

The Effects of an Agility-Based Training Program on Basketball Dribbling Performance in Under-12 (U12) Basketball Players

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Abstract :

This study aimed to investigate the effectiveness of an agility-based training program in improving basketball dribbling performance among Under-12 (U12) basketball players. An experimental research design employing a one-group pre-test–post-test approach was adopted. The study sample consisted of 15 U12 basketball players who were purposively selected from the Biskra Basketball Club. The participants completed a structured agility-based training program over the intervention period, after which their performance was reassessed using the same testing procedures.

The findings revealed statistically significant improvements in both agility and basketball dribbling performance following the intervention. These results indicate that integrating agility-focused exercises into youth basketball training programs can effectively enhance sport-specific technical performance. The study emphasizes the importance of agility development during the early stages of long-term athlete development and recommends the systematic incorporation of agility training into youth basketball coaching programs.

Keywords: Agility; Agility-Based Training Program; Basketball; Dribbling Performance; Under-12 (U12) Players

Introduction

Agility is widely recognized as one of the fundamental physical attributes that plays a pivotal role in enhancing athletic performance, particularly in basketball. Its importance is even greater among young athletes, as this developmental stage coincides with a critical period of motor and skill acquisition. Owing to the dynamic nature of basketball, players are required to execute rapid changes of direction, make quick decisions, and perform technical actions accurately and efficiently within the shortest possible time. Consequently, a high level of agility enables players to translate their physical capacities into effective technical, tactical, and sport-specific

performance. Therefore, incorporating agility training into basketball training programs is essential, particularly during the early stages of athlete development.

The present study was motivated by the findings of a preliminary investigation, which revealed a noticeable lack of training programs specifically designed to develop agility among Under-12 (U12) basketball players. This age category represents one of the most critical stages in long-term athlete development and is widely recognized as the "golden age" for enhancing fundamental physical capacities, including agility. Developing agility during this period not only contributes to the improvement of basketball-specific skills but also plays an important role in reducing the risk of sports-related injuries.

Furthermore, the researchers observed that many youth basketball coaches continue to prioritize technical skill acquisition while giving limited attention to physical conditioning. This prevailing approach is based on the assumption that players at this developmental stage should focus primarily on mastering the fundamental skills of basketball, with little integration of physical training. However, such an approach overlooks the importance of combining age-appropriate agility training with technical skill development in accordance with children's physiological and motor development.

This gap highlights the need to investigate whether integrating agility-focused exercises into technical training programs can effectively enhance the technical performance of young basketball players. Addressing this issue may provide valuable evidence for coaches and practitioners seeking to optimize training strategies during one of the most influential stages of athletic development.

Accordingly, the present study seeks to answer the following research question:

To what extent does an agility-based training program improve basketball-specific skill performance among Under-12 (U12) basketball players?

1. Research Questions

Main Research Question :

- To what extent does an agility-based training program improve sport-specific skill performance among Under-12 (U12) basketball players?

Sub-Research Questions :

- Are there statistically significant differences between the pre-test and post-test measurements in dribbling performance in favor of the post-test?
- Are there statistically significant differences between the pre-test and post-test measurements in agility in favor of the post-test?

2. Research Hypotheses

General Hypothesis

- An agility-based training program significantly improves sport-specific skill performance among Under-12 (U12) basketball players.

Sub-Hypotheses

- There are statistically significant differences between the pre-test and post-test measurements in dribbling performance in favor of the post-test.

- There are statistically significant differences between the pre-test and post-test measurements in agility in favor of the post-test.

3. Operational Definitions

- **Agility :**

Conceptual Definition :Agility is a complex physical attribute characterized by the ability to accelerate, decelerate, and rapidly change direction while maintaining optimal body control without compromising movement speed (Zaki Mohamed Mohamed Hassan, 2015).

Operational Definition :In the present study, agility is defined as the player's ability to efficiently integrate speed, coordination, and balance in order to execute basketball movements rapidly, accurately, and effectively. Agility was operationally assessed using the Agility T-Test, with performance expressed as the time (seconds) required to complete the test.

- **Sport-Specific Skill Performance**

Conceptual Definition :Skill is a coordinated sequence of movements performed according to biomechanical, anatomical, physiological, and regulatory principles to accomplish a specific motor task (Talha Hossam El-Din et al., 2006). Automatic skill performance refers to the execution of movement with minimal conscious attention directed toward the performance process (Jamal Alaa El-Din et al., 2017).

Operational Definition :In this study, sport-specific skill performance refers to the player's ability to execute basketball-specific technical skills efficiently under game-related conditions. It is characterized by speed, accuracy, movement fluency, and technical quality. Operationally, sport-specific skill performance was assessed using the Basketball Dribbling Test, with performance recorded according to the standardized testing protocol.

- **Under-12 (U12) Basketball Players**

Conceptual Definition :The Under-12 (U12) category corresponds to late childhood (10–12 years), commonly referred to as the pre-adolescent stage, during which substantial physical, cognitive, and psychological development occurs (Omar Ahmed Hamshari, 2001).

Operational Definition :In the present study, Under-12 (U12) basketball players are defined as male athletes aged between 10 and 12 years, officially registered with their basketball clubs and regularly participating in structured basketball training.

- **Basketball**

Conceptual Definition :According to the International Basketball Federation (FIBA), basketball is played by two teams of five players each. The objective of each team is to score in the opponent's basket while preventing the opposing team from scoring. The game is officiated by referees, table officials, and, where applicable, a commissioner (FIBA Official Basketball Rules, 2017).

Operational Definition : In the context of this study, basketball is defined as a team sport requiring the integration of technical, physical, tactical, and cognitive abilities, in which two teams of five players compete to score more points than their opponents in accordance with the official rules established by FIBA.

4. Study Objectives

The present study aims to:

- Determine whether there are statistically significant differences between the pre-test and post-test measurements, in favor of the post-test, in basketball dribbling performance.
- Determine whether there are statistically significant differences between the pre-test and post-test measurements, in favor of the post-test, in agility.

5. Methodological Framework of the Study

Fieldwork Procedures :

The fieldwork was conducted according to the following steps:

- Obtaining official approval from the participating team to conduct the field study at the Biskra Sports Club.
- Conducting a pilot study with a number of basketball coaches to validate and refine certain components of the proposed training program.
- Presenting the proposed training program to experienced basketball coaches in order to identify any shortcomings and incorporate their recommendations before implementation.
- Implementing the proposed training program.
- The training program lasted two months and consisted of four mesocycles.
- Conducting the pre-test on 24 October 2017.
- Conducting the post-test on 2 January 2018.

6. Research Methodology

Research Design : The present study, entitled "The Effects of a Proposed Agility-Based Training Program on Sport-Specific Skill Performance in Under-12 (U12) Basketball Players," adopted the experimental research method to achieve the objectives of the study, which focuses on training programs designed for young basketball players.

The experimental method is based on observation and experimental (field) designs and is used to investigate causal and correlational relationships between variables. It emphasizes the relationship between causes and their effects by examining the impact of an independent variable on a dependent variable. Therefore, this method is particularly appropriate for identifying causal relationships in scientific research (Al-Arabi Belkacem Farhati, 2012, p. 129).

Accordingly, the study employed a one-group pre-test–post-test experimental design, in which the same experimental group was assessed before and after the implementation of the proposed training program to determine its effectiveness and its impact on improving sport-specific skill performance.

7. Study Population and Sample

Study Population : The study population refers to the entire group of individuals in which the researcher is interested (Abdelkader Abbas, 2013, p. 188).

The study population consisted of Under-12 (U12) basketball players. To identify the target population, the researchers contacted the Biskra Provincial Basketball League, which provided detailed information regarding the affiliated clubs, age categories, and the number of registered players within the Biskra district. The league also supplied information about the teams' training venues, which facilitated the organization and implementation of the fieldwork.

The total study population comprised 47 Under-12 (U12) basketball players.

Study Sample : A study sample is the group that best represents the study population and is considered a subset of that population (Amer Ibrahim Qandilji, 2012, p. 186).

The study sample was selected using purposive sampling and consisted of 15 Under-12 (U12) basketball players from the Nadhi Riyadhi Madinat Biskra (NRMB).

The sample was selected for the following reasons:

The club is recognized as one of the most prestigious basketball development programs in Biskra Province.

The club enjoys organizational stability, reflected in the continuity of its administrative and coaching staff.

The club's management demonstrated a high level of cooperation and provided all necessary facilities to support the implementation of the study.

8. Study Instrument :

Description and Purpose of the Study Instrument :

- The study instrument consisted of the development of a proposed agility-based training program.
- In accordance with the objectives and nature of the study, and in order to test the proposed research hypotheses, the researchers undertook the following procedures:
- Designing and developing a proposed agility-based training program aimed at improving the sport-specific skill performance of Under-12 (U12) basketball players.
- Preparation Procedures for Implementing the Proposed Training Program

Prior to implementing the training program, the following steps were completed:

- Developing the overall structure and content of the training program.
- Selecting and preparing the appropriate facilities, equipment, and training materials.
- Identifying the physical and skill tests used to assess the study variables.
- Determining the duration of the training program and scheduling the pre-test and post-test assessments

Data Collection Instruments :

The following sources and instruments were used to collect the required data:

- Arabic and international scientific references.
- Internet-based academic resources.
- Pre-test and post-test data recording forms.
- Interviews conducted with experts and specialists in the field.

Physical and Skill Tests Used in the Study

Physical Test : Basketball Agility Lane Test

Equipment : The following equipment was used to administer the Basketball Agility Lane Test

- Half of a standard basketball court.
- Four (4) cones.
- A stopwatch.

Adhesive tape to mark the starting point, finishing point, and change-of-direction lines.

Test Procedure :

Four cones are placed at the four corners of the key (painted area).

The player starts from the left corner of the free-throw line nearest the baseline.

At the start signal, the player sprints toward the baseline and runs around the first cone to the right.

The player then performs a defensive slide to the left until passing the second cone.

- After passing the second cone, the player backpedals toward the free-throw line.
- Upon passing the third cone, the player performs another defensive slide until reaching the starting point, where the change-of-direction line is touched with the left foot.
- The player immediately changes direction and performs a defensive slide to the right toward the cone positioned on the right side of the free-throw line.
- After rounding the cone, the player sprints toward the baseline.
- Upon passing the baseline cone, the player performs a defensive slide to the left toward the opposite corner.
- Finally, after rounding the last cone, the player backpedals to the starting point, where the test is completed.

Test Instructions : Each participant performs two trials, and the fastest completion time is recorded.

One technical error is permitted without penalty. If more than one error is committed, the trial must be repeated.

The following are considered technical errors:

Knocking over a cone.

Cutting across a corner instead of running around the cone.

Sprinting or side running instead of performing a defensive slide.

Crossing the feet during the defensive slide.

Failing to touch the designated change-of-direction point or falling to the floor.

Scoring :

Timing begins as soon as
the player initiates movement.

The best time (in seconds)
obtained from the two
trials is recorded as the final
score (Salwan Saleh j, 2014, pp. 52–53).

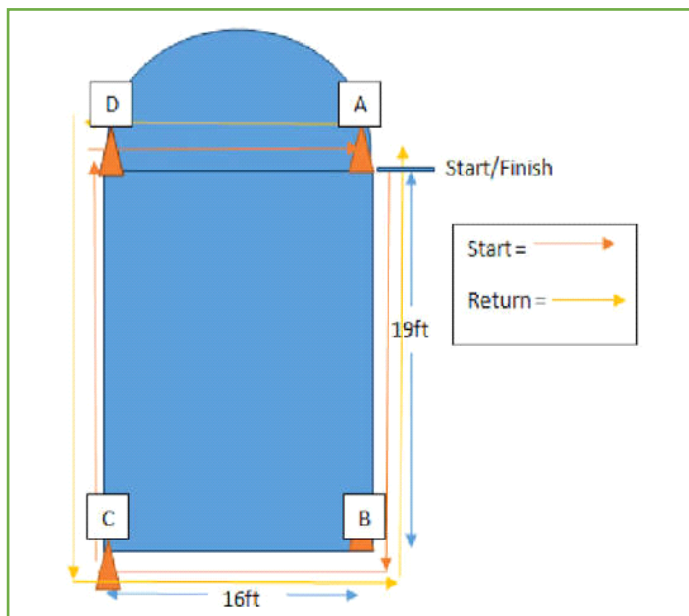


Figure 1. Agility Lane Drill Test. Adapted from Dawes et al. (2016)

Skill Test :

Basketball Dribbling Test

Purpose of the Test : The test is designed to assess the player's ability to maintain ball control and demonstrate agility while dribbling.

Equipment and Test Setup :

The test requires a flat surface with a minimum length of 12 m. Four obstacles (or four chairs) are arranged in a straight line. A starting line measuring 1.80 m in length is marked on the floor at a distance of 3.60 m from the first obstacle. The distance between consecutive obstacles is 1.80 m. It is recommended that the positions of the obstacles be marked or numbered on the floor to facilitate test administration (Mohamed Mahmoud et al., 1999, pp. 105–108).

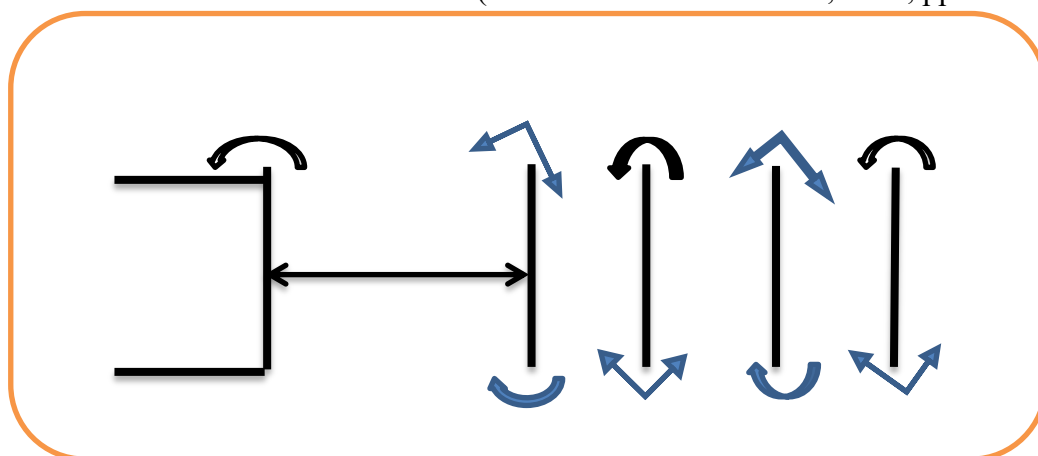


Figure 2. Diagram illustrating How to perform the dialogue test in basketball

9. Preliminary Development of the Training Program and Its Implementation Procedures:

Description of the Study Instrument :

Based on the nature of the present study, which falls within the category of Applied (Experimental) Research, the study aims to generate knowledge with practical value.

Accordingly, the primary study instrument consisted of the development of a proposed agility-based training program. A training program is defined as the systematic organization of a series of training sessions designed to develop one or more performance components, whether targeting a single or multiple training objectives, with the ultimate goal of enabling players to achieve the desired level of performance.

Fundamental Considerations for the Content of the Proposed Training Program :

- Ensuring that both the physical and skill-training components were appropriate for the players' age, abilities, and performance level.
- Providing a balanced and diversified training content that addressed the essential physical and technical requirements without overemphasizing or neglecting any training component.
- Incorporating exercises that promoted teamwork and cooperation, thereby encouraging interaction, healthy competition, and increased motivation within the training group.

Requirements for the Training Equipment

- Ease of use for Under-12 basketball players.
- Safety, ensuring that the equipment posed no risk of injury.
- Variety in the use of training equipment to maintain players' motivation and maximize the effectiveness of the training process.
- Equipment and Materials Used for Testing and Training

The following equipment was used during the assessment procedures and throughout the implementation of the proposed agility-based training program:

- Size 6 basketballs. Training ropes. _ Agility ladder.
- Exercise mats. _ Training cones.
- Hoops. _ Tennis balls (Mostafa El-Sayeh et al., 2009, p. 86).

Validity of the Study Instrument :

Face Validity : The proposed Agility-Based Training Program was developed in accordance with established scientific principles and informed by relevant empirical studies that demonstrated satisfactory psychometric properties, as well as practical coaching experience. These scientific and practical foundations provided strong evidence supporting the anticipated effectiveness of the study instrument.

Content Validity (Expert Review) : The proposed Agility-Based Training Program, designed to improve the Sport-Specific Skill Performance of Under-12 (U12) Basketball Players, was submitted to a panel of experts in basketball coaching and sports training for evaluation. The experts thoroughly reviewed the program and provided comments, recommendations, and suggestions regarding its content, structure, training load, and suitability for the target age group. Based on their feedback, the necessary modifications were incorporated, and the training program was refined and finalized in its final form, as presented in this study.

10. Scope of the Study

• Time Scope :

The study commenced in January 2016 with a Pilot Study aimed at identifying and defining the study variables in accordance with the field context. This phase involved several field visits, beginning with the Biskra Provincial Basketball League, which provided statistical information on basketball clubs, age categories, training venues, and the achievements of the affiliated teams. Based on these preliminary investigations, Nadhi Riyadhi Madinat Biskra (NRMB) was selected as the study site owing to its distinguished record of achievements at the provincial, regional, and national levels.

Following an extensive review of the relevant literature and previous studies, the Proposed Agility-Based Training Program was developed and subsequently evaluated in consultation with experienced basketball coaches. After incorporating their recommendations and making the necessary modifications, the final version of the program was completed over a period of three months.

The Pre-test was administered on 24 October 2017, followed by the implementation of the proposed training program. Upon completion of the intervention, the Post-test was conducted on 2 January 2018

Geographical Scope :

The study, including the administration of the Pre-test and Post-test as well as the implementation of the Proposed Agility-Based Training Program, was conducted at the sports field of Lebsaïra Fatima Middle School, Biskra, Algeria.

- Statistical Analysis
- Statistical Procedures

Following the implementation of the Proposed Agility-Based Training Program, the data obtained from the Pre-test and Post-test assessments were coded, entered, and analyzed using the Statistical Package for the Social Sciences (SPSS) (Khamis Taam Allah, 2004, p. 213).

To test the research hypotheses in accordance with the study objectives, the following statistical procedures were employed:

11. Arithmetic Mean (Mean)

The arithmetic mean is defined as the sum of all observations divided by the total number of observations (Mosaed Bin Abdullah Al-Nouh, 2004, p. 161).

$$[\bar{X} = \frac{\sum_{i=1}^N n_i x_i}{\sum_{i=1}^N n_i}]$$

Standard Deviation (SD)

The standard deviation is the square root of the average squared deviations of the observations from their arithmetic mean (Wajih Mahjoub, 2014, p. 201).

$$[SD = \sqrt{\frac{\sum_{i=1}^N (X - \bar{X})^2}{N}}]$$

- Where:
- X = Individual participant's score.
- $\bar{X}$ = Arithmetic mean.

- N = Total number of participants.
- $\Sigma(X - \bar{X})^2$ = Sum of squared deviations from the arithmetic mean.

Paired Samples t-Test

The paired samples t-test was employed to determine whether statistically significant differences existed between the Pre-test and Post-test measurements

$$[t = \frac{\sum d}{\sqrt{\frac{N \sum d^2 - (\sum d)^2}{N-1}}}]$$

Where:

- t = Calculated t-value.
- d = Difference between the Post-test and Pre-test scores for each participant.
- Σd = Sum of the paired differences.
- Σd^2 = Sum of the squared paired differences.
- $(\Sigma d)^2$ = Square of the sum of the paired differences.
- N = Sample size (number of participants).

12. Analysis of the First Hypothesis

Presentation, Analysis, and Discussion of the First Hypothesis :

First Hypothesis : There are statistically significant differences between the Pre-test and Post-test measurements in Basketball Dribbling Performance, in favor of the Post-test.

Table 01. Comparison of the Pre-test and Post-test Results for Basketball Dribbling Performance.

Participant	Pre-test: Basketball Dribbling Performance	Post-test: Basketball Dribbling Performance
1	17	26
2	12	23
3	18	25
4	19	28
5	18	24
6	13	28
7	15	28
8	21	30
9	20	30
10	19	27
11	19	28
12	18	25
13	16	24
14	12	22
15	10	20

13. Statistical Analysis of the Pre-test and Post-test Results for Basketball Dribbling Performance

Table 02 : presents the statistical analysis of the Pre-test and Post-test results for Basketball Dribbling Performance.

Measurement	Unit	of	Sample	Mean	Standard	Calculated	p-	Statistical
	Measurement		Size (N)		Deviation	t-value	value	Significance
			Pearson		(SD) of the	Calculated	Degrees	of
			Correlation		Mean	t Value	Freedom	Significant
Pre-test: Basketball Dribbling Performance	Seconds/Points	Sample (n)	(r)	16.47	3.335	-15.667	0.001	
Post-test: Basketball Dribbling Performance	Seconds/Points	15	0.732	25.87	2.924	-15.667	14	

Table 03. Results of the Paired Samples t-Test and Pearson Correlation Analysis for Basketball Dribbling Performance (Pre-test vs. Post-test)

The results presented in the previous table indicate apparent differences between the Pre-test and Post-test measurements of Basketball Dribbling Performance, as also illustrated by the corresponding figure.

The statistical analysis revealed a Mean score of 16.47 in the Pre-test, compared with 25.87 in the Post-test, representing a mean difference of 9.40 points in favor of the Post-test. This improvement reflects the effectiveness of the Proposed Agility-Based Training Program in enhancing Basketball Dribbling Performance. The Standard Deviation (SD) was 3.335 for the Pre-test and 2.924 for the Post-test, indicating a reduction in score variability following the intervention.

Furthermore, the table reporting the Paired Samples t-Test and Pearson Correlation Analysis showed a strong positive correlation ($r = 0.732$) between the Pre-test and Post-test scores. The calculated t-value was -15.667 with 14 degrees of freedom, while the significance level was $p < 0.001$. Since the obtained p-value was lower than the predetermined significance level ($\alpha = 0.05$), the observed differences were considered statistically significant in favor of the Post-test.

Overall, the statistical findings demonstrate a substantial improvement in Basketball Dribbling Performance among the Under-12 (U12) basketball players following the intervention. This improvement can be attributed to several factors, including scientifically based training planning, adherence to established training principles, the selection of appropriate training methods and exercises, and the systematic organization of the program content. According to the FIBA classification of fundamental basketball skills, dribbling is one of the most essential technical skills for young players, as it requires rapid acceleration, sudden stops, frequent changes of direction, and effective whole-body coordination. Accordingly, the proposed

training program was specifically designed to integrate agility-oriented exercises with basketball dribbling tasks in order to promote movement automation and improve the quality of sport-specific skill performance.

The improvement observed in the present study is also supported by previous research emphasizing the importance of Agility in youth basketball development. According to Didier Reiss (2013), physical fitness components contribute substantially to movement efficiency and injury prevention. Likewise, Ali Fahmy Al-Bayek (2013) emphasized that agility is a fundamental physical quality for mastering technical performance, as it enhances movement control, balance, and the efficient coordination of body segments. Similarly, Sébastien Ratel and Vincent Martin (2014) reported that agility-oriented training improves movement speed, efficiency, and recovery from training loads, thereby enhancing the execution of complex motor skills.

Furthermore, Dalia, citing Zainab Abu Bakr (2014), reported that agility represents the most influential motor ability underlying the acquisition of fundamental basketball skills, accounting for approximately 86% of skill performance. Agility was identified as the primary physical quality integrating the contributions of other physical capacities into accurate, efficient, and aesthetically coordinated movement. In addition, Issam Abdel-Khalek (2005) highlighted that agility in basketball is reflected in rapid movement execution, coordination, efficient changes in body position, sudden stopping ability, and continuous movement sequencing according to the tactical demands of the game.

These principles were fully considered during the development of the proposed training program. The training sessions incorporated reverse-direction drills, variations in movement speed, constrained training spaces, and agility-specific movement patterns directly integrated with Basketball Dribbling Performance. Such training methods have also been recommended by Matveyev and Hare as effective strategies for developing agility.

The present findings are further supported by the study conducted by Nart Shawka (2013), which investigated the relationship between agility and skill performance in handball. That study demonstrated that improvements in agility produced significant enhancements in the execution of fundamental skills, including dribbling, ultimately leading to higher overall skill performance.

Finally, the positive outcomes observed in the present study can be attributed to the effectiveness of the Proposed Agility-Based Training Program, which successfully integrated agility development with basketball-specific technical training. These findings are consistent with those reported by Rateb Al-Dawad (2011), who concluded that integrating physical training with fundamental technical skills and coordinative abilities contributes to stabilizing technical performance and facilitates the development of automated skill execution.

Based on these findings, the first research hypothesis was supported, confirming that there were statistically significant differences between the Pre-test and Post-test measurements in Basketball Dribbling Performance, in favor of the Post-test.

14. Presentation, Analysis, and Discussion of the Second Hypothesis :

➤ Second Hypothesis :

There are statistically significant differences between the Pre-test and Post-test measurements of Agility, in favor of the Post-test.

- Table 04. Comparison of the Pre-test and Post-test Results for Agility

Participant	Pre-test: Agility Test	Post-test: Agility Test
1	9.18	8.93
2	11.56	9.02
3	9.62	8.31
4	9.60	8.31
5	9.13	8.28
6	9.85	8.50
7	9.95	9.01
8	9.02	8.34
9	9.31	8.57
10	9.14	8.66
11	9.22	8.98
12	9.40	9.02
13	9.53	8.09
14	9.12	8.28
15	9.28	8.81

15. Statistical Analysis of the Pre-test and Post-test Results for the Agility Test

Table 05. Statistical Analysis of the Pre-test and Post-test Results for the Agility Test.

Measurement	Unit of Measurement	Sample Size (N)	Mean	Standard Deviation (SD)	Calculated t-value	p-value (Sig.)	Statistical Significance
Pre-test: Basketball Dribbling Performance	Seconds	15	9.547	0.634	5.869	0.001	Significant
Post-test: Basketball Dribbling Performance	Seconds	15	8.607	0.330	5.869	0.001	

Table : 06. Results of the Paired Samples *t*-Test and Pearson Correlation Analysis for the Pre-test and Post-test Measurements of the Agility Test

	Sample (n)	Pearson Correlation (r)	Standard Error of the Mean (SEM)	Degrees of Freedom (df)

Pre-test vs. Post-test	15	0.303	0.160	14
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Proper training planning and the design of training programs based on sound scientific principles, while considering athletes' developmental needs and the specific demands of basketball, play a fundamental role in improving players' physical and technical performance. Translating these principles into well-structured training sessions contributes to positive adaptations in the athletes' overall performance. Among the most important principles adopted in the present study were the continuous development of Agility, the systematic variation of training intensity and load, and the incorporation of multidirectional movement patterns and frequent changes of direction. These principles are consistent with the recommendations of Zaki Mohammed (2015). Likewise, Baechle and Earle (2000) emphasized that physical fitness components both influence and are influenced by technical skill development in basketball, identifying Agility as one of the most critical determinants of basketball performance.

The improvement in agility observed in the present study may also be attributed to the developmental characteristics of the Under-12 (U12) age group, which is widely recognized as one of the most appropriate stages for developing agility and other coordinative abilities. This view has been supported by several researchers, including Fadel Hussein Aziz (2015).

Another important feature of the proposed training program was the use of a wide variety of training equipment and instructional aids. These tools not only enhanced players' motivation and concentration but also facilitated the acquisition and development of agility-related movement patterns. In this regard, Nawal Mahdi and Asmaa Hamid reported that the appropriate use of pedagogical equipment during agility training positively contributes to agility development.

Moreover, the diversity of technical skills acquired by young basketball players and the variety of movement patterns performed during training have a direct influence on athletic performance. Sports characterized by a broad repertoire of technical skills and complex motor actions, such as basketball, naturally promote higher levels of agility. This relationship was emphasized by Jamal Alaa El-Din and Nahed Anwar Al-Sabbagh (2007). Similarly, Risan Khurbit (2003) argued that basketball itself represents an effective means of developing agility because of its continuous multidirectional movements and complex technical demands. Furthermore, Mufti Ibrahim Hammad, citing Hare (2008), explained that increasing motor experiences, diversifying movement patterns, and reducing movement execution time all contribute substantially to agility development. These characteristics closely reflect the technical and tactical requirements of basketball, where players are required to execute rapid movements and continuously adapt to changing game situations. Consequently, agility becomes an essential component of successful basketball performance.

Based on the presentation, analysis, and discussion of the findings related to the Second Hypothesis, the results demonstrated that the Proposed Agility-Based Training Program produced significant improvements in Agility, with statistically significant differences observed between the Pre-test and Post-test measurements in favor of the Post-test. Therefore, the second research hypothesis was supported.

16. Study Conclusions :

- The Proposed Agility-Based Training Program produced significant improvements in the physical performance of Under-12 (U12) Basketball Players, as evidenced by the statistically significant differences observed between the Pre-test and Post-test measurements in favor of the Post-test for Agility.
- Integrating agility exercises with basketball-specific skill training had a positive effect on the participants, resulting in a clear improvement in Basketball Dribbling Performance and the overall quality of sport-specific skill execution.
- A significant relationship was observed between the development of Agility and improvements in Basketball Dribbling Performance, indicating that enhancing agility contributes positively to sport-specific technical performance among young basketball players.
- The training approach adopted throughout the program positively influenced the players' overall performance by improving both their physical capacities and basketball-specific technical skills.

17. Practical Recommendations:

- Design training sessions that closely simulate competitive game situations, particularly during technical skill training, to facilitate the transfer of learning and improve the overall performance of young basketball players.
- Give greater attention to the planning and implementation of scientifically designed training programs for Under-12 (U12) Basketball Players, considering the developmental importance of this age category.
- Emphasize the systematic development of Agility during youth training programs because of its fundamental role in enhancing Sport-Specific Skill Performance.

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