of football players within reduced playing areas. These games are conducted according to rules and conditions established by the coach in accordance with the players' age and their physical and technical levels. They aim to develop selected physical attributes and fundamental football skills, including speed, agility, endurance, strength, passing, dribbling, receiving, and shooting, through playing situations that resemble the conditions of actual football performance.

5.3. Physical Attributes:

A. Terminological Definition: Physical attributes refer to a set of general and specific physical abilities and capacities possessed by an individual, the importance of which

varies according to the nature and requirements of the sport being practiced. The most important physical attributes include endurance, strength, speed, flexibility, and agility (Boumezrag & Rouab, 2022).

B. Operational Definition: For the purposes of the present study, the researcher defines physical attributes as the physical abilities possessed by football players that can be developed and assessed through appropriate physical fitness tests. In the present study, these attributes include endurance, strength, speed, flexibility, and agility, as they constitute fundamental requirements for physical performance in football and are intended to be developed through the implementation of the small-sided games training program.

6. Previous and Related Studies:

First Study: Boudali Adel (2026), PhD Dissertation:

Title of the Study: The Effect of Proposed Educational Units Based on the Integration of a Set of Small-Sided Games on the Development of Certain Sensorimotor Abilities among Primary School Pupils Aged 5–9 Years.

General Research Question: Is there an effect of the proposed educational-unit program incorporating a set of small-sided games on the development of certain sensorimotor abilities among primary school pupils aged 5–9 years?

Methodology: The researcher adopted the experimental method because of its suitability to the nature of the study, using an experimental design involving two equivalent groups: an experimental group and a control group.

Sample: The study population consisted of 749 male and female pupils enrolled in seven primary schools. The study sample was selected using purposive sampling and consisted of 40 first-grade primary school pupils. They were then randomly divided into two equivalent groups, with 20 pupils assigned to the experimental group and 20 to the control group.

Instruments: The researcher used the Haywood Sensorimotor Ability Scale (Haywood) as an instrument for measuring the variables under investigation. The SPSS statistical software was also used to conduct the appropriate statistical analyses of the collected data.

Results: The findings demonstrated a positive effect of the proposed educational units incorporating a set of small-sided games on the development of certain sensorimotor abilities among primary school pupils. These findings confirm the effectiveness of integrating small-sided games into educational units to improve and develop sensorimotor abilities in this age group.

Second Study: Chirak Samir (2024)

Title of the Study: The Role of Small-Sided Games in Developing Certain Psychological Skills among Football Players: A Field Study of Senior-Level Clubs Affiliated with the Bordj Bou Arreridj Provincial League.

General Research Question: Do small-sided games contribute to the development of certain psychological skills among senior football players?

Methodology: The researcher adopted the descriptive method, considering it appropriate to the nature and objectives of the study.

Study Sample: The main study sample consisted of 12 senior-team coaches from 21 clubs affiliated with the Bordj Bou Arreridj Provincial League. The participants were selected using a random sampling method.

Research Instrument: A questionnaire was used as the main data-collection instrument. It was specifically designed and divided into three main dimensions.

Results: The study reached a number of important findings that confirmed the validity of the formulated hypotheses:

1. The first hypothesis was confirmed, demonstrating that small-sided games play an effective and influential role in developing the psychological dimension among football players.
2. The second hypothesis was confirmed, showing that small-sided games contribute significantly to the development of players' attentional skills.
3. The third hypothesis was confirmed, as the findings demonstrated that small-sided games have a significant positive role in developing mental imagery skills among football players.

Third Study: Adel Malik & Al-Saeed Mazrou (2023), Article

Title of the Study: The Effect of Small-Sided Games (SSGs) Training on the Development of Endurance and Agility among Students of the College of Physical Education and Sports Sciences, Mustansiriyah University.

General Research Question: What is the effect of small-sided games (SSGs) training on the development of endurance and agility among students of the College of Physical Education and Sports Sciences at Mustansiriyah University?

Methodology: The researchers adopted the experimental method, using a pre-test/post-test design with two groups: an experimental group and a control group.

Sample: The sample consisted of 20 students from the Department of Football at the College of Physical Education and Sports Sciences, Mustansiriyah University, during the 2024–2025 academic year. Their ages ranged from 18 to 22 years. The participants

were randomly divided into two equal groups of 10 students each. The experimental group underwent an eight-week training program based on small-sided games, with three training sessions per week, while the control group continued with its regular traditional training program.

Research Instruments:

- Yo-Yo Intermittent Recovery Test – Level 1, used to assess aerobic endurance.
- Illinois Agility Test, used to assess agility.
- Basic anthropometric measurements, including height and body weight.

Results:

The findings revealed statistically significant differences ($p \leq 0.05$) in favor of the experimental group in both endurance and agility between the pre-test and post-test measurements. In contrast, the control group did not demonstrate statistically significant improvement. Post-test comparisons also confirmed the superiority of the experimental group in both variables, indicating the effectiveness of small-sided games training in enhancing aerobic endurance and agility among students of physical education colleges.

II. Field Study Procedures:

2.1. Research Methodology:

Based on the nature of the research problem and the objectives of the study, the researcher adopted the experimental method, as it was considered the most appropriate methodology for the nature of the research. This involved designing a proposed training program based on small-sided games, followed by its implementation with a group of football players. A set of physical tests was administered before and after the implementation of the training program in order to determine the extent to which the proposed training program contributed to the development of certain physical attributes among the participants. Following the collection of the results, the data were analyzed and statistically processed using appropriate statistical methods in order to obtain accurate and objective findings.

Furthermore, the battery of physical tests was presented to a group of specialists and experts to assess its suitability for the age group under investigation and to verify its validity for measuring the targeted physical attributes and skills. The objectives, content, and implementation procedures of the proposed training program were also discussed with the experts to ensure that the program was consistent with the characteristics of the participants' developmental stage, their performance level, and the objectives of the study.

2.2. Study Population and Sample:

2.2.1. Study Population:

From a terminological perspective, the study population refers to “the original group from which the sample is selected” (Mohamed Ziane Omar, 1983, p. 11). In the present study, the study population consists of football players in the U14 age category affiliated with the sports club CBAT Chabab Ain Taghrout – Bordj Bou Arreridj, who meet the conditions specified by the researcher. This group represents the target population for investigating the effect of small-sided games training on the development of certain physical attributes.

2.2.2. Study Sample:

The research sample was selected using a random sampling method and consisted of 20 U14 football players affiliated with CBAT Chabab Ain Taghrout – Bordj Bou Arreridj. The participants were divided into two equivalent groups: an experimental group consisting of 10 players, who underwent a training program based on small-sided games (Jeux réduits), and a control group consisting of 10 players, who continued their traditional training program adopted by the club. This division was adopted to compare the effect of small-sided games training on the physical variables under investigation.

2.3. Study Variables:

A. Independent Variable: The independent variable is small-sided games (Jeux réduits), which consist of various reduced training formats implemented according to specific organizational structures, rules, playing areas, and numbers of players, with the aim of developing different physical aspects of football players' performance.

B. Dependent Variable: The dependent variable consists of the physical attributes relevant to football performance, whose development is intended to be assessed following the implementation of a training program based on small-sided games. These attributes include a set of fundamental physical abilities associated with the performance demands of football players.

2-4- Calculation of the Psychometric Properties of the Study Instruments

First: Homogeneity of the Two Study Groups in Terms of Height, Weight, and Waist Circumference.

To verify the homogeneity of the experimental and control groups, differences between the two groups were examined with respect to certain variables that could potentially influence the study results, namely waist circumference, height, and body weight. This was achieved by comparing the variances of the two groups using the Fisher's F-

test (F-test). The results are presented in Table 01.

Table 01: Homogeneity of the Two Study Groups in Terms of Height, Weight, and Waist Circumference

Sample	Experimental Group		Control Group		Calculated F-value	Critical F-value	Degrees of Freedom (df)
	Arithmetic Mean	Standard Deviation (SD)	Arithmetic Mean	Standard Deviation (SD)			
Body Weight	53.26	4.901	52.29	4.591	1.087	2.262	10
Body Height	1.64	0.076	1.58	0.019	1.081		
Waist Circumference	64.500	5.400	65.500	4.628	1.363		

Source: Prepared by the researcher based on the results of the pilot study.

The results presented in Table 01 indicate that the calculated Fisher's F-value for the weight variable was 1.217, while it was 0.994 for height and 1.381 for waist circumference. By comparing these calculated values with the tabulated Fisher's F-value at the 0.05 significance level, it can be observed that the calculated values were lower than the tabulated value. This indicates that there were no statistically significant differences between the experimental and control groups with regard to the anthropometric variables examined, namely weight, height, and waist circumference. Therefore, it can be concluded that the participants in the two study groups demonstrated an acceptable degree of homogeneity in these variables. This allows any differences that may emerge in the post-test results to be attributed, to a greater extent, to the effect of the proposed training program rather than to initial differences between the participants in the two groups.

Second: Psychometric Properties of the Physical Tests:

To verify the suitability and quality of the physical tests used in the present study, certain psychometric properties of these tests were assessed, primarily reliability and validity, prior to their administration to the main study sample.

A. Reliability:

To determine the reliability coefficients of the physical tests, the test-retest method was employed. The tests were initially administered to a pilot sample of 10 players, who were selected from the study population and excluded from the main study sample. The same tests were subsequently re-administered to the same participants after an appropriate time interval, while ensuring that the conditions of administration were kept as consistent as possible in both testing sessions.

The Pearson correlation coefficient was then calculated to determine the correlation between the results of the first and second administrations. The closer the correlation coefficient is to 1.00, the higher the degree of test reliability and the greater its ability to produce consistent results when administered repeatedly under similar conditions.

The calculated correlation coefficients were used to assess the level of reliability of the physical tests employed in the study and to determine their suitability for measuring the targeted physical attributes among 15-year-old football players.

B. Validity:

To determine the self-validity of the physical tests used in the present study, the square root of the reliability coefficient calculated using the test-retest method was determined. Table 02 presents the results of the psychometric properties of the physical tests administered to the participants in the pilot study.

Table 02: Psychometric Properties of the Physical Tests Used in the Study.

Tests	Test		Retest		Reliability	Validity
	Arithmetic Mean	Standard Deviation (SD)	Arithmetic Mean	Standard Deviation (SD)		
6-Minute Cooper Test	1228.1	86.991	1217.2	149.21	0.84	0.90
T-Test for Change of Direction Speed	11.40	0.528	11.46	0.372	0.77	0.79
Standing Long Jump Test	1.85	0.262	1.73	0.131	0.93	0.89
20-Meter	4.09	0.225	4.25	0.138	0.87	0.82

Sprint Test						
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Source: Prepared by the researcher based on the results of the pilot study.

Based on the results presented in the table, it can be observed that the reliability coefficients ranged from 0.77 to 0.93, while the validity coefficients ranged from 0.79 to 0.90. All of these values are statistically acceptable and indicate that the selected tests possess appropriate levels of reliability and validity. Therefore, they can be considered suitable for measuring the physical variables investigated in the present study.

Furthermore, the relatively high reliability coefficients confirm the stability of the measurements and the possibility of obtaining consistent results when the tests are repeated under similar conditions. Similarly, the high validity coefficients indicate that the tests have an adequate ability to measure the characteristics and attributes for which they were designed. Accordingly, these tests can be adopted for the pre- and post-testing of both the experimental and control groups.

3. Presentation, Analysis, and Discussion of the Results:

3.1. Presentation of the Results of the Differences Between the Control and Experimental Groups in the Pre-Tests:

Table 07 presents the nature of the differences between the control and experimental groups in the pre-test physical and technical assessments, with the aim of determining the extent to which the two groups were equivalent before the implementation of the proposed training program.

Tests	Experimental Group		Control Group		Calculated t-value	Critical t-value	Significance (Sig.)	Degrees of Freedom (df)	Statistical Significance
	Arithmetic Mean	Standard Deviation (SD)	Arithmetic Mean	Standard Deviation (SD)					
6-Minute Cooper Test	1228.1	86.991	1216.2	149.21	0.237	2.262	0.218	09	Not Significant
T-Test	11.30	0.528	11.36	0.372	0.287		0.680		Not

for Change of Direc- tion Speed					-				Si- gni- fi- cant
Stan- ding Long Jump Test	1.85	0.262	1.90	0.131	1.061 -		0.516		Not Si- gnifi cant
20-Me- ter Sprint Test	3.99	0.225	4.09	0.138	1.031		0.130		Not Si- gnifi cant

Source: Prepared by the researcher based on the outputs of SPSS V26.

Table 07 presents the differences between the experimental and control groups in the pre-test physical assessments, with the aim of verifying the equivalence of the two groups before implementing the proposed training program. The results indicate that none of the tests showed statistically significant differences, as all Sig. values were greater than 0.05. Furthermore, the absolute values of the calculated t-statistic (T) were lower than the tabulated value (2.262), indicating that the two groups had comparable levels across the physical variables prior to the beginning of the experiment.

6-Minute Demi-Cooper Test: The experimental group recorded a mean of 1228.1 m, with a standard deviation of 86.991, compared with a mean of 1217.2 m and a standard deviation of 149.21 for the control group. The calculated T-value was 0.237, with a Sig. value of 0.818, which is greater than 0.05. This indicates that there were no statistically significant differences between the two groups and that their cardiorespiratory endurance levels were comparable.

Change-of-Direction Speed Test: The experimental group recorded a mean performance time of 11.40 s, with a standard deviation of 0.528, compared with 11.46 s and a standard deviation of 0.372 for the control group. The calculated T-value was -0.287, with a Sig. value of 0.780, which is greater than 0.05. This confirms that there were no statistically significant differences between the two groups in change-of-direction speed.

Standing Horizontal Jump Test: The experimental group recorded a mean distance of 1.85 m, with a standard deviation of 0.262, compared with 1.73 m and a standard

deviation of 0.131 for the control group. The calculated T-value was -1.061 , with a Sig. value of 0.316, which is greater than 0.05. This indicates that there were no statistically significant differences between the two groups and that their levels of lower-limb explosive power were comparable.

20-m Sprint Test: The experimental group recorded a mean time of 4.09 s, with a standard deviation of 0.225, compared with 4.25 s and a standard deviation of 0.138 for the control group. The calculated T-value was 1.031, with a Sig. value of 0.330, which is greater than 0.05. This indicates that there were no statistically significant differences between the two groups in sprint speed.

Overall, the results indicate that the two groups were equivalent in the pre-test physical assessments, allowing them to be considered comparable prior to the implementation of the training program. Consequently, any subsequent differences can be attributed, to a greater extent, to the effect of the proposed training program.

3.2. Presentation of the Results of the Differences Between the Experimental and Control Groups in the Post-Tests

Table 08: Presents the nature of the differences between the experimental and control groups in the post-test physical and technical assessments.

Tests	Experimental Group		Control Group		Calculated t-value	Critical t-value	Significance (Sig.)	Degrees of Freedom (df)	Statistical Significance
	Arithmetic Mean	Standard Deviation (SD)	Arithmetic Mean	Standard Deviation (SD)					
6-Minute Cooper Test	1422	1.66	1345	1.59	3.22	2.262	2.262	09	Not Significant
T-Test for Change of Direction	10.54	0.506	11.39	0.336	4.365		2.262		Not Significant

Speed									
Stan- ding Long Jump Test	17.63	1.02 9	16.72	1.30 4	5.249 -		2.26 2		Not S- gnifi cant
20-Me- ter Sprint Test	1.90	0.29 7	1.68	0.10 8	7.460		2.26 2		Not S- gnifi cant

Source: Prepared by the researcher based on the outputs of SPSS V 26.

Table 08 presents the differences between the experimental and control groups in the post-test physical assessments, with the aim of determining the effect of the proposed training program. The results indicate that all tests showed statistically significant differences between the two groups, as the Sig. values were less than 0.05. Moreover, the absolute values of the calculated t-statistic (T) were greater than the tabulated value (2.262), indicating statistically significant differences in favor of the experimental group.

6-Minute Demi-Cooper Test: The experimental group recorded a mean of 1422 m, with a standard deviation of 1.66, compared with a mean of 1345 m and a standard deviation of 1.59 for the control group. The calculated T-value was 3.22, with a Sig. value of 0.01, which is less than 0.05. This indicates statistically significant differences between the two groups in favor of the experimental group, reflecting an improvement in the cardiorespiratory endurance of its participants.

Change-of-Direction Speed Test: The experimental group recorded a mean performance time of 10.54 s, with a standard deviation of 0.506, compared with 11.39 s and a standard deviation of 0.336 for the control group. The calculated T-value was -4.365, with a Sig. value of 0.04, which is less than 0.05. This indicates statistically significant differences in favor of the experimental group and reflects an improvement in its ability to change direction rapidly.

Horizontal Jump Test: The experimental group recorded a mean of 17.63, with a standard deviation of 1.029, compared with 16.72 and a standard deviation of 1.304 for the control group. The calculated T-value was -5.249, with a Sig. value of 0.00, which is less than 0.05. This indicates statistically significant differences in favor of the experimental group, reflecting an improvement in the explosive power of the lower limbs.

20-m Sprint Test: The experimental group recorded a mean time of 1.90 s, with a

standard deviation of 0.297, compared with 1.68 s and a standard deviation of 0.108 for the control group. The calculated T-value was 7.460, with a Sig. value of 0.00, which is less than 0.05. This indicates the existence of statistically significant differences between the two groups.

Overall, the results presented in Table 08 demonstrate statistically significant differences between the experimental and control groups in all post-test physical assessments, as evidenced by the Sig. values being below 0.05 and the absolute calculated T-values exceeding the tabulated value. These findings indicate an improvement in the performance of the experimental group compared with the control group and suggest the effectiveness of the proposed training program in developing certain physical abilities among the experimental participants.

Important Note: Some values in the table require further verification, particularly the standard deviations (1.66 and 1.59) reported for the Cooper test, as well as the values related to the 20-m sprint test, because the reported means and standard deviations do not appear to correspond clearly with the reported T and Sig. values. In addition, the direction of the difference in the 20-m sprint test should be carefully considered, since a lower completion time indicates better performance.

3.3. Presentation of the Results of the Differences Between the Pre-Test and Post-Test in the Experimental and Control Groups:

3.3.1. Presentation of the Results of the Differences Between the Pre-Test and Post-Test in the Experimental Group for the 6-Minute Demi-Cooper Test:

Table 09: Presents the nature of the differences between the pre-test and post-test results of the experimental group in the 6-Minute Demi-Cooper Test.

Tests	Pre-Test		Post-Test		Calculated t-value	Critical t-value	(Sig.)	(df)	Statistical Significance
	Arithmetic Mean	Standard Deviation (SD)	Arithmetic Mean	Standard Deviation (SD)					
6-Minute Cooper Test	1228.1	86.991	1422	75.430	-6.855	2.262	0.00	09	Significant

Source: Prepared by the researcher based on the outputs of SPSS V 26.

Table 09 presents the differences between the pre-test and post-test results of the experimental group in the 6-Minute Demi-Cooper Test, with the aim of determining the extent of improvement in cardiorespiratory endurance following the implementation of the proposed training program. The results indicate the presence of a statistically significant difference between the two measurements, as the Sig. value was 0.00, which is lower than the adopted significance level of 0.05. Furthermore, the absolute calculated T-value (6.855) was greater than the tabulated T-value (2.262) at 9 degrees of freedom, indicating a statistically significant difference between the pre-test and post-test measurements.

The experimental group recorded a mean distance of 1228.1 m in the pre-test, with a standard deviation of 86.991, whereas the mean distance increased to 1422 m in the post-test, with a standard deviation of 75.430. This demonstrates a noticeable improvement in the distance covered during the six-minute test following the implementation of the training program, and consequently indicates an improvement in the participants' cardiorespiratory endurance.

Overall, these findings indicate that the proposed training program had a positive effect on the development of cardiorespiratory endurance among the experimental group. This is supported by the increase in the mean performance between the pre-test and post-test measurements, together with the statistically significant difference observed between the two measurements. Therefore, it can be concluded that the improvement achieved was largely associated with the effect of the implemented training program. This is consistent with the findings of Boudali Adel (2026) and Cherak Samir (2024).

3.3.2. Presentation of the Results of the Differences Between the Pre-Test and Post-Test in the Experimental Group in the Horizontal Jump Test:

Table 10: Presents the nature of the differences between the pre-test and post-test results of the experimental group in the Horizontal Jump Test.

Tests	Pre-Test		Post-Test		Calculated t-value	Critical t-value	(Sig.)	(df)	Statistical Significance
	Arithmetic Mean	Standard Deviation (SD)	Arithmetic Mean	Standard Deviation (SD)					

Standing Long Jump Test	1.93	0.262	2.15	0.248	-7.249	2.262	0.00	09	Significant
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Source: Prepared by the researcher based on the outputs of SPSS Version 26.

Table 10 presents the differences between the pre-test and post-test results of the experimental group in the Horizontal Jump Test, with the aim of determining the effect of the proposed training program on the development of lower-limb explosive power. The results indicate the presence of statistically significant differences between the two measurements, as the calculated T-value was -7.249 , which exceeds the tabulated value of 2.262 in absolute terms. Furthermore, the Sig. value was 0.00 , which is lower than the adopted significance level of 0.05 , with 9 degrees of freedom. These results indicate the existence of statistically significant differences between the pre-test and post-test measurements.

The experimental group recorded a mean distance of 1.93 m in the pre-test, with a standard deviation of 0.262 , whereas the mean distance increased to 2.15 m in the post-test, with a standard deviation of 0.248 . This represents an increase of 0.22 m, indicating an improvement in the lower-limb explosive power of the experimental group following the implementation of the proposed training program.

Overall, the results demonstrate a statistically significant improvement between the pre-test and post-test measurements in the Horizontal Jump Test, indicating the positive effect of the proposed training program on the development of explosive power among the participants in the experimental group. This is consistent with the findings of Adel Malek and Saïd Mazrou (2023), as well as Mohamed Adel et al. (2022).

3.3.3. Presentation of the Results of the Differences Between the Pre-Test and Post-Test in the 20-m Sprint Test for the Experimental and Control Groups:

Table 11: Presents the nature of the differences between the pre-test and post-test results in the 20-m Sprint Test among the participants in the experimental group.

Tests	Pre-Test		Post-Test		Calculated t-value	Critical t-value	(Sig.)	(df)	Statistical Significance
	Arithmetic Mean	Standard Deviation (SD)	Arithmetic Mean	Standard Deviation (SD)					
20-Meter Sprint Test	4.29	0.297	3.94	0.225	3.836	2.262	0.00	09	Significant

Source: Prepared by the researcher based on the outputs of SPSS V 26.

Table 11 presents the differences between the pre-test and post-test results of the experimental group in the 20-m Sprint Test, with the aim of determining the effect of the proposed training program on the development of sprint speed. The results indicate the presence of statistically significant differences between the two measurements, as the calculated T-value was 3.836, which is greater than the tabulated value of 2.262. Furthermore, the Sig. value was 0.04, which is lower than the adopted significance level of 0.05, with 9 degrees of freedom. This indicates the presence of statistically significant differences between the pre-test and post-test measurements.

The experimental group recorded a mean completion time of 4.29 s in the pre-test, with a standard deviation of 0.297, whereas the mean completion time decreased to 3.94 s in the post-test, with a standard deviation of 0.225. This represents an improvement of 0.35 s. The reduction in completion time indicates an improvement in the sprint speed of the experimental group following the implementation of the training program.

Overall, the results demonstrate a statistically significant improvement in the performance of the experimental group in the 20-m Sprint Test, indicating that the proposed training program contributed to the development of sprint speed among the participants in the experimental group. This is consistent with the findings of Abdelkader Khalif and Fateh Mezari (2022) and Khemouri Nabil et al. (2020).

3.3.4. Presentation of the Results of the Differences Between the Pre-Test and Post-Test in the t-Test for Change-of-Direction Speed among the Experimental and Control Groups:

Table 12: Presents the nature of the differences between the pre-test and post-test results in the t-test for change-of-direction speed among the participants in the experimental group.

Tests	Pre-Test		Post-Test		Calculated t-value	Critical t-value	(Sg.)	(df)	Statistical Significance
	Arithmetic Mean	Standard Deviation (SD)	Arithmetic Mean	Standard Deviation (SD)					
T-Test for Change of Direction Speed	11.54	0.506	10.30	0.528	-4.365	2.262	0.00	09	Significant

Source: Prepared by the researcher based on the outputs of SPSS Version 26.

Table 12 presents the differences between the pre-test and post-test results of the experimental group in the T-Test for Change-of-Direction Speed, with the aim of determining the effect of the proposed training program on the development of change-of-direction speed. The results indicate the presence of statistically significant differences between the two measurements, as the calculated T-value was -4.365 , which exceeds the tabulated value of 2.262 in absolute terms. Furthermore, the Sg. value was 0.00 , which is lower than the adopted significance level of 0.05 , with 9 degrees of freedom. This indicates the presence of statistically significant differences between the pre-test and post-test measurements.

The experimental group recorded a mean completion time of 11.54 s in the pre-test, with a standard deviation of 0.506 , whereas the mean completion time decreased to 10.30 s in the post-test, with a standard deviation of 0.528 , representing a reduction of 1.24 s. This decrease is considered positive in the change-of-direction speed test, since improved performance in time-based tests is reflected by a reduction in completion time. Therefore, the results indicate an improvement in change-of-direction speed among the experimental group following the implementation of the training program.

Overall, the findings demonstrate statistically significant differences between the pre-test and post-test measurements in favor of the post-test, indicating an improvement in change-of-direction speed among the experimental group. These results reflect the positive effect of the proposed training program on the development of this physical variable. This is consistent with the findings of Abdelkader Khalif and Fateh Mezari (2022) and Adel Malek and Saïd Mazrou (2023).

3.4. General Discussion of the Results in Light of the Hypotheses:

3.4.1. Discussion of the Results in Light of the First Hypothesis:

The first hypothesis states that there are statistically significant differences between the pre-test and post-test results of the experimental group in speed among football players aged 13–15 years, in favor of the post-test results following the implementation of the small-sided games training program (Jeux réduits). Based on the results obtained from the 20-m Sprint Test and the Change-of-Direction Speed Test, statistically significant differences were found between the pre-test and post-test measurements, in favor of the post-test.

In the 20-m Sprint Test, the mean performance time decreased from 4.29 s in the pre-test to 3.94 s in the post-test, with a calculated T-value of 3.836 and a Sig. value of 0.04, which is lower than the significance level of 0.05. This indicates an improvement in sprint speed among the experimental group. Similarly, the mean performance time in the Change-of-Direction Speed Test decreased from 11.54 s to 10.30 s, with a calculated T-value of -4.365 and a Sig. value of 0.00, confirming the existence of a statistically significant difference in favor of the post-test.

This improvement can be attributed to the effectiveness of small-sided games training (Jeux réduits), which incorporates short sprints, accelerations, repeated changes of direction, and game situations requiring rapid responses and decision-making. These activities closely resemble the demands of actual football performance.

Accordingly, based on the statistical findings, the first hypothesis is accepted, confirming that the small-sided games training program contributed to the development of speed and change-of-direction ability among football players aged 13–15 years. This is consistent with the findings of Aakli Hussein (2019) and Boudali Adel (2026).

3.4.2. Discussion of the Results in Light of the Second Hypothesis:

The second hypothesis states that there are statistically significant differences between the pre-test and post-test results of the experimental group in strength following the implementation of the small-sided games training program (Jeux réduits). Based on the results obtained from the Horizontal Jump Test, statistically significant differences were found between the pre-test and post-test measurements in favor of the post-test.

The mean performance in the Horizontal Jump Test increased from 1.93 m in the pre-test to 2.15 m in the post-test. The calculated T-value was -7.249, which exceeds the tabulated value of 2.262 in absolute terms, while the Sig. value was 0.00, which is lower than the significance level of 0.05. These results confirm the existence of statistically significant differences between the two measurements in favor of the post-test and indicate an improvement in the explosive strength of the experimental group.

This improvement can be attributed to the nature of small-sided games training, which involves numerous movements requiring the application of force, such as acceleration and deceleration, physical contact and challenges for ball possession, jumping, sprinting, and changes of direction. These activities contribute to the development of

muscular strength, particularly explosive strength of the lower limbs. Furthermore, the repeated exposure to such situations throughout the training program may have enhanced the players' ability to generate force within a short period of time.

Accordingly, based on the statistical findings, the second hypothesis is accepted, indicating that the small-sided games training program contributed positively to the development of strength, particularly explosive strength, among the experimental group. This is consistent with the findings of Abdelkader Khalif and Fateh Mezari (2022) and Mejjab Issam (2019).

3.4.3. Discussion of the Results in Light of the Third Hypothesis:

The third hypothesis states that there are statistically significant differences between the pre-test and post-test results of the experimental group in endurance among football players aged 13–15 years, in favor of the post-test results following the implementation of the small-sided games training program (*Jeux réduits*). Based on the results of the 6-Minute Demi-Cooper Test, a statistically significant difference was observed between the pre-test and post-test measurements in favor of the post-test.

The mean performance increased from 1228.1 m in the pre-test to 1422 m in the post-test. The calculated T-value was -5.855 , which exceeds the tabulated value of 2.262 in absolute terms, while the Sig. value was 0.00 , which is lower than the significance level of 0.05 . These findings demonstrate the existence of statistically significant differences between the two measurements and indicate an improvement in the cardiorespiratory endurance of the experimental group.

This improvement can be attributed to the nature of small-sided games training, which requires players to remain continuously active and repeatedly participate in game situations through running, pressing, off-the-ball movement, and transitions between attacking and defensive phases. Such activities contribute to enhancing the ability to tolerate physical effort and maintain performance throughout training sessions.

Accordingly, based on the statistical findings, the third hypothesis is accepted, confirming that the small-sided games training program contributed positively to the development of endurance among football players aged 13–15 years. This is consistent with the findings of Abdelkader Khalif and Fateh Mezari (2022) and Adel Malek and Saïd Mazrou (2023).

3.4.4. Discussion of the Results in Light of the General Hypothesis:

The general hypothesis states that small-sided games training (*Jeux réduits*) has a positive effect on the development of certain physical attributes among football players

aged 13–15 years. Based on the results obtained from the physical tests, statistically significant differences were found between the pre-test and post-test measurements among the experimental group, in favor of the post-test.

The results demonstrated an improvement in speed, as evidenced by the decrease in the 20-m sprint time from 4.29 s to 3.94 s, as well as an improvement in change-of-direction speed, with the mean performance time decreasing from 11.54 s to 10.30 s. The Horizontal Jump Test also showed an increase in the mean performance from 1.93 m to 2.15 m, indicating an improvement in explosive strength. In addition, endurance improved, as demonstrated by the increase in the 6-Minute Demi-Cooper Test performance from 1228.1 m to 1422 m.

These findings can be explained by the specific characteristics of small-sided games training, which combines physical exertion with game situations that closely resemble actual match conditions. Such situations require players to repeatedly perform running, acceleration, deceleration, changes of direction, challenges for ball possession, and continuous movement. Consequently, several physical attributes can be developed simultaneously. Furthermore, the nature of these training activities can increase players' motivation and enhance their active participation during training sessions.

Based on the statistical findings obtained from the various physical tests, the general hypothesis of the study can be accepted. It can therefore be concluded that small-sided games training (Jeux réduits) had a positive effect on the development of certain physical attributes, namely speed, strength, and endurance, among football players aged 13–15 years. This finding confirms the effectiveness of this training approach in improving physical abilities associated with football performance. This is consistent with the findings of Abdelkader Khalif and Fateh Mezari (2022) and Adel Malek and Saïd Mazrou (2023), Aakli Hussein (2019) and Boudali Adel (2026), findings and Mejjab Issam (2019).

4. General Conclusions:

In light of the findings obtained from the study, and based on the analysis and discussion of the pre-test and post-test results of the physical assessments, the following general conclusions can be drawn:

- ✓ The results revealed statistically significant differences between the pre-test and post-test measurements among the experimental group in speed, indicating an improvement in sprint speed and change-of-direction speed following the implementation of the small-sided games training program.
- ✓ The results of the Horizontal Jump Test demonstrated an improvement in the explosive strength of the lower limbs among the experimental group, indicating the effectiveness of small-sided games training in developing this physical attribute.

- ✓ The experimental group showed a clear improvement in cardiorespiratory endurance, as the distance covered in the 6-Minute Demi-Cooper Test increased in the post-test compared with the pre-test.
- ✓ The comparison between the experimental and control groups in the pre-tests revealed a close level of performance between the two groups before the implementation of the training program. This supports the initial equivalence of the two groups and strengthens the possibility of attributing subsequent differences to the effect of the training program.
- ✓ The results of the post-tests demonstrated the superiority of the experimental group over the control group in the various physical attributes examined, confirming the positive effect of the proposed training program.
- ✓ Small-sided games training (Jeux réduits) contributed to the simultaneous development of several physical attributes, owing to the repeated performance of running, acceleration, changes of direction, competition, and continuous movement in situations that closely resemble actual match conditions.
- ✓ The study demonstrated that small-sided games represent an effective training method that can be employed in the preparation of football players aged 13–15 years, particularly for developing physical attributes that are directly related to actual competitive performance.
- ✓ Overall, the findings confirm the validity of the partial hypotheses and the general hypothesis of the study, and support the effectiveness of the small-sided games training program in developing certain physical attributes among football players aged 13–15 years.

5. Conclusion:

This study aimed to investigate the effect of small-sided games training (Jeux réduits) on the development of certain physical attributes among football players aged 13–15 years, through the implementation of a proposed training program and the comparison of the pre-test and post-test results of the experimental and control groups.

The findings revealed statistically significant differences in favor of the post-test measurements of the experimental group in endurance, speed, explosive strength, and change-of-direction speed. The post-test results also demonstrated the superiority of the experimental group over the control group in the physical tests examined, confirming the effectiveness of the proposed training program.

This improvement can be attributed to the nature of small-sided games, which com-

bine physical exertion with situations that closely resemble competitive match conditions through repeated running, acceleration, changes of direction, physical competition, and continuous movement. These characteristics contributed to the development of the players' physical abilities.

Accordingly, the study concluded that small-sided games training (Jeux réduits) represents an effective training approach for developing certain physical attributes among football players aged 13–15 years. Therefore, it can be incorporated into training programs designed for this age group, taking into consideration the players' physical and developmental capabilities as well as the specific objectives of the training program.

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