

# THE EFFECT OF A TRAINING PROGRAM ON DIFFERENT SURFACES IN DEVELOPING THE FOREHAND AND BACKHAND SKILLS OF JUNIOR TENNIS PLAYERS

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## **ABSTRACT:**

*This study aims to evaluate the effect of a training program on different surfaces in developing the forehand and backhand skills of junior tennis players. An experimental approach with a pre-test and post-test design was used, with participants divided into two experimental groups. The players performed tests to measure the accuracy and technical performance of the skills. The training program was implemented using various surfaces, including grass and clay courts. The results showed significant improvements in performance and accuracy for both skills in the experimental groups after the training program, highlighting the importance of surface diversity in enhancing player performance.*

## **KEYWORDS:**

*Training Program, Forehand, Backhand and Tennis*

## INTRODUCTION:

The forehand and backhand strokes are among the most important and frequently performed skills during matches and mastering them is essential for achieving success. Complete mastery of these strokes leads to integrated performance in tennis between the forehand and backhand strokes, and a player's development level significantly depends on their efficiency in utilizing these two strokes. The significance of this research lies in enhancing the skills of the forehand and backhand strokes through a training program with specific exercises on various court surfaces. Each surface has a different rebound speed compared to others, and it is essential for players to adapt to these diverse rebounds.<sup>1</sup> Therefore, the researcher sees a necessity to implement a specific training program that exposes the player to different stimuli resulting from these varied rebounds according to the type of court. The game's conditions require performing matches on various surfaces, whether grass or clay, thereby increasing performance output.

## RESEARCH PROBLEM:

Tennis includes various and rapid skills, both fundamental and derived, and the development of these skills is closely related to the evolution of physical, mental, psychological, and specific skill-related attributes that distinguish tennis from other sports. Possessing high-level skills alone is not beneficial without the ability to perform these skills effectively, especially since most balls exhibit varied rebounds and speeds depending on the court type. Through the researcher's experience and monitoring of local and international tournaments, she noticed coaches focus on the quantity of physical exercises while neglecting specialized training exercises across different surfaces, which subsequently weakened players' ability to cope with less challenging situations aligned with performance requirements and movement situations in the game, negatively affecting player rankings. Therefore, the researcher aimed to use a method involving specialized exercises on courts of varying hardness to adapt to different game situations to succeed in performance outcome metrics.

## RESEARCH OBJECTIVES:

1. To identify the effect of the training program using different surfaces on developing the forehand and backhand skills in junior tennis players.
2. To determine the best surfaces used in developing the forehand and backhand skills in junior tennis players.

## RESEARCH HYPOTHESES:

1. There is a significant (positive) effect of the experimental program using different courts on developing the forehand and backhand skills in tennis.
2. There are variations in the best surfaces used in developing the forehand and backhand skills in tennis.

## RESEARCH DOMAINS:

- **Human Domain:** Players of Al-Dura Tennis Academy in Karbala Governorate aged 12-14 for the sports season 2023-2024.
- **Time Domain:** From November 20, 2023, to September 27, 2024.
- **Spatial Domain:** Al-Dura Tennis Academy courts in Karbala Governorate.

## RESEARCH METHODOLOGY AND FIELD PROCEDURES:

### Research Methodology:

The researcher employed an experimental method using an equivalent group design.

### Research Population:

The researcher defined the research population as the players of Al-Dura Tennis Academy for the 2023-2024 season, totaling 20 players. A sample was chosen using a comprehensive selection method, and the sample was randomly divided into two equal experimental groups, each consisting of 10 players.

## FIELD PROCEDURES:

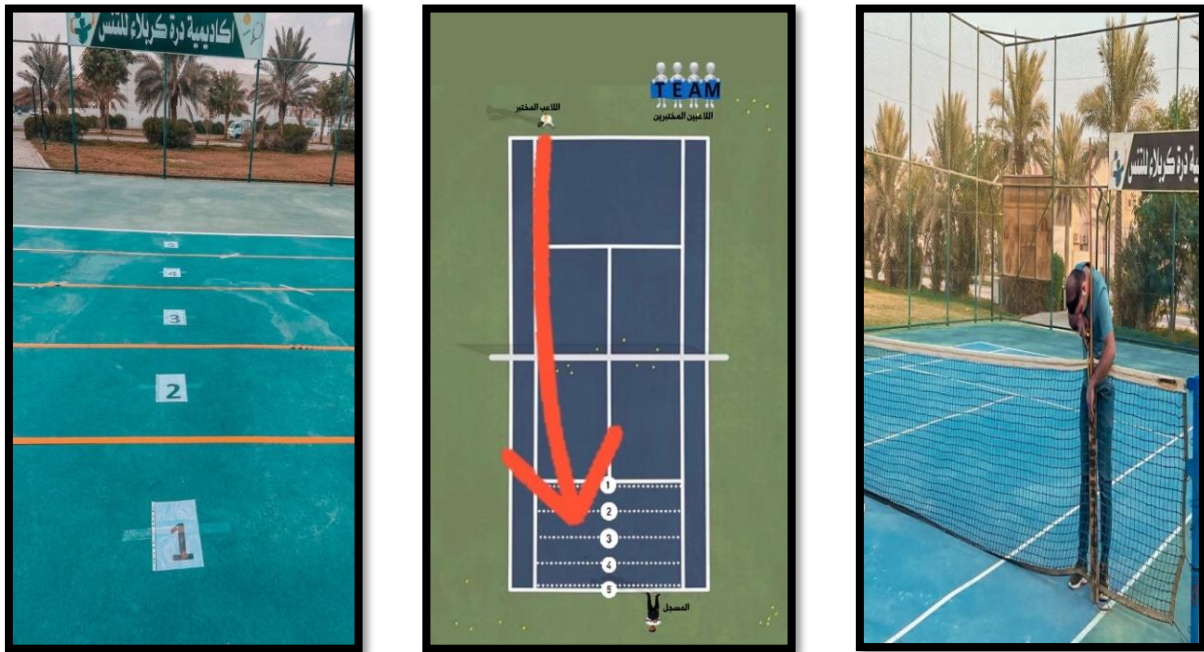
### 1. Tennis Skills Tests:<sup>2</sup>

The researcher relied on two types of tests: the first to measure the accuracy of executing the forehand and backhand strokes, and the second to evaluate performance in terms of the technical execution of these skills. A set of tests was derived from literature, and the tests were presented to a group of 11 experts in tennis for their opinions on their suitability and relevance to the research topic. The experts agreed on the tests related to the research topic and sample, selecting those with an agreement rate of 55% or higher. All tests for the basic skills are standardized for the Iraqi environment and focused on the following skill tests:

1. The Hayet Test for measuring forehand accuracy.
2. The Hayet Test for measuring backhand accuracy.

### 3-4-5-1 Accuracy Tests for Forehand and Backhand Skills in Tennis:

**Test Name:** Measuring the accuracy of the forehand and backhand strokes in tennis is conducted on a standard tennis court with prepared rackets and 30 tennis balls, along with a recording form and a fixed rope, as illustrated in Figure (1), showing the standing areas of the testers and how to conduct the test along with evaluation marks.



**Test Tools:** A rope is fixed between two poles in line with the net, parallel to it, at a height of 7 feet from the ground and 4 feet from the net, as illustrated in Figure (29). Three parallel lines are drawn between the service line and the baseline, with a distance of 4.5 feet between the lines.

**Implementation Method:** The player stands on the center mark, which is located at the midpoint of the baseline, and is given five trial attempts to assess their test performance after guidance from the coach. The ball must be thrown directly behind the service line using a ball machine if available or by the coach. The player then attempts to return the ball with their racket using either the forehand or backhand stroke, with each player assigned ten attempts for the forehand and ten for the backhand.

**Scoring:** The player's score is the total points earned from their ten attempts for each skill. The ball must cross the net and pass under the rope to score points on a scale from 1 to 5. If the ball goes over the rope, half the score is given for the area where it lands correctly. The maximum score for each skill is 50 points.

## 2. SCIENTIFIC FOUNDATIONS FOR TESTS:

### First: Validity of Tests:

The researcher relied on content validity in determining the validity of the tests by presenting the proposed tests to a group of experts in tennis and measurement to determine their agreement on the suitability of these tests for the research sample.

### Second: Test Reliability:

The researcher employed the method of applying and reapplying the tests. After seven days from the initial trial, the researcher reapplied these tests (forehand and backhand) on a pilot sample of 5 players on Monday, September 26, 2023, at 5 PM. The researcher then calculated the correlation between the first and second trial results using Pearson's correlation coefficient. The results showed that all tests exhibited strong and high reliability, as indicated in Table (8).

### Third: Objectivity of Tests:

To extract the objectivity of the tests, the researcher used the scores of three evaluators to assess the skill performance (technique) of the forehand and backhand strokes in tennis through their apparent shape and skill performance evaluation test. The Pearson correlation coefficient between their scores was calculated, showing that these tests had high objectivity.

### Equivalence of Groups:

To attribute changes in test results to the experimental factor, before implementing the exercises, the researcher worked to ensure the experimental control and to equalize the study sample groups as much as possible. This was done for all dependent variables of the study, including skill performance and accuracy in tennis skills, through preliminary tests using the independent sample t-test, as shown in Table (2).

**Table (2):** Shows the equivalence of the study groups.

Variables	Measurement Unit	Experimental Group 1	Experimental Group 2	Calculated t Value	Significance Level (Sig)	Type of Significance
Skill Performance - Forehand	Degree	5.21	± 1.92	5.88	± 1.42	0.54
Skill Performance - Backhand	Degree	5.02	± 1.08	5.27	± 1.52	0.81
Accuracy - Forehand	Degree	12.34	± 4.85	12.69	± 4.12	0.72
Accuracy - Backhand	Degree	11.20	± 3.33	11.69	± 3.58	0.97

From Table (2), it is clear that the significance level of the test (Sig) is greater than 0.05 for all variables under study; hence, the significance of the test is non-significant.

**MAIN EXPERIMENT PROCEDURES:**

**1. Preliminary Tests:**

The researcher, with the assistance of the working team, conducted preliminary tests on the research groups (control and experimental) regarding the dependent variables of skill performance and accuracy in forehand and backhand strokes on Wednesday and Thursday, September 28 and 29, 2023, at 4 PM on the Al-Dura Tennis Academy court. The researcher will use a Nikon camera to record the technical performance of the forehand and backhand strokes and will record them on CD for analysis by evaluators using pre-prepared evaluation forms. The accuracy tests will be recorded directly using the pre-prepared evaluation form.

**2. Preparation and Implementation of Specialized Exercises:**

After conducting the preliminary tests and measurements, the specialized exercises were incorporated into the training program for the study sample during the training sessions on the different surfaces. The implementation phase was divided as follows:

- a) **Training sessions (before the experimental program):** The control group followed the traditional training program according to the club’s schedule, while the experimental group received the training program using different surfaces.
- b) **Training sessions (after the experimental program):** The training program for the experimental group included using different surfaces such as grass and clay courts in the training plan, which included specialized exercises to improve accuracy and enhance technique in forehand and backhand strokes.

**3. Main Tests:**

The main tests were conducted on the research groups on Tuesday and Wednesday, October 3 and 4, 2023. The researcher used the same measures, tests, and procedures as those in the preliminary tests to assess skill performance and accuracy.

**4. Statistical Data Analysis:**

To analyze the data, the researcher employed the statistical program SPSS to analyze the test results, including calculating the mean and standard deviations for each group. The data will be processed using paired and independent samples t-tests to reveal the differences between the means of the two groups before and after the experimental program.

**5. Statistical Methods for Data Analysis:**

To analyze the data, the researcher used the SPSS statistical program to evaluate the test results, including calculating the means and standard deviations for each group. The data were processed using paired and independent samples t-tests to identify the differences between the means of the two groups before and after the experimental program.

**PRESENTATION OF RESULTS AND ANALYSIS AND DISCUSSION:**

**• Presentation of Pre- and Post-Test Results for Research Variables:**

After collecting the pre- and post-test data for each court within the experiment (the grass court and the sand court), the researcher conducted a statistical analysis that clarifies the test results for the three groups on both the grass and sand courts.

**Table 3** shows the mean and standard deviation of the sample results for the grass court.

Statistical Means	Variables	Pre-Test	Mean ± SD	Post-Test	Mean ± SD	Calculated t Value	Level of Significance Sig	Type of Significance
Skill Performance	Forehand	5.21	1.92	6.89	1.56	3.63	0.001	Significant
	Backhand	5.02	1.08	6.21	1.39	3.21	0.001	Significant
Accuracy	Forehand	12.34	4.85	14.44	3.48	3.23	0.002	Significant
	Backhand	11.20	3.33	13.68	3.69	3.28	0.002	Significant

**Table 4** shows the mean and standard deviation of the sample results for the sand court.

Statistical Means	Variables	Pre-Test	Mean ± SD	Post-Test	Mean ± SD	Calculated t Value	Level of Significance Sig	Type of Significance
Skill Performance	Forehand	5.88	1.42	7.36	1.41	5.12	0.000	Significant
	Backhand	5.27	1.52	7.38	1.28	3.83	0.000	Significant
Accuracy	Forehand	12.69	4.12	15.98	3.39	4.97	0.000	Significant
	Backhand	11.69	3.58	15.53	3.53	6.27	0.000	Significant

**• Presentation of Differences in Pre- and Post-Test Results for Research Variables and Analysis:**

After collecting the pre- and post-test data for each group, the researcher tested them on the same court on which they trained. To determine the significance of the differences between the pre- and post-measurements, the researcher statistically analyzed the data using the t-test. It was found that the calculated t value for the results of the experimental groups in the forehand stroke was greater than the tabulated value, indicating significant differences between the pre- and post-tests for all experimental groups regarding this skill in favor of the post-test.

Regarding the differences between the pre- and post-tests for the experimental groups in the backhand skill, it was found that the calculated t value was greater in both experimental groups, indicating significant differences between the pre- and post-tests for this skill in favor of the post-test. The researcher attributes these significant differences to the effect of the scientific training program designed, characterized by the fluctuation of its training units in terms of increased and decreased training loads and rest for each training unit. The "training is a series of repetitions and exercise periods with intervals of rest between each repetition, and the intervals extend according to the achievement of development." He determined the intensity used between (80-90%) with two high training units followed by a low training unit, and the time of performance for each of the skill and movement exercises, as well as the intensity, repetitions, and rest used for that exercise were specified.<sup>3</sup>

The training program used, along with the interaction between players and coaches in executing the components of the training unit, and the use of high-intensity interval training methods, is considered one of the important training approaches due to its clear impact. The training program used, characterized by an increase in the number of stimuli and their diversity and the provision of various alternatives for responses, has created a positive state between stimulus and response, which contributed to improving the level of performance through the varied training used in the designed program.<sup>4</sup> Each physical or skill performance period is interspersed with repeated rest periods, representing a sequential exchange between work and rest that promotes achieving the desired goals.

**• Presentation of Differences in Post-Test Results for Research Variables and Analysis:**

After collecting the post-test data, to understand the differences in the improvement achieved in the performance of the forehand and backhand skills for all groups on different surfaces, the researcher tested both research groups post-test and then conducted a statistical analysis of that data. To determine the significance of the differences between the groups, the researcher used the t-test, as shown in Table (7).

**Table 7** shows the differences between the first experimental group (grass court) and the second experimental group (sand court).

Statistical Means	Variables	Experimental Group One	Experimental Group Two	Calculated t Value	Level of Significance Sig	Type of Significance
Skill Performance	Forehand	6.89	1.56	7.36	1.41	3.71
	Backhand	6.21	1.39	7.38	1.28	3.86
Accuracy	Forehand	14.44	3.48	15.98	3.39	3.94
	Backhand	13.68	3.69	15.53	3.53	3.86

From our analysis of Table (7), the calculated t value for the forehand on the grass court is smaller than the Sig value, which is (0.05), indicating significant differences between the two groups. For the backhand, the value was also smaller than the Sig value of (0.05), indicating significant differences between the two groups.

• **Discussion of the Results of the Differences in Post-Test Research Variables:**

From the previous results of the differences, it is evident that the second experimental group performed better in the forehand and backhand skills. The researcher attributes this progress to the fact that the second experimental group trained throughout the entire duration of the program on the grass court, which has advantages over sand courts. Grass courts are characterized by moderate speed, which helps the player execute these strokes accurately, as a moderate speed facilitates successful skill execution; the higher the speed of the ball, the lower the chances of success in executing the forehand stroke. Additionally, moderate speed allows for better decision-making and positioning for stroke execution.<sup>5</sup>

The average speed of the balls is directly proportional to the execution of the forehand stroke and success in performing it accurately. Another advantage affecting the development of the forehand stroke positively is the rebound variable concerning the launched balls, where a moderate rebound height provides better opportunities for player success in executing the ball. On the other hand, the moderate rebound height allows the player to respond accurately and gives the player a chance to know the trajectory of the incoming ball, facilitating the learning and performance of skills correctly. The facilitation of performing tasks is one of the essential pillars of motor learning.<sup>6</sup>

**CONCLUSIONS:**

- 1. Positive Impact of the Training Program:** The training program implemented using different surfaces (grass and sand) proved effective in improving the forehand and backhand skills of junior tennis players. Statistical analyses of pre- and post-test measurements showed significant improvements in technical performance and accuracy.
- 2. Variability Between Surfaces:** The results showed that training on grass surfaces achieved better performance compared to sand surfaces, attributed to the characteristics of grass courts, such as moderate ball speed and moderate rebound height, which helped players execute strokes more accurately and efficiently.
- 3. Importance of Variety in Exercises:** The study demonstrated that variety in exercises and the use of different training methods on diverse courts significantly contributed to improving players' skills and their ability to adapt to different playing situations.
- 4. Impact of Field Conditions:** The progress made by the group that trained on grass courts is attributed to the balance of ball speed and rebound height, which provided players with better opportunities to make correct decisions during matches.

**RECOMMENDATIONS:**

Based on the results of the research, the following recommendations can be made:

- 1. Diverse Playing Surfaces in Training:** It is recommended to diversify the surfaces on which players train, such as grass and sand courts, due to their positive impact on improving the forehand and backhand skills. Diversification in surfaces enhances players' ability to adapt to different court conditions, leading to improved performance in various tournaments.
- 2. Use of Specialized Training Programs:** It is advisable to design specialized training programs that focus on developing fundamental tennis skills, such as the forehand and backhand, while considering the type of surface on which training will occur. These programs should include multiple exercises tailored to the characteristics of each court to increase training effectiveness.
- 3. Increased Focus on Adapting to Ball Speed and Bounce:** Training should include specific guidance for players on how to adapt to changes in ball speed and bounce according to the type of surface, which will help improve their ability to make quick and correct decisions during matches.

4. **Conduct Further Studies on Surface Effects:** Additional studies are recommended to investigate the effects of other types of courts on skill development in tennis, such as hard or artificial surfaces, in order to compare their effectiveness in training with that of grass and sand courts.
5. **Attention to Rest and Recovery Intervals in Training:** Given the importance of distributing training loads and rest in developing physical and skill performance, it is recommended to schedule training sessions that include appropriate rest periods to allow players to recover their fitness and enhance their technical performance.
6. **Enhancing Coaches' Competence:** Organizing workshops and training courses for coaches is recommended to introduce them to the latest training methods that include exercises on diverse surfaces, thereby improving their training techniques to meet the players' needs.

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