The Impact of Mental Speed Exercises on Developing Physical Performance in Youth Futsal

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Abstract

In the introduction, the researcher discusses the importance of the study. The benefit of the research lies in utilizing and developing the features and characteristics of mental speed training through exercises that improve the level of physical performance in futsal, including football, which has been characterized by scientific development in its physical and skill requirements, qualifying players to perform optimally in matches. The research problem was identified by the researcher through observing the training process in clubs and futsal clubs in the governorate. It was noted that there is a problem with the low level of mental speed because most of their training was conducted in a traditional manner, requiring significant time and effort for players to achieve good training and optimal performance. Therefore, the researcher implemented specific exercises to develop mental speed in the physical performance of youth futsal players. After reviewing research, sources, and training science references, the researcher found that there are types of exercises that may help improve players' speed, which is crucial for physical performance and, consequently, the match outcome. The second chapter included the research methodology and field procedures, where the researcher used the experimental method suitable for the nature of the problem. The research community consisted of professional futsal league clubs in the 2024-2025 season. The research sample was deliberately selected from the players of the Uruk Futsal Club, representing 5% of the original community, totaling 21 players. Five players were chosen for the pilot study, and 16 were deliberately selected to form the research sample, making up 76% of the total. They were divided into two equal groups using the lottery method, with each group consisting of eight players. The researcher then statistically processed the extracted values using the SPSS statistical package. The fourth chapter included the presentation, analysis, and discussion of the results, which were presented, analyzed, and discussed based on scientific sources.

1-1 Introduction and Importance of the Research

The scientific and technological advancements that have encompassed all areas of public life, especially the sports field, have positively reflected on the development of athletes' performance levels in all sports, including futsal. Modern aids such as technological devices and advanced training programs have contributed to adopting scientific methods that lead to finding the most suitable, ideal, and economical movements for the athlete's body by focusing on athletes'

strengths and weaknesses and providing appropriate solutions. Recent studies and research have emphasized the precision in selecting suitable exercises for the practiced activity, contributing to the development of performance and sports achievement. Sports training science is built on scientific principles and foundations that cannot be ignored or neglected, as it represents the scientific programming of training in all aspects of preparation (physical, skill, psychological, and educational). The method of control or change in any aspect, whether increasing one aspect and reducing another, is done through different training stages according to the training condition. Futsal is a sport similar in its performance to football played on open fields but is played indoors. It is played by five players, including the goalkeeper. This game has received significant attention and development in recent years in terms of training methods and techniques, as well as various training tools and devices, contributing to the development of different activities in general and futsal in particular. A good coach identifies the strengths and weaknesses of their players and sets appropriate training programs to achieve advanced levels through proper scientific planning of their programs.

2-1 Research Problem:

Through the researcher's experience as a futsal goalkeeper and following the training of the futsal team and the Iraqi Premier Futsal League matches, a problem was noticed in the low level of physical and tactical performance because most of their training was conducted in a single manner, requiring significant time and effort for players to achieve good training and optimal performance. Therefore, the researcher implemented some mental speed exercises to develop physical and tactical performance in youth futsal. After reviewing research, sources, and training science references, the researcher found that there are types of exercises that may help improve players' performance speed, and the importance of mental speed in physical and tactical performance, and consequently, the match outcome.

3-1Research Objectives:

1. **Develop Exercises**: To create exercises aimed at enhancing **mental speed** to improve **physical performance** in **youth futsal**.
2. **Statistical Differences**: To identify statistical differences between **pre- and post-tests** for the **control and experimental groups** regarding the impact of exercises on mental speed and physical performance in youth futsal.
3. **Group Comparisons**: To compare the **control and experimental groups** in **post-tests** to assess the impact of exercises on mental speed and physical performance in youth futsal.

4-1Research Hypotheses:

1. **Pre- and Post-Test Differences**: There are statistically significant differences between **pre- and post-tests** in the impact of exercises on mental speed and physical performance in youth futsal, favoring the post-tests.
2. **Experimental vs. Control Group**: There are statistically significant differences between the **experimental and control groups** in post-test results, favoring the experimental group.

5-1Research Fields:

1. **Human Field**: Urok Sports Club.
2. **Time Field**: From **July 22, 2024, to December 22, 2024**.
3. **Place Field**: Sumer Sports Forum.

2. Research Methodology and Field Procedures:

2-1 Research Method:

The nature of the problem to be addressed determines the research method used by the researcher to achieve the objectives of the study. Since the method should align with solving the problem, the researcher used the experimental method with pre- and post-tests, designed for both the control and experimental groups. This method involves a deliberate and controlled change of specific conditions for an event and observing the resulting changes in the event itself. This approach is most suitable for achieving the research hypotheses.

2-2 Research Population and Sample:

Sampling is essential in scientific research, and it must be representative of the original population. The researcher collects data and information either from the entire population or from a representative sample. The research sample was deliberately selected from the players of the Uruk Futsal Club, totaling 21 players. Five players were chosen for the pilot study, and 16 were deliberately selected to form the research sample, making up 76% of the total. They were divided into two equal groups using the lottery method, with each group consisting of eight players. The groups were homogenized and matched as shown in Table 1.

Table 1: Homogeneity and Equivalence of the Research Sample Members

Variables		Control group		Experimental Group		t Calculated	value sig	Levin	value sig
		M	S	M	S				
Height		991.3	174.750	4.390	173.875	0.416	0.683	0.020	0.890
the age		0.518	16.375	0.535	16.500	0.474	0.642	0.467	0.506
Cluster		406.4	65.375	4.941	64.125	0.533	0.602	0.154	0.701
Training age		641.0	2.125	0.518	2.375	0.855	0.405	0.037	0.849
Power distinguished by speed		0.073	4.134	0.079	4.120	0.360	0.723	0.035	0.854
Endurance performance		0.877	35.338	0.696	36.188	2.123	0.050	0.119	0.736
Maximum transfer speed		0.108	2.811	0.099	2.780	0.604	0.554	0.001	0.972
Motor response		.0.027	1.688	0.066	1.658	1.188	0.252	9.755	0.007
Technical assignment	Performance accuracy	1.165	4.750	2.232	5.125	0.420	0.680	4.343	0.056
	Performance time	0.503	16.964	0.529	16.925	0.150	0.883	0.052	0.823
	Accuracy index	0.071	0.281	0.133	0.304	0.433	0.671	4.129	0.062
Plan wall handling	Performance accuracy	0.535	2.000	0.518	2.375	1.416	0.176	1.657	0.219
	Performance time	0.309	5.376	0.201	5.318	0.450	0.659	1.693	0.214
	Accuracy index	0.110	0.375	0.091	0.446	1.396	0.182	0.275	0.608

3-2 Devices, Tools, and Methods of Data Collection in the Research:

To obtain accurate and precise data that ensures the achievement of the research objectives, the researcher utilized various devices and tools to meet the research requirements, as follows:

3-2-1 Devices and Tools Used in the Research:

- **Laptop**: DELL
- **Electronic Stopwatch**: PC396
- **Futsal Balls**: 15
- **Regulation Futsal Court**
- **Small Goals**: 4
- **Weight Scale**: (Chinese-made) 1
- **Whistles**: FOX, 5
- **Adhesive Tape**
- **Rectangles for Accuracy Measurement**: 4
- **Nylon Markers**
- **Height Measuring Tape**: 1

2-3-2 Methods of Data Collection:

- **Questionnaires**:
- **Observation**:
- **Personal Interviews**:
- **Tests and Measurements**:
- **Arabic and Foreign Sources and References**:
- **Internet (International Information Network)**:

4-2 Field Research Procedures:

4-1-2 Identifying Research Variables:

First: Identifying some candidate physical abilities. To enable the researcher to identify which physical abilities are suitable and consistent with the nature of futsal, expert opinions were surveyed to determine the most important abilities for futsal players. This is confirmed by Fares Sami, quoting Mohamed Othman, who said, “There are different levels of importance and priorities depending on the requirements of each competition.” Some physical abilities that received a percentage of 75% or higher were adopted, as confirmed by Benjamin, who stated, “A percentage of 75% is a good rate for studying variables.”

2-4-2 Tests Used in the Research:

1-2-4-2 Physical Tests:

- **First**: Test of speed-strength for leg muscles.
- **Second**: Maximum transitional speed test.
- **Third**: Response speed test.
- **Fourth**: Nelson's test for motor response.

5-2 Main Experiment:

1-5-2 Pre-Tests:

Pre-tests and measurements were conducted at the Sumer Sports Forum in Dhi Qar on Tuesday, September 10, 2024. Variables such as weight, height, and age were measured, as well as physical performance. The researcher considered the conditions related to the tests in terms of time, place, tools used, method of implementation, and the assisting team to ensure these conditions were maintained in the post-tests.

2-5-2 Mental Speed Exercises:

The researcher prepared exercises aimed at enhancing the mental speed of youth futsal players. The exercises included the following: The implementation of the exercises lasted for eight weeks, with three training sessions per week on Wednesdays, Saturdays, and Mondays. This resulted in a total of 24 training sessions, each lasting 30-40 minutes. The duration of the training was no less than six weeks to allow for noticeable development from the guidance and adjustments, which the researcher considered after discussing various aspects. The proposed exercises were implemented from September 11, 2024, to November 11, 2024. The design of these exercises was based on scientific principles, including:

- Suitability of the proposed exercises' content to the level and abilities of the research sample.
- Consideration of the goal of the proposed exercises.
- Consideration of individual differences among the research sample.
- Appropriate structuring of training load in terms of intensity, volume, and rest.

3-5-2 Post-Tests:

The post-tests for the research sample were conducted starting from November 13, 2024, at the Sumer Sports Forum in Dhi Qar, after the eight-week exercise implementation period. The

researcher ensured that the conditions and procedures of the post-tests were consistent with those of the pre-tests.

3. Presentation, Analysis, and Discussion of Results:

This chapter presents, analyzes, and discusses the research results after the researcher completed data collection from the used tests, which were tabulated for ease of extracting scientific evidence. These tables serve as a suitable illustrative tool for the research, enabling the achievement of the research hypotheses and objectives in light of the field procedures conducted by the researcher.

3-1 Presentation, Analysis, and Discussion of Physical Performance Results:

3-1-1 Presentation, Analysis, and Discussion of Physical Performance Results for the Control Group:

Table (2) shows the differences between the pre- and post-tests in physical performance for the control group.

Sequence	Variables	Unit of measurement	Pretest		Posttest		S.f	m.f	t Calculated	value sig
			M	S	M	S				
1	Power distinguished by speed		0.073	4.134	0.210	4.395	0.261-	0.249	2.969	0.021
2	Maximum transition speed		0.108	2.811	0.108	2.744	0.068	0.017	11.439	0.000
3	Motor response		0.027	1.688	0.052	1.618	0.070	0.041	4.864	0.002

Based on the extracted data for the research sample, Table (2) illustrates the differences in physical performance values (speed-strength, performance endurance, maximum transitional speed, and motor response) between the pre- and post-tests. As shown in the table, the nature of the control group sample exhibited differences between the pre- and post-tests.

- For the variable of **speed-strength**, using the paired samples t-test to extract differences, the calculated value was **2.969** at a significance level of **0.021** and a degree of freedom of **7**, favoring the post-test.
- For the variable of **performance endurance**, using the paired samples t-test to extract differences, the calculated value was **10.316** at a significance level of **0.000** and a degree of freedom of **7**, favoring the post-test.

- For the variable of **maximum transitional speed**, using the paired samples t-test to extract differences, the calculated value was **11.439** at a significance level of **0.000** and a degree of freedom of **7**, favoring the post-test.
- For the variable of **motor response**, using the paired samples t-test to extract differences, the calculated value was **4.864** at a significance level of **0.002** and a degree of freedom of **7**, favoring the post-test.

3-1-2 Presentation, Analysis, and Discussion of Physical Performance Results for the Experimental Group:

Table (3) shows the differences between the pre- and post-tests in physical performance for the experimental group.

Sequence	Variables	Unit of measurement	Pretest		Posttest		S.f	m.f	t Calculated	value sig
			M	S	M	S				
1	Power distinguished by speed		0.079	4.120	0.194	4.649	-0.529	0.236	6.329	**0.000**
2	Maximum transition speed		0.099	2.780	0.092	2.409	0.371	0.042	24.861	0.000
3	Motor response		0.066	1.658	0.055	1.451	0.206	0.020	29.233	0.000

Based on the extracted data for the research sample, **Table (3)** shows the differences in physical performance values (speed-strength, performance endurance, maximum transitional speed, and motor response) between the pre- and post-tests. As shown in the table, the nature of the experimental group sample exhibited differences between the pre- and post-tests.

- For the variable of **speed-strength**, using the paired samples t-test to extract differences, the calculated value was **6.329** at a significance level of **0.000** and a degree of freedom of **7**, favoring the post-test.
- For the variable of **performance endurance**, using the paired samples t-test to extract differences, the calculated value was **30.240** at a significance level of **0.000** and a degree of freedom of **7**, favoring the post-test.
- For the variable of **maximum transitional speed**, using the paired samples t-test to extract differences, the calculated value was **24.861** at a significance level of **0.000** and a degree of freedom of **7**, favoring the post-test.

- For the variable of **motor response**, using the paired samples t-test to extract differences, the calculated value was **29.233** at a significance level of **0.000** and a degree of freedom of **7**, favoring the post-test.

3-1-3 Presentation, Analysis, and Discussion of Physical Performance Results for Both the Control and Experimental Groups:

Table (4) shows the differences between the control and experimental

Sequence	Variables	Control group		Experimental group		t Calculated	value sig
		M	S	M	S		
1	Power distinguished by speed	0.210	4.395	0.194	4.649	2.472	0.025
2	Maximum transition speed	0.108	2.744	0.092	2.409	6.289	0.000
3	Motor response	0.052	1.618	0.055	1.451	5.898	0.000

In light of the data extracted for the research sample individuals, Table (4) shows the differences in physical performance values (speed-strength, performance endurance, maximum transitional speed, motor response) in the post-test. As shown in the table above, the nature of the sample individuals in the control and experimental groups showed differences in the post-test.

- **Speed-Strength Variable**: Using the independent samples t-test to extract differences, the calculated value was (2.472) at a significance level of (0.025) and a degree of freedom (14), in favor of the experimental group.
- **Performance Endurance Variable**: Using the independent samples t-test to extract differences, the calculated value was (6.122) at a significance level of (0.000) and a degree of freedom (14), in favor of the experimental group.
- **Maximum Transitional Speed Variable**: Using the independent samples t-test to extract differences, the calculated value was (6.289) at a significance level of (0.000) and a degree of freedom (14), in favor of the experimental group.

- **Motor Response Variable**: Using the independent samples t-test to extract differences, the calculated value was (5.898) at a significance level of (0.000) and a degree of freedom (14), in favor of the experimental group.

4. Conclusions and Recommendations

4-1 Conclusions

In light of the statistical analysis of the test results conducted on the groups, the researcher reached the following conclusions:

- Mental speed exercises positively affected some physical abilities of the experimental research sample.
- Using mental speed exercises helps create a new environment for players, but continuous use may have a negative competitive effect, distancing players from real competition. Therefore, players should be trained on mental speed exercises in an integrated manner.
- These exercises contributed to adding excitement, enthusiasm, and motivation to the research sample, breaking the monotony by diversifying the exercises.
- experimental group's level was the high number of Mental Speed exercises. It is possible that the improvement in the Physical Performance was related to the increased repetitions within training units during the research period underthe researcher's supervision and the trainer's implementation

4-2 Recommendations

In light of the conclusions drawn from the research, the researcher recommends the following:

- Use the mental speed exercises prepared by the researcher and develop exercises that meet the needs and level of the selected sample.
- Utilize mental speed exercises due to their impact on some physical abilities.
- Work on testing the impact of the exercises under study on the effectiveness of physical performance.

References

- Zafer Hashim Al-Kazemi: *Practical Applications for Writing Messages and Educational and Psychological Theses*, 1st edition, Beirut, Dar Al-Kitab Al-Ilmiyya, 2013.
- Fakher Aqil: *Foundations of Scientific Research in Behavioral Sciences*, Beirut, Dar Al-Ilm Lil-Malayin, 1979.
- Fares Sami Youssef Shaba: *Determining Standard Levels for Some Physical and Offensive Skills in Basketball in Iraq*, Master's Thesis, College of Physical Education, University of Baghdad, 2000.
- Benjamin et al.: *Evaluation of Student Aggregate and Technological Education*, translated by Mohamed Amin Al-Mufti et al., Cairo, 1983.
- Qais Naji Abdul Jabbar and Bustousi Ahmed: *Tests and Principles of Statistics in the Sports Field*, 1st edition, Higher Education Press, Baghdad, 1987.
- Risan Khreibat Majid: *Encyclopedia of Measurements and Tests in Physical Education*, Vol. 1, University of Basra, Ministry of Higher Education and Scientific Research Printing House, 1998.
- Hikmat Ab. Alwan, Amjad Ab. Kadim, SPORT TK. Year 2022. Volume 11. Supplement 1. Article 14, Impact of special skill exercises on harmonic abilities and passing skills in junior footballers,2022 https://revistas.um.es/sportk/article/view/509481/333271