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## Special Exercises on Sand and Grass Surfaces and Their Effect on Transitional Speed of Tennis Players

Sura Mahmoud Ali<sup>1\*</sup>, Ali Hameed Abdul Kareem<sup>1</sup>, Mokhles Hassan Haider<sup>1</sup>

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### ABSTRACT

The study aims at preparing specific exercises on both sand and grass training surfaces of tennis players, and investigating the effect of these exercises on the transitional speed of tennis players. To achieve the study's aims, 12 tennis players were randomly chosen to be the study's sample. Two groups were enrolled in this experiment, (6) tennis players in the experimental group and the same number in the control group. Special transitional speed exercises on both sand and grass surfaces, were applied to the experimental group, using four training sessions per week for eight weeks. The results show a significant effect on the transitional speed test results for the experimental group. The major conclusion was that implementing specific exercises on different training surfaces (sand and grass) prepared by the researcher had a positive effect on transitional speed.

### INTRODUCTION

The faculties of physical education and sports sciences have contributed to the Iraqi individual's physical development (Hameed, 2024). A topic related to the work in the sports area is achieving success in the practice of sports sciences in general (Hameed, 2024). Speed is a crucial element in sports, including transitional speed, which is essential for athletes to perform well. Transitional speed refers to an athlete's ability to cover a specific distance in the least possible time. To enhance transitional speed, various training methods can be employed, such as training on sand and natural grass surfaces. These surfaces play a vital role in athletes' performance, affecting skill development and necessary techniques for excellence (Sahafizad, 2013).

Nowadays, we have seen an increase in the training programs on both sand and natural grass used by athletes worldwide. Training on both sand and grass can be performed on a consecutive daily basis, and training sessions can be characterized by high intensity, in addition to extending the specified time sessions (Pereira, 2022).

Due to the difficulty of movement on sand surfaces, caused by increased relative motion between loose, dry sand particles, players are forced to exert more strength and effort to overcome this difficulty in movement. This is confirmed by (Schmidt, 2018), as training on sand increases the athlete's ability to work diligently and quickly by making the exercise more intense than usual. Similarly, regarding training on natural grass, both (Chartrand & Guillaunme, 2020) mention that training on natural grass, can be effective method for improving speed by incorporating training on natural grass into regular fitness routine. Athletes can expect to develop strong muscles and tendons, as well as improving

transitional speed and acceleration, Training on different surfaces provides many benefits, including:

- It's effect on athlete performance and safety (O'Dell, Scott, 2015).
- Diversifying training surfaces helps to work different leg muscles, resulting in significant physical benefits for athletes (Duncan, 2015).
- Diversifying training surfaces also helps reduce fatigue and the risk of injury for athletes.
- Diversifying training surfaces helps to reduce boredom, routine, and engage in walking or running on new types of surfaces. It is not only beneficial for the player's mind but also essential for improving their performance (Mario, 2015). The study aimed to design specific exercises on both sand and grass training surface to enhance tennis player's transitional speed and understand the effect of these exercises on tennis player's transitional speed. It's hypothesized that there are statistically significant differences between the pre and post-test measurements between the experimental and control groups in developing tennis players' transitional speed.

### LITERATURE REVIEW

#### Sand Surfaces

Sand has a surface that is unstable. Sand training helps strengthen under worked muscles, especially those in the knees, ankles, and feet. This is due to the higher workload needed to change direction, run, jump, and accelerate. This type of training has many benefits for athletes and can be used to improve performance on the field or court. Sand is a great training tool for improving speed and agility. It provides resistance that challenges the players' muscles, helping to make him faster and more explosive. (Cissik, 2012).

<sup>1</sup> Department of Student Activities, Al Iraqia University, Iraq

\* Corresponding author's e-mail: [lulaperla23@gmail.com](mailto:lulaperla23@gmail.com)

### Grass Surfaces

Grass training is an essential part of any athlete's training program. Grass training can help an athlete become familiar with the field of play, giving them the edge in game day performance (Sparacio & Baker, 2015).

Training on grass can provide athletes with an enhanced and more tailored workout, enabling them to reach the highest levels of performance possible. Grass training can be a great way to improve speed, endurance and agility for athletes. It has been scientifically proven that this type of training can lead to healthier joints and ligaments, due to the softness and stability of grass (Stark, 2019). Grass training can help athletes improve physical performance, better understand athletic movement, and develop long-term health benefits.

### MATERIALS & METHODS

#### Subjects

The study was conducted on a sample of twelve (N=12) male tennis players of age ranging from 18 to 21 years were selected from al Iraqia university. Further, the subjects were purposively divided in two groups. First

group, designated as experimental group (N 1 =6) and the second one as control group (N 2 =6).

#### Methodology

The study was restricted to the variable transitional speed of tennis players. Experimental group have undergone special training for 8-week by following a sequence of selected special transitional speed exercises. It was applied at a rate of (4) weekly training sessions, for a total of (24). The repetitive training method was used at an intensity level ranging from (90-100%) for transitional speed, and the performance time was (10-25 seconds). The work-to-rest time is (3:1-4:1), and the special exercises were performed on the sand and the grass courts\Ministry of Youth and Sports.

Both the groups were take part in the pre-test and post-test for transitional speed test (30 m from standing).

#### Statistical Analysis

The paired samples t-test was employed to find out the significance of differences between experimental and control groups. The data relates to variables of the study was analyzed with the help of SPSS (Statistical Package

**Table 1:** Equivalence of Research Groups.

Variable	The experimental group		The control group		(T)	sig	The significance
Speed test (s)	mean	Std	mean	std	1.092	0.28	Insignificant
	4.631	0.055	4.610	0.041			

\* Significant 0.05 > At a degree of freedom (22)

for Social Science) statistical software.

#### Transitional Speed Test (30 m from Standing)

##### The Purpose of the Test

Measuring translational speed

##### Tools

6 signs, registration form, whistle, stopwatch, measuring tape.

##### Description of Performance

The athlete stands behind the starting line, and after hearing the whistle, he sets off at maximum speed for a distance of (30 m) and (5 repetitions).

One attempt should not exceed (4:70 seconds), and the rest between each repetition should be (30 seconds). If

the player fails for the specified time, the attempt will be considered a failure and the attempt will be repeated.

##### Scoring

The time taken to complete the test is recorded in second. Table (2) shows the means and standard deviations for the pre-test and post-test of the experimental group. The table (3) shows the value of (t) for the pre-test and post-test for the experimental group. The table (4) It shows the means and standard deviations for the pre-test and post-test of the control group. The table (5) shows the value of (t) for the pre-test and post-test of the control group. Table (6) shows the means, standard deviations, calculated (t) value, and statistical significance for the

**Table 2:** The means and standard deviations for the pre-test and post-test of the experimental group

Variable	The experimental group		The control group	
	mean	Std	mean	Std
Speed test (s)	4.631	0.055	4.526	0.032

**Table 3:** The value of (t) for the pre-test and post-test for the experimental group

Variable	Difference of Means	Standard Error	df	T	Sig
Speed test	0.00	4.742	11	0.02225	0.10550

**Table 4:** The means and standard deviations for the pre-test and post-test of the control group

Variable	The experimental group		The control group	
	mean	SD	mean	SD
Speed test (s)	4.610	0.041	4.595	0.037

**Table 5:** The value of (t) for the pre-test and post-test of the control group

Variables	Difference of Means	Standard Error	df	T	Sig
Speed test	0.01450	0.01376	11	1.054	0.00

**Table 6:** The means, standard deviations, calculated (t) value, and statistical significance for the post-tests of both the experimental and control groups

Variable	The experimental group		The control group		(T)	sig	The significance
	mean	Std	mean	std			
Speed test (s)	4.526	0.032	4.595	0.037	4.893	0.00	Significant

\* Significant 0.05 > At a degree of freedom (22)

post-tests of both the experimental and control groups.

### RESULTS AND DISCUSSION

Tables (2, 3, 4, 5, and 6) present the statistical values of the transitional speed variable for the pre-posttest for both the experimental and control groups. These values show development in the transitional speed variable in favor of the experimental group. This development in transitional speed is attributed to the nature of the mixed sand and grass surface and the application of specific exercises on it. These exercises on a mixed surface coordinate muscle actions together to produce optimal kinetic energy.

These exercises on mixed sand and grass surfaces help coordinate muscle actions together to produce optimal kinetic energy. This aligns with a study by Binnie (2013), which indicated that integrating unconventional training methods and environments, such as training on sand and natural grass surfaces, can enhance physical, skill, and kinesthetic abilities. Training on uneven surfaces requires continual adjustment of movements and balance, aiding in the rapid and efficient development of athletic capabilities.

This is supported by Schmidt (2018), who state that the increased resistance generated by sandy terrain improves athletes' capabilities such as speed and explosive strength. Muscles endure greater workload during training due to the instability of sand, requiring them to exert more force to stabilize joints continuously during movement. This leads to greater joint mobility, muscle strengthening, and improved balance, making training on sand easier on the joints than training on stable ground. This aligns with Kercher (2022), who found that running on sand requires greater effort from knee tendons and hamstring muscles, resulting in overall better exercise. Similarly, studies by Impellizzeri (2008) and Mirzaei, Norasteh, & Asadi (2013) suggest that sand can be used as a training surface to improve neuromuscular adaptations during transitional speed training. Martyn (2013) also support this, stating that the unique features of sand training can have a positive impact on performance gains on stable surfaces.

Kroger *et al.*, (2015) confirm that training on sand improves athletes' muscular performance, consistent with Abdulaziz (2006), who suggests that sand training helps develop physical capabilities due to its unique environment accessibility. Similarly, Graham and Hamilton (2020) assert that training on natural grass enhances athlete speed by making muscles more active than running on hard surfaces, while Sparacio and Baker (2015) affirm that training on natural grass improves balance and control, providing athletes with the advantage they need to enhance their style and movement as required.

In addition, the researcher believes that the playing surface is a specific variable that affects running performance. If an athlete wants to improve their skills and physical abilities, it is better to diversify their training, including exercises on sand and grass surfaces. Since sand facilitates faster muscle development and enhances their ability to produce power at all levels. Martin (2013) demonstrate that training on sand is one of the best methods to elevate an athlete to their optimal level. Sand provides the best natural environment for resistance training, which works to enhance the physical and functional performance of athletes.

Goldner and Fenger (2020) also mention that athletes can benefit from sand due to its ability to support physical performance during activity. Sand surfaces can absorb shocks and provide a stable ground, leading to reduced fatigue and improved performance during play. Studies have shown a relationship between sandy surfaces and increased physical capabilities for athletes, such as speed, as training on sandy surfaces can reduce the risk of injury due to its softness. Therefore, sandy surfaces can be a valuable asset for athletes needing good physical capabilities for performance.

### CONCLUSIONS

Implementing specific exercises on different training surfaces (sand and grass) prepared by the researcher has a positive effect on transitional speed. The nature of the

grass surface, the nature of the sand surface, the specific exercises applied on them, the intensities included in the specific exercises, and the rest periods between repetitions and sets contributed to the development of transitional speed.

### Recommendations

It is necessary to focus on training on sand and grass surfaces and to integrate them into various training programs because they have a good effect on developing physical abilities, such as transitional speed. Conduct research and studies that involve diversifying training surfaces for various physical, skills, physiological, and proprioceptive abilities. It is necessary to conduct comparative studies that involve the use of sand and grass surfaces in other individual and team sports.

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