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The Effect of Compound Exercises Using a Training Intervention Mothod on Some Physical and Functional Abilities of Football Players

Mohammed Ghani Hussein, moh_rfe20.edbs@uomustansiriyah.edu.iq, (1)

Al-Mustansiriya University, College of Basic Education, Department of Physical Education and Sports Sciences, Iraq

(1) Corresponding author

Abstract

General Background: The development of football players' physical and functional capabilities is crucial for optimizing performance, particularly in the latter stages of a match. **Specific Background:** Many players experience premature exhaustion, sluggish recovery, and reduced concentration due to inadequate training methodologies. **Knowledge Gap:** Existing training approaches often fail to integrate complex exercises that enhance both physical and functional attributes simultaneously. **Aims:** This study investigates the impact of complex exercises using a training intervention method on the physical and functional capabilities of football players. **Methods:** An experimental approach with a one-group pre-test and post-test design was applied to 17 players from Al-Masafi Sports Club competing in the Iraqi Premier League (2024–2025). Functional and physical performance was assessed before and after an eight-week training intervention. **Results:** Statistical analysis revealed significant improvements in key functional variables, including vital lung capacity and relative oxygen consumption (VO_2 Max), as well as enhancements in physical abilities such as sprinting speed and explosive power. **Novelty:** This study demonstrates the effectiveness of high-intensity interval training combined with complex exercises tailored to match-specific demands, bridging the gap between conventional conditioning and real-game performance. **Implications:** Coaches and sports scientists should incorporate targeted complex training methodologies to optimize players' endurance, recovery, and concentration, ultimately enhancing competitive performance.

Highlights:

- Players experience fatigue, slow recovery, and reduced concentration.
- C2o.mplex training interventions improve physical and functional capabilities.
- E3n.hances endurance, recovery, and performance in competitive football.

Keywords: physical abilities, functional abilities, football players

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Introduction

Diversifying training methods and means to serve training objectives may help the coach achieve training objectives with less time and cost, which leads to developing players' skills and improving their performance, not to mention developing physical and functional abilities. Players who possess a high level of physical ability are more capable of executing what is required of them during the match. Sports training in various sports, including football, must follow the appropriate scientific methodologies pertinent to each game, alongside the efficacy of training, depends on the competencies of coaches and their acknowledgment of individual traits, as well as the selection of optimal training techniques, in order to advance the training process, including the method of training intervention, which is important in preparing training programs that lead the player to reach a high level of training. Compound exercises are among the most important contemporary exercises used in modern training programs, which work to develop the physical and functional side of football players, as they are similar to

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the player's duty in competitive conditions. In addition, the integrate by them of many skills inside a single exercise and are executed in various phases of preparation. Furthermore, their variety enhances the aspects of motivation and exhilaration, practicing them. Compound exercises are meant as "a method that uses heavy and light resistance in a varied manner, with the ultimate goal of improving muscular capacity ".

The significance of the study is apparent in the need to understand the impact of using compound workouts via the training intervention method and diversifying various training techniques of football training, which leads to many effects on the functional systems and with the difference and diversity of these training methods and techniques, which will subsequently be reflected in increasing the ability to adapt to the different requirements of the game and what this has to do with developing the special physical abilities of football players.

1. Research 's Problem

Through researcher's experience, he found that some players exhibit a substantial deterioration in performance, particularly in the last third for match. This is due to the players' weak physical and functional abilities, which leads to early fatigue, slow recovery, lack of concentration, and an inability to carry out the duties assigned to them during the match, which require a certain physical effort. It is not possible to raise the level of football players to reach the highest levels without raising their functional and physical efficiency. for identifying the most effective training methodologies and techniques to be adopted for raising level of these important special physical abilities, we must use modern training techniques, methods, and means and test them on training samples to achieve the set goals, including football.

2. Research Objectives

a. Develop complex exercises using a training intervention approach that are tailored to the research sample's abilities.

b. Identify the effect of complex exercises using a training intervention approach on developing some physical and functional abilities of football players.

3. Research Hypotheses

Compound exercises using the training intervention method exert a beneficial influence on certain physical and functional capabilities of the study model.

4. Research Areas

Human Area: Al-Masafi Club football players.

Time Area: From October 1, 2024 to December 12, 2024.

Spatial Area: Al-Masafi Sports Club Stadium.

Methods

((The methodology is the method followed by the researcher to determine the steps of his research through which he can reach a solution to the research problem))[1], and the researcher used the experimental method to suit the nature of the problem by using the An exploratory approach using a one-group pre-test and post-test methodology.

1. Research Sample

The study sample was deliberately chosen. A total of 24 players from Al-Masafi Sports Club are participate in the Iraqi Premier League for the 2024-2025 season, seventeen performers were selected from among them, after excluding (4) for the pilot study, and (3) goalkeepers from the team. This resulted in a research sample percentage of (70.83%) of the original population.

2. Devices and Tools used in the Research

A German spirometer to measure vital capacity of the lungs, a Svig manometer to measure vital capacity of the lungs, (4) stopwatches, a (50 cm) wooden box to measure maximum oxygen consumption, a measuring tape, cones and poles of varying heights, a football field, (10) footballs, a Dell electronic calculator, and a data recording form.

3. Tests used in the Research

First: Physical tests:

a. Standing long jump test.[2]

b. Standing trunk flexion test.[3]

c. 30 m sprint test.[4]

Second: Functional tests:

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a. Forced expiratory volume (FEV1) measurement.[5]

b. Vital capacity (VC) measurement.

c. (Relative oxygen consumption (ROC) measurement (VO2 Max)

4. Pilot Experiment

The scholar conducted the pilot experiment on a sample of four participants. October 1, 2024.

The aim was to obtain the following:

a. Confirm integrity the tools managed

b. Spot difficulties faced by the work team and researchers in performing the tests.

c. Identify the time required for each scale

5. Pre-tests

Pre-tests on functional variables and physical abilities were conducted for the research group on Thursday, October 3, 2024, at 5:00 PM, at the Al-Masafi Sports Club Stadium.

6. Main Experiment

Compound exercises were applied using an interventional training approach to members of the experimental group from October 5, 2024, to December 10, 2024. The exercises were implemented In the specialized preparation phase using a high-intensity interval training methodology, which spanned eight weeks with three training sessions each week, totaling twenty-four training sessions. The length of the primary segment of the workout unit ranged between (30-42) minutes. Intensity was calculated by extracting the heart rate by measuring the heart rate as an indicator for regulating the training load. (To measure intensity, the maximum heart rate = 220 - the athlete's age).)

7. Post-tests

The researcher conducted the post-tests for the two research groups on functional and physical tests on Thursday, December 12, 2024, exactly same settings as the preliminary testing.

8. Statistical Methods

The scholar used the statistical software (SPSS) to obtain the test results.

Result and Discussion

Exposition, examination, and discourse on the findings:

Table 1. Reviews arithmetic mean, standard deviation calculated (T) value for the tests under study.

Variables	Pre- test		Post-test		f	f.h	T test	Error value	Sig. level
	M.	St.d	M.	St.d					
Jump from a standstill	2.32	0.17	2.69	0.120	0.34	0.002	14.20	0.001	Sig.
Bend the trunk forward from a standing position	13.2	0.59	18.1	0.55	-4.92	0.57	17.3	0.00	Sig.
Running 30m	4.38	0.72	3.84	0.12	0.53	0.16	13.6	0.00	Sig.
To measure forced	3.15	0.24	3.98	0.04	-0.83	0.25	-13.3	0.00	Sig.

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expiratory volume (FEV1)									
To measure vital capacity (VC)	3.23	0.13	4.21	0.22	-0.98	0.15	-15.4	0.00	Sig.
To measure relative oxygen consumption (R.VO2. Max.)	37.1	0.37	46.4	0.52	-9.23	0.77	-10.3	0.00	Sig.

After researcher presenting the obtained data indicating substantial variations between the pre- and post-tests, favoring the post-test, in terms of physical capacities. functional variables under study. The researcher believes that the development achieved in the results of the research sample was due to the high intensity physical effort performed by the players, as the concentration of hormones increases after performing the effort in proportion to the nature of that effort and its time period, and that high-intensity exercise leads to an increase in the concentration of the hormone, while the reason for this increase according to the raise of percentage for metabolic processes to rise to acquisition of oxygen to compensate for the deficiency that occurs as a result of high-intensity physical effort resulting from continuous training. This leads to the completion of energy production processes. The study author ascribes this to the significant exertion experienced by the players due to the implementation of high-intensity interval training during training sessions, which resulted in enhanced endurance of the devices under the imposed strain.

(Metivier) asserts that "the increase in the concentration of these hormones is due to the increased rate of vital reactions, increased oxygen consumption, and the need to decompose creatine phosphate, as well as increased metabolic processes for energy production from glucose, muscle glycogen, and fat." One of the factors contributing to improved performance in athletes is the development of the hormone thyroxine and its ability to secrete the hormone necessary to increase the energy required for performance.[6], The development of this hormone reflects increased activity in metabolic processes in every cell of the body, particularly oxidation processes, as well as increased breathing and heart rate.

(Cuytoxi) believes that “the responses of the body’s various systems to physical effort require a rapid metabolic process, increased oxygen consumption, and the inhibition of certain enzymes to stimulate the required metabolic pathways, in addition to the need to increase the heart rate and the speed of blood flow to nourish the tissues with energy and oxygen. These activities are controlled by the hormone thyroxine, which increases with increased physical effort to implement the conditions required by the type of effort ” . [7]

The researcher attributes this to the fact that physical exercises have included the academic principles behind the elements of training intensity and are consistent with the training of these physical qualities, which are the basis for developing the energy production systems for players, which led to the emergence of these moral differences. This is consistent with what was stated in scientific sources. (Michacl. J. Alter) stated that ((in order to ensure the appropriate balance of aerobic and non-aerobic energy capacity in sports and to solve physical and psychological duties, this needs implementing various training means with means to control work for functional devices in various and multiple dimensions)).[8]

Achieving adaptation to this type of training ensures a high level of performance during the match. The effect of this type of training increases the ability to build ATP and increases the capacity of mitochondria in the muscles by increasing the amount of carbohydrate and glycogen reserves in the muscle, which makes the trained muscles less dependent on blood to obtain glucose, resulting in a reduction in O2 levels deficiency and lactic acid buildup in the muscles, that afterward reproduced the reduction of exhaustion index and an increase in the player’s ability to continue performing with high efficiency.

Conclusions

1- According to statistics noteworthy differences were seen in the results of the pre- and post-tests for several functional characteristics under investigation of the research sample, in favor of the post-tests.

2- According to statistics substantial differences were seen in the pre- and post-test findings for the enhancement of several physical abilities in the study sample, favoring the post-tests.

3-The development achieved by experimental group in physical abilities and functional variables was the result of the effective impact of the qualitative exercises used during the training modules prepared by the researcher using the training intervention method.

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