

## The Effect of Exercises Using the Sandy Environment on the Performance Endurance and Quality of the Lower Limb Muscles of Futsal Players

*Asst. Prof. Dr. Muthana Layth Hatem and Asst. Prof. Dr. Mustafa Ghasib Abdulzahra*  
*University of Misan, College of Physical Education and Sports Science*

**Abstract:** Many players feel a state of monotony and boredom in the implementation of training doses, and this is likely that most of them have become aware and familiar with the routine of training as a result of their exposure to an effect that continues at one pace, which makes them aware of the size of the training rhythm and to avoid the obstacle of this rhythm by replacing the training stimuli, and putting the players in front of renewed challenges and motivating them with unusual stimuli, in an environment different from the environment to which the players are accustomed, by applying the rhythm of muscular work exercises in the sandy medium. As a training technique that did not receive sufficient attention to those concerned in futsal and are unaware of its returns, so we began to ask questions about whether the application of muscular rhythm exercises using sandy medium affects the endurance of skill performance, and what kind of impact exercises have on the quality of the muscles of the lower limb. The research aims to identify the effect of exercises using the sandy environment on the performance endurance and quality of the muscles of the lower limb of futsal players. The researchers used the experimental method and identified the research community who are the players of Ahrar Maysan futsal in Maysan Governorate category of applicants over the age of (20) years. The study came out with the following conclusions: The exercises using the sandy environment affected the development of performance endurance effectively; and the exercises using the sandy environment improved the functional measurements of the quality of the muscles of the lower limb (quadriceps, popliteal, twin leg) among the research sample members.

**Keywords:** sandy environment training, skill performance endurance, lower limb muscle quality.

### 1. INTRODUCTION

#### 1.1 Introduction and Importance of the Research:

The philosophy of modern training was not limited to providing sports training as an intensity, repetition and comfort, but rather tended to diversify means and methods and integrate them with training doses in order to return feasible benefits, so researchers recently investigated to provide means with more effective visions and mixed with training doses and impact events in the internal environment of athletes and raise the level of achievement.

In view of the importance of diversity in the methods and means of modern training and their application in the preparation of training programs, to achieve the desired goals for which they were developed, it has become necessary for those concerned in futsal to use them in the implementation of training doses, hence the researchers have been highlighting the application of special muscular work rhythm exercises, using sandy medium, which forms continuous resistances to the lower limb due to the difficulty of movement on it, which affects this. The training method on the muscular system improves the work of the sensory and motor nerves to achieve optimal arousal to recruit the work of the muscles on multiple contractions in achieving the required motor action duty.

In order to adapt events in the tissues and cells of the working and opposite muscles as a result of the

external load, and this may be reflected positively in the physical aspect of bearing the skill performance and other physiological represented by the quality of the muscles of the lower limb and from the foregoing the research acquires that importance.

#### 1.2 Research Problem:

Many players feel a state of monotony and boredom in the implementation of training doses, and this is likely that most of them have become aware and familiar with the routine of training as a result of their exposure to an effect that continues at one pace, which makes them aware of the size of the training rhythm and to avoid the obstacle of this rhythm by replacing the training stimuli, and putting the players in front of renewed challenges and motivating them with unusual stimuli, in an environment different from the environment to which the players are accustomed, by applying the rhythm of muscular work exercises in the sandy medium. As a training technique that did not receive sufficient attention to those concerned in futsal and are unaware of its returns, so we began to ask questions about whether the application of muscular rhythm exercises using sandy medium affects the endurance of skill performance, and what kind of impact exercises have on the quality of the muscles of the lower limb.

**1-3 The research aimed at:** to identify the effect of exercises using the sandy environment in

bearing the skill performance and quality of the muscles of the lower limb of futsal players.

**1.4 Research Hypothesis:** Exercises using the sandy environment affect the tolerance of skill performance and the quality of the muscles of the lower limb of futsal players.

## 2- RESEARCH METHODOLOGY AND FIELD PROCEDURES:

### 2.1 Research Procedures:

According to the nature of the problem, the researchers used the experimental method with one group as the best and easiest approach in achieving the objectives of the research.

### 2.2 Research Community:

The researchers identified the research community in a deliberate way, and they are the players of Ahrar Maysan futsal in Maysan Governorate, the category of applicants over the age of (20) years, and registered with the lists of the Sub-Federation of Football for the sports season (2023-2024), and their number is (14) players, and their percentage was (100%), and homogeneity has been done in (height, body mass, chronological age, training age) in addition to parity (performance endurance, efficiency of the muscles of the lower limbs) on members of the community, and it was found that there is homogeneity and clear equivalence in those Variables.

### 2.3 Field Research Procedures:

After obtaining all the original approvals from Ahrar Maysan Futsal Club, and the members of the research sample knew the importance of the study and the extent of benefiting from it, they expressed their consent to cooperate with the researchers and implement their research procedures, and after completing all the preliminary procedures, measurements and pre-tests were conducted in the stadium of Ahrar Maysan Club, starting with measuring the efficiency of the muscles of the

lower limb at full rest time via ultrasound device technology (Skulpt Aim) (Takashi Abe, 2015), after which the players will warm up for the purpose of performing the skill performance endurance test (Suhaib Mazen Maghamis, 2019) on Friday, 1/11/2023, where the researchers prepared muscular rhythm exercises, which were carried out using the sandy environment. As it continued to be applied in the special preparation stage within the trainer's curriculum for a period of (8) weeks and by (24) training units, and at a rate of (3) training units per week on (Sunday, Tuesday and Thursday), where the first training unit was applied on Sunday 3/11/2023 and the last training unit was on Thursday, 25/1/2024, and the partial stress of the exercises was calculated by (the maximum repetition of each exercise  $\times$  the required intensity / 100) and according to the ability of the players, and it was controlled to gradually raise the intensity of the training units by increasing the performance time or reducing rest periods, the rest time between exercises as well as repetitions was determined according to the work-to-rest ratio (3:1) so that the player can reach the recovery stage through the return of the player's pulse (110-120) n / d to not reach the overload stage, and the researcher used the high repetitive training method. During the implementation of the exercises using sandy medium, and after the implementation of the prescribed time period of the application of the exercises, the aforementioned measurements and post-tests were conducted under the same conditions on Sunday, 28/1/2024 at ten o'clock in the morning.

**2-4 Statistical Methods:** The researchers used the Statistical Bag (SPSS) version (23).

## 3- PRESENTATION AND DISCUSSION OF RESULTS:

### 3.1 Presentation of Results:

**Table (1):** shows the arithmetic means, standard deviations, calculated (T) value, significance level and significance of differences in performance endurance testing and measuring the quality of the pre-post-lower limb muscles of the research sample

Statistical Treatments		Unit of measurement	Going to	±	Calculated value (T)	Significance level	Significant differences
Skill Performance Endurance Test							
Endurance Performance	southern	second	61.10	1.14	13.63	0.000	Moral
	Go away		57.22	0.89			
Functional measurements of the quality of the muscles of the lower right limb							
Quad	southern	BMI	158.6	4.32	20.58	0.000	Moral
	Go away		187.1	3.54			
Populsive	southern		145.1	2.48	24.11	0.000	Moral
	Go away		165.5	3.93			
Twin leg	southern		142.6	2.94	19.70	0.000	Moral
	Go away		164.5	3.27			
Functional measurements of the quality of the muscles of the lower left limb							
Quad	southern	BMI	155.3	3.55	33.15	0.000	Moral
	Go away		185.5	2.42			
Populsive	southern		143.6	2.65	11.65	0.000	Moral
	Go away		163.5	2.42			
Twin leg	southern		141.1	2.31	22.55	0.000	Moral
	Go away		162.1	3.40			

**3.2 Discussion of the results:**

**3.2.1 Discussion of the results of skill performance tolerance:**

The researchers attribute the development in bearing skill performance to the positive effects of training using the sandy environment to the degree of impact produced by the healthy relationship between the components of pregnancy, which continued throughout the duration of the exercises according to the principle of gradation by increasing the training load, which leads to an increase in the speed of contraction of the muscle group as a result of the muscular work of the exercises carried out by the eye for a certain period of time and under the influence of this intensity, which led to physical and physiological adaptation to long physical efforts, which in turn leads to This is consistent with what Pavel Kumar (2015) & (Toyomura, 2017) "asserted that "sand training is one of the best exercises to develop endurance and physiological abilities of players." Also, "the results of the effectiveness of training on the sand environment proved the improvement of the physical and skill level of individual and team sports players." (Gauer, 2014) The role of these

exercises, which correspond to the work of muscle fibers and their working contractions that are similar to performance in futsal skills, and this is confirmed (Wernbom, 2007) (Castagna, 2009) "During the development of endurance it is necessary to take into account the type of training that targets working and fixed muscle groups and should correspond to the type of muscle contractions used in a particular technique resulting from the development of muscle activity and tolerance to perform work."

The researchers believe that the exercises formed the load in a way that ensures development, as it was codified on the basis of the principle of individual differences, which had a clear impact by translating the method of implementation, as well as training doses included a large number of repetitions that could allow the development of performance tolerance, and this is confirmed by (Murlasits, 2018) (Barbero-Alvarez, 2008). "When developing endurance, you must carry out training doses commensurate with the potential of each player, with the number of times the exercise is performed gradually according to the time period." All previous scientific studies and research

(Balabinis, C. 2003) (Enoka, R. 2008) (Impellizzeri, F. 2005) (Spencer, M. 2005) also confirm that "increased repetition during special training leads to an improvement in the level of muscular endurance of all kinds, including performance tolerance". The exercises in the sand environment also included the method of implementing and controlling play in medium spaces, and was represented by the gradual increase in space and reducing the number of players during the time of large performance may increase the time of exercise and thus improve physical efficiency and endurance to performance, and this interpretation came in line and consistent with what the results of previous studies indicated "The diversity of training methods, in particular playing with medium spaces and gradation, is sufficient to improve physical efficiency, including endurance for the longest possible period of time." (Stephen V., 2009) & (Greig, M. 2008) & (Dogramaci, S. 2006)

The researchers also believe that exercises using sandy medium is one of the forms of resistance training, and that the implementation of performance in a dry sand environment requires greater strength due to the weight of the body that leads to immersion of the legs in the sand, and gives more resistance to the muscles and thus suffer from a greater muscular workload during exercises, which is positively affected by the physical aspect that helps to improve the performance endurance of the lower limb during implementation. This is consistent with (Malina, 2005) "Training on sand makes the resistance of body weight heavier to immerse the man in the sand, which gives greater resistance to the body, as the implementation of movement with sand is heavier than movement on other surfaces, so it is met with great resistance that leads to the acquisition of muscles more strength and the development of the element of endurance." "Sand training is an effective form in developing lower limb muscle endurance." (Bahman, M. 2014)

### 3.2.2 Discussion of the results of measuring the quality of the muscles of the lower limb:

The researchers believe that the improvement in the quality of the muscles of the lower limb (quadriceps, popliteal, twins of the leg) to adapt functionally quickly signal the motor nerves supplied, to the nature of the adaptations that have been acquired due to the regularity in the rhythm exercises of muscular work using the sandy environment for the requirements of the technical performance executed, which was clearly reflected

in the adaptation of the nervous system to that condition, which led to the emergence of indicators of the quality of those targeted muscles, because the function of sensory nerves during these exercises is to transfer impulses Neurological from the ascending receptors of the lower extremities, towards the control center of the central nervous system represented by the brain, as its main function is to analyze, process and issue commands to carry out an appropriate motor action and thus improve the quality of the muscles in the lower limb. "Sand training maximizes the recruitment of motor units and improves their functional rate, which is a better indicator of physical performance due to muscle quality". (Latham. 2004) & (Purves D, 2008) "Sand training improves the efficiency of the nervous and muscular systems, leads to significant adaptations in muscle quality and positively affects the skill performance of athletes." (Pereira, 2021)

The researchers also believe that the functional improvement in the quality of the muscles of the lower limb (quadriceps, popliteal, twins of the leg) and adapt quickly to the signal of the issued motor nerves, as their main function is to deal and control the various activities of the body, including motor, and whenever the flow is regular and sequential will be reflected in its action on optimal performance, by stimulating the largest number of motor units to cause the maximum response to the contraction of muscle fibers by the descending receptors of the lower limbs, and these adaptations were acquired As a result of regularity in the rhythm of muscular work training in the sandy environment for the requirements of technical performance in futsal. This agrees with (Granacher U, 2009) & (Caserotti P, 2008) "Sand training brings about rapid functional responses associated with changes in increased use of muscle motor units and coordination mechanisms that improve muscle quality." Also, "strength training affects muscle quality and mass and works to stimulate motor units better, which leads to the participation of a large number of them in performance as a result of the use of specific exercises on the sandy environment." (Kim K. 2012) & (Jafarnezhadgero, 2022) & (Delmonico et al. 2009)

The researchers also believe that the development of the quality of the muscles of the lower limbs as a result of adapting the speed of the sensory and motor nerves in the muscles (quadriceps, popliteal, twins of the leg) due to the formation of complex muscular rhythm exercises, which resembled the skill performance of futsal and work to mix it with

the training method implemented in the sandy medium, which is an effective and effective way to increase the intensity of the exercises, which formed continuous resistances to the work of those muscles, and with the increase in the speed of their movement, the resistance to the range of motion increases. They have during that medium, so the method of training in the sandy medium is characterized by the nature of suspense and excitement to avoid boredom and routine exercise in the entire training process, to motivate the players by changing stimuli and putting them in front of constantly renewed challenges without causing muscle strains and may lead to injury, which resulted in the development of the efficiency of the functional muscle and give it the ability to endure better performance. This is consistent with (Mustafa C., 2014) "The process of mixing the physical and skill aspects contributes to the development of special physical abilities that are trained according to the motor paths of the required performance through the use of different types of resistances to train this muscle." And "that regular sports training leads to an increase in the efficiency of the muscular system, as the increase in resistances located on the muscles of the lower limb by immersing them in the sand leads to their development and development, the greater the resistance that the muscle works against, the better the performance in it." (Gaurav Singh, 2022) & (Granacher U., 2015) & (Ramirez-Campillo, 2021) and "that sand training was not limited to improving health-related fitness but became a norm in the number of various sports training programs, so the number of sand training doses was replaced by a parallel method to training on the ground for fear of the seriousness of possible injuries and as a kind of change in the daily training routine." (F M Impellizzeri, 2008) & (Impellizzeri, 2008).

#### 4. CONCLUSIONS AND RECOMMENDATIONS

##### 4.1 CONCLUSIONS

1- The functional measurements of the quality of the muscles of the lower limb (quadriceps, popliteal, twin of the leg) showed their presence within the normal limits of the study sample members.

2- The exercises using the sandy environment affected the development of performance tolerance effectively among the members of the research sample.

3- The exercises using the sandy environment improved the functional measurements of the

quality of the muscles of the lower limb (quadriceps, popliteal, twin leg) among the research sample members.

##### 4.2 RECOMMENDATIONS

1- Adopting exercises using the sandy environment as an aid in developing performance endurance in futsal.

2- Adopting functional measurements of the quality of the muscles of the lower limb (quadriceps, popliteal, twin of the leg) as an indication of the development of the training status of futsal.

3- The need to adopt medical examinations to show the efficiency of the nervous and muscular systems to confirm the health status of the athlete.

4- The need to use modern and innovative training methods in developing the training situation of futsal and other sports.

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