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The effect of relaxation, stress management, and recovery exercises on a number of physical variables among young soccer players

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Abstract

To prepare exercises with accompanying means for calming, relaxation, and recovery in a number of physical variables for young soccer players. To investigate the effect of using exercises with accompanying means for calming, relaxation, and recovery on the number of physical variables for the experimental group of young soccer players. To determine the statistical significance of the differences in a number of physical variables for young soccer players between the experimental and control groups in the two post-tests. The researchers used the experimental method as it is suitable for the nature and problem of the research, with the design of equivalent control and experimental groups. The research population consisted of players from the youth clubs in Salah ad-Din Governorate (Samarra Club and Shirqat Club). The researchers intentionally selected a sample of 30 players from Shirqat Sports Club's youth soccer team. The players were divided into two groups, the control and experimental groups, with each group consisting of 10 players. Ten players were excluded for the purposes of pilot experiments and tests. The researchers used the statistical package SPSS to verify the study results. One of the conclusions reached by the researchers was that exercises with accompanying means for calming, relaxation, and recovery led to a clear improvement in the physical variables for the experimental research group. The researchers recommended the use of exercises with accompanying means for calming, relaxation, and recovery, as they play a significant role in improving the physical condition of soccer players.

Keywords

accompanying means, calming, relaxation, recovery, physical variables.

The world has witnessed significant and widespread advancements in the field of sports training across various activities, leading to remarkable achievements in competitions and events. These accomplishments are not mere coincidences or happenstance but are the result of careful scientific work and planning. Enhancing athletic performance in various sports disciplines is no longer solely reliant on executing high-intensity training. It also involves focusing on the intensity, volume, and quality of exercises utilized, as well as emphasizing the importance of recovery.

Recovery, in this context, refers to the processes of renewal, activation, restoration, strengthening, rebuilding, reproduction, compensation, healing, or the

time period that follows a physical load or exertion until the individual reaches their pre-exertion level or regains the ability to perform a specific load again. It involves utilizing effective recovery methods and paying attention to calming, relaxation, and alleviating the fatigue and exhaustion experienced by athletes during the training process.

Over the years, many researchers, and scientists in the field of sports physiology have attempted to innovate and develop novel means and techniques to assist athletes in combating the muscular fatigue resulting from training loads and intensities, ultimately leading to effective recovery. Understanding the recovery process correctly and comprehending its effects on performance levels are crucial.

Therefore, the importance of this research lies in the utilization of exercises accompanied by means of calming, relaxation, and recovery. The researchers believe that such practices may serve as helpful and necessary factors in improving the performance and physical capabilities of young soccer players.

Research Problem

The issue of recovery in modern sports training has become equally important as the training load itself. Training is the primary method used by coaches to influence athletes, aiming to improve performance and sports achievements. As the researchers are members of the management of Shirqat Club and have observed numerous training sessions in various age groups across clubs in the province and Iraq as a whole, and by reviewing research studies and scientific sources, as well as consulting with experts in sports training, they have noticed a significant neglect by most coaches towards warm-up, relaxation exercises, and recovery methods in general.

Most coaches tend to focus primarily on the intensity and rigor of the training process, overlooking the crucial factor of recovery. Based on these observations, the researchers question whether the use of exercises accompanied by means of calming, relaxation, and recovery has an impact on a range of physical variables for young soccer players. They aim to conduct a research investigation to uncover scientific facts that can serve the training process and benefit soccer players, specifically.

Research Objectives

1- To develop exercises using accompanying means for calming, relaxation, and recovery for young soccer players.
2- To investigate the impact of using exercises accompanied by means of calming, relaxation, and recovery on a range of physical variables for young soccer players.

Research Hypotheses

1- There are statistically significant differences between the pre-test and post-test results in certain physical variables for both groups.
2- There are statistically significant differences in certain physical variables in the post-tests between the experimental and control groups.

Research Areas

1-5-1 Human field: The players of Al-Shirqat Youth Soccer Club.
1-5-2 Temporal field: From November 1, 2022, until April 2, 2023.
1-5-3 Spatial field: Al-Shirqat Sports Club stadium in Salah ad Din Governorate.

Research Methodology

The researchers utilized the experimental methodology as it was suitable for the nature of the research and because it "is characterized by precision and control over the studied variables, where intentional changes occur in some variables while controlling other variables. It is considered the only research method that accurately illustrates the relationship between cause and effect".

Research Community and Sample Selection:

The researchers identified the research community as soccer clubs in Salah ad-Din Governorate participating in the first division of the Iraqi League, specifically Samarra and Ash-Shirqat. The total number of players in this community was 60. The research sample was selected using purposive

sampling, focusing on the youth soccer players of Ash-Shirqat Sports Club for the season 2022-2023. The selected sample consisted of 30 players, chosen through non-probability non-random sampling. The researchers divided the sample into two groups: an experimental group and a control group, each consisting of 10 players. The researchers excluded a few players from the sample to ensure its homogeneity.

Sample Homogeneity

The researchers conducted homogeneity tests for the research sample across the following variables: chronological age, mass, total height, and training age. The results are presented in Table 1.

Table (1)

Variables	MU	X	SD	M	Torsion coefficient
Chronological age	Year	17.65	0.98	17	1.98
Mass	Kg	60.60	4.30	60	0.418
Overall length	CM	168.18	6.68	168	0.080
Training age	Year	4.500	0.827	4	1.813

Based on Table 1, it is evident that the values of the coefficient of variation (0.418, 1.98, 0.080, 1.813) indicate a normal distribution of the research sample. This suggests that the participants in the sample are homogeneous with respect to the variables under investigation.

Equivalence of the Research Groups:

The researchers conducted an equivalence assessment between the experimental and control research groups regarding the variables under study before introducing the independent variable. It is important for the researchers to create equivalent groups, at least in terms of variables that are relevant to the research[1]. Table 2 provides an overview of the equivalence assessment.

Table no. (2)

Variables		UM	Control group		Experimental Group		Calculated (t) value	Sig
			X	SD	X	SD		
Physical	Explosive power	meter	2.37	0.041	2.32	0.111	1.765	0.176
	Maximum transition speed	Second	4.86	0.133	4.90	0.082	1.810	0.168
	General Stretching	Second	3.56	0.067	3.51	0.079	1.805	0.169

Significant at error ratio (**0.05**)

Based on Table 2, it is apparent that the values of "sig" (significance level) are greater than 0.05. This indicates that the research groups are equivalent in the pretest for the variables under study.

Research Tools and Equipment Used

Information Collection Methods:

Questionnaires, personal interviews.

Devices and Tools Used in Research

Standard soccer field, electronic weighing scale, measuring tape, three stopwatch timers for measuring time, colored cones (10), circular multi-colored plates (10), white chalk for marking the field, personal computer (Dell), ropes, flags, whistle.

Determination of Physical Abilities

After analyzing the content of scientific and foreign sources, the researchers utilized the following physical abilities and their corresponding tests:

Long Jump from a stationary position (Explosive Power) [2]

30-meter Sprint (Transitional Speed) [3]

1000-meter Run (General Endurance)

Field Procedures Used in the Research

Field procedures used in research are constructive steps that significantly and effectively contribute to giving the research its distinctive positive characteristic. These procedures vary from one study to another, depending on the

specificity of the objectives to be achieved. In order for the current research to be based on sound scientific foundations and principles, the researchers have employed a number of field procedures under investigation, as follows:

Survey Experiments

The researchers conducted several survey experiments with the assistance of the research team to identify the obstacles and challenges that they, as well as the assistants and players, might face during the implementation of the exercises and tests that would be applied later. This was done to determine the necessary time for the ongoing study's tests.

The objectives of these survey experiments included:

- Ensuring the safety and suitability of equipment and tools.
- Ensuring the competence of the assisting team in executing the tests.
- Ensuring the ease of application and suitability of the tests for the sample's level.
- Determining the required time for conducting the tests.
- Identifying any potential obstacles that may arise and attempting to mitigate them, as well as avoiding errors and intervening in the process.

First Survey Experiment

The first survey experiment took place on (8/12/2022). During this experiment, the exercises and equipment that the players would perform during the training session were tested. This allowed the players to gain an understanding of how to execute the exercises, identify potential errors, and work on addressing them. Additionally, it helped determine the appropriate timing for the exercises.

Second Survey Experiment

It took place on (10/12/2022) after receiving guidance from the experts. Some exercises were modified, and the training unit was conducted with the assistance of the work team. The objective was to ensure the efficiency of the work team and their knowledge of the exercises and methods. The registration process was also established. In this experiment, the researchers trained the assisting work team, Annex (1), on how to conduct the tests and record the results.

Final Study Procedures:

Preliminary Tests for Physical, Skill, and Functional Variables

Preliminary tests for the physical variables of both groups were conducted on the same day, 12/12/2022, at 1:00 PM, on the soccer field of Al-Shirqat Sports Club. The tests included the following:

Test: On 12/12/2022, tests were conducted for the physical variables (agility, handling, shooting).

Implementation of Relaxation and Recovery Exercises Accompanied by Rehabilitation Methods.

Based on scientific sources, exercises were selected using relaxation, recovery, and rehabilitation methods. After completing the preliminary tests for physical attributes, basic skills, and functional variables, exercises were carried out using relaxation, recovery, and rehabilitation methods developed by the researchers and the supervisor of the experimental research group.

The experiment started on Saturday, 17/12/2022, and continued until 8/2/2023. The exercises included the following:

Implementation of the Main Experiment.

After dividing the sample into two groups (experimental and control) and considering that this experiment represents the actual fieldwork of the study, the researchers, in collaboration with the supervisor, prepared relaxation and recovery exercises accompanied by rehabilitation methods. The main experiment started on Saturday, 17/12/2022, and continued until Wednesday, 8/2/2023.

- The exercises accompanied by relaxation, recovery, and rehabilitation methods specific to the research were implemented for scientific research purposes.
- The rehabilitation exercises were conducted during the preparation period.
- The rehabilitation part begins with relaxation exercises, such as barefoot jogging for 3 minutes, followed by barefoot walking for 3 minutes.
- Then, the relaxation exercises described in Annex (8) were performed, illustrating the exercises used and their execution method.

- Manual massage was then applied for 4 minutes, with 2 minutes dedicated to each leg, using techniques such as stroking and kneading.
- Next, electric massage therapy was employed using a portable electric massager of the "Super Life" model, for a duration of 4 minutes, with 2 minutes allocated to each leg.
- Finally, ice bath therapy was utilized as a recovery method. The temperature of the ice bath ranged from -4 to -9 degrees Celsius, and the participant sat in the ice bath for 3 minutes.
- The use of warm water showers on Mondays instead of ice baths.
- The duration of implementing the exercises accompanied by relaxation, recovery, and rehabilitation methods is 8 weeks.
- Training days were scheduled for Saturdays, Mondays, and Wednesdays.
- The total number of rehabilitation training units is 24, with 3 units per week.
- The duration of the exercises and rehabilitation methods ranged from 20 to 30 minutes.
- The intensity of the exercises was kept below 40%.

3-12-4 post-training assessments.

After the completion of the exercise and testing period for the physical variables (maximum transitional speed, explosive leg strength, general endurance), the researchers conducted tests on the players.

On Wednesday, 8/2/2023, tests for the physical variables (maximum transitional speed, explosive leg strength, general endurance) were conducted.

Statistical Methods:

The researchers used the statistical software SPSS for data analysis.

Presentation and analysis of results and discussion

Presentation and analysis of results for the physical variables and discussion.

Presentation, analysis, and discussion of the results of the physical tests for the control group.

Table (3) Statistical parameters of the pre- and post-tests of the physical variables of the control group

variables	MU	Control group Pre-test		Control group Post-Test		Calculated (t) value	Sig	dif
		X	SD	X	SD			
Maximum transition speed	Second	4.86	0.133	4.77	0.156	1.242	0.246	unsig
The explosive power of the legs	Meter	2.37	0.040	2.40	0.042	2.055	0.070	unsig
General Stretching	Minute	3.56	0.067	3.52	0.087	2.053	0.050	unsig

• Significant at the error rate (≥0.05) and in front of the degree of freedom (15) value (T) = 2.13

From Table (3), the following can be inferred: The mean values of the pre-test for the control group in the physical variables (maximum transitional speed, explosive power of the legs, general flexibility) were (4.86, 2.37, 3.56), and the standard deviations were (0.133, 0.040, 0.067). The mean values of the post-test were (4.77, 2.40, 3.52), and the standard deviations were (0.156, 0.042, 0.087). The calculated values of "t" were (1.242, 2.055, 2.053), and the significance value (sig) reached (0.246, 0.070, 0.050). This indicates the presence of statistically non-significant differences between the pre-test and post-test for the control group.

Presentation, analysis and discussion of the results of physical variables tests for the experimental group

Table (4) Statistical parameters for the pre- and post-tests of the physical variables of the experimental group

Variables	MU	Experimental Group Pre-test		Experimental Group Post-Test		Calculated (t) value	Sig	dif
		X	SD	X	SD			

Maximum transition speed	second	4.91	0.207	4.52	0.150	3.083	0.001	sig
The explosive power of the legs	meter	2.32	0.111	2.56	0.080	4.922	0.001	sig
General Stretching	minute	3.51	0.079	3.28	0.101	6.325	0.000	sig

• Significant at the error rate (≥0.05) and in front of the degree of freedom (15) value (T) = 2.13

From Table (4), the following can be deduced:

The arithmetic mean values of the pre-test for the experimental group of physical variables (maximum transitional speed, explosive strength of the legs, general agility) were (4.91, 2.32, 3.51) with standard deviations of (0.207, 0.111, 0.079). As for the arithmetic mean values of the post-test, they were (4.52, 2.56, 3.28) with standard deviations of (0.150 ,0.080 ,0.101).

The calculated values of (t) were (3.083, 4.922, 6.325), while the significance level (sig) was (0.001, 0.001, 0.000). This indicates the presence of significant differences between the pre-test and post-test for the experimental group in the following physical variables: maximum transitional speed, explosive strength of the legs, and general agility. The researchers attribute this progress to the training program implemented by the coach, which included warm-up exercises and relaxation techniques accompanied by therapeutic methods prepared by the researchers. These exercises were found to enhance the variables used in the research.

The researchers attribute the significant differences in the 30-meter sprint test, which measures transitional speed, to the training units implemented by the coach and the various methods used, such as position exchange exercises, free running, ball running, and extreme speed sprints. They also emphasize the role of relaxation and recovery exercises, as well as the therapeutic methods prepared by the researchers, in reducing fatigue, muscle relaxation, preventing injuries and muscle contractions, and improving blood circulation to enhance oxygen transfer to the muscles. Mohammed Hussein Alawi (1992) confirms the importance of training using submaximal to maximal speed, avoiding muscle contractions, and emphasizing correct timing, fluidity, and relaxation in motor performance[4].

For soccer players, maximum transitional speed is considered the starting point for acceleration and quick bursts from a standing position or slow movement. In various situations, players need to be fast over short distances and make sudden transitions from defense to attack[5]. On the other hand, some consider speed in soccer as essential for the player, as it is the basis for quick adaptation to the field, fast thinking, and simple and complex motor skills to find teammates[6].

The results indicate significant differences in the 1000-meter running test, which measures endurance among the experimental group players. The researchers attribute the improvement in endurance to the adaptation of the cardiovascular, respiratory, and internal organs of the athletes. The warm-up, relaxation exercises, and recovery methods played a role in developing and adapting the cardiovascular and respiratory systems, reducing fatigue, and eliminating concentrated acids in the muscles. This aligns with Kamal Darwish and Mohammed Sabri (1999), who state the importance of endurance for soccer players due to the duration of the match. Endurance refers to the ability of large muscle groups to sustain moderate contractions for relatively long periods of time, requiring adaptation of the cardiovascular and respiratory systems to support this activity.[7]

Long jump tests, which measure physical variables and leg explosive power, show significant differences between the pre-test and post-test for the experimental group[8]. These variables play a significant role for soccer players. The researchers attribute this improvement to the positive role played by exercises accompanied by relaxation, recovery, and rehabilitation methods in reducing fatigue, speeding up muscle fiber recovery, and increasing the density of blood vessels in each muscle fiber. Additionally, high-intensity training exercises used by the coach in the main section and recovery exercises with accompanying methods contributed to the adaptation of muscles and body systems. This is consistent with Ahmed Nasr Al-Din (2003), who states that recovery refers to the renewal of physiological and physical indicators for athletes after exposure to intense pressure or influences. The speed of recovery is as important as a fitness development program for athletes in the training field, as the body's inability to recover energy sources after training doses will lead to a decline in their athletic performance[9]. Muscular strength is one of the most important physical variables due to its effectiveness in daily life[10]. It is the basis for all motor

variables in players, as it has a significant impact on speed, agility, flexibility, and is essential for soccer players in ball handling, dribbling, competing for the ball, heading, and scoring goals.

4.1.3 Presentation, analysis and discussion of the results of the two-dimensional tests of the two research groups (control and experimental) in physical variables

Table 5 Statistical parameters by post-test of physical variables for the two research groups (control and experimental)

Variables	MU	Control group post-test		Experimental Group Post-Test		Calculated (t) value	Sig	dif
		X	SD	X	SD			
Maximum transition speed	second	4.77	0.156	4.52	0.150	3.585	0.004	sig
The explosive power of the legs	meter	2.40	0.042	2.56	0.080	7.158	0.000	sig
General Stretching	minute	3.49	0.087	3.28	0.101	4.533	0.001	sig

• Significant at the error rate (≥0.05) and in front of the degree of freedom (15) value (T) = 2.13

According to Table 5, the following can be observed: The mean value for the post-test of the control group for the physical variables (maximum transitional speed, leg explosive power, overall jump) was 4.77, 2.40, and 3.49, respectively. The standard deviation was 0.156, 0.042, and 0.087, respectively. On the other hand, the mean values for the post-test of the experimental group were 4.52, 2.56, and 3.28, respectively, with standard deviations of 0.150, 0.080, and 0.101, respectively. The calculated t-values were 3.585, 7.158, and 4.533, and the significance level (sig) was 0.004, 0.000, and 0.001, respectively. This indicates the presence of significant differences between the research groups, favoring the post-tests of the experimental group in the examined physical variables (maximum transitional speed, explosive power, and overall jump) that were addressed in the study. These variables were influenced by the use of relaxation exercises, recovery methods, and rehabilitation techniques.

The researchers attribute the observed improvement in the experimental group to the positive effects of the exercises with accompanying means prepared by the researchers. The results indicated the effectiveness of these exercises and recovery methods used by the experimental group. Both groups trained in the main program under the same coach, with the same workload and intensity. It is evident that the accompanying means and recovery exercises prepared by the researchers played a major role in developing the physical variables (maximum transitional speed, explosive strength, general endurance) addressed in the study. These means and exercises helped reduce the accumulation of lactate in the muscles, which contributes to reducing fatigue. Abu Al-A'la also suggests that the body eliminates lactic acid more quickly if the player performs low-intensity exercises during the recovery period instead of complete rest[11].

Furthermore, these means and exercises also worked on stimulating the circulatory system and enhancing the efficiency of the nervous and muscular systems, compensating for the oxygen deficiency resulting from exertion. According to Risan Khreibat Majid, the effect of massage leads to recovery processes[12]. Additionally, the massage technique helps activate the blood circulation, allowing for greater blood flow to the massaged areas. These means and exercises contribute to the adaptation of the muscular and nervous systems to withstand exertion. As Khreibat (2014) pointed out, the adaptation process leads to a higher level of performance capacity and the ability to handle greater efforts. As the performance capacity increases, the execution of physical tasks becomes easier and less exhausting due to the adaptation to these requirements[13].

The researchers attribute this difference to the good training conducted by the coach in the main part and the exercises with accompanying means of relaxation and recovery used in the study, which were prepared by the researchers. These means and exercises had a positive effect, leading to improvements in the physical variables. Thus, training using recovery methods and its impact on muscular strength for the player and their physical development in facing resistance and fatigue during play was evident. Abu Al-A'la (2003) confirms that "muscular strength is related to the number of

activated muscle fibers. If we need muscle contraction to overcome a simple resistance, the nervous system activates fewer motor units and, consequently, fewer muscle fibers. Since fast motor units contain a greater number of muscle fibers compared to slow units, the muscle contraction to face resistance, depending on its magnitude, can be either small or large[14]." The adaptation process occurred as a result of following the progressive overload in training and continuing with the recovery exercises while considering the scientific principles underlying the training process. This aligns with what Salama (2000) mentioned, stating that "the training load must be gradually increased by determining the necessary period for adaptation to occur. This increase in the training load should be suitable for the player's level and capabilities, ensuring that the magnitude of the increase is not excessively high[15]." Despite both groups using recovery exercises, the experimental group showed superior results. Although both groups used recovery exercises, they differed in the proportions, exercises, and means utilized. This difference played a role in attributing the progress to the experimental group, which used a recovery program consisting of calming exercises, relaxation techniques, and recovery methods.

Conclusions

- The relaxation and recovery exercises accompanied by recovery methods resulted in a noticeable improvement in the physical variables addressed in the study (maximum transitional speed, explosive strength, general endurance) for the experimental group.
- The use of relaxation and recovery exercises, along with the employed recovery methods, facilitated faster fatigue recovery for young players, as indicated by the research results.
- The training program or recovery exercises followed by the coach did not show a significant improvement in several skill-related, physical, and functional variables for the control group of young players.

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