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USING VARIABLE RATIOS IN PERIODS OF WORK TO REST AND ITS REFLECTION TO DEVELOPING SOME PHYSICAL VARIABLES FOR HANDBALL PRACTITIONERS AGED 40-50 YEARS

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Abstract

The Study Aims at

- Preparing exercises in variable ratios for periods of work and rest (1:1) and (1:2) and its reflection on the development of some physical variables for players practicing handball at the ages of 40-50 years.
- Recognizing the reflection of exercises in variable ratios for periods of work and rest in the development of some physical variables for handball players aged 40-50 years.

It is Hypothesized That:

- There are statistically significant differences between the two experimental groups for the pre and posttests in the development of some physical variables for handball players aged 40-50 years.
- There are statistically significant differences between the two experimental groups for the two posttests in the development of some physical variables for handball players aged 40-50 years.

Conclusions

- The first experimental group, which uses a work-to-rest ratio (1:1), has achieved a remarkable development in the variables of strength endurance for the muscles of the legs and long speed endurance in the post tests between the two groups.

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- The second experimental group, which uses a work-to-rest ratio (1: 2), achieved superiority in the variables of strength endurance of the abdominal muscles and the characteristic strength endurance in speed in the post tests between the two groups.

Keywords: (strength endurance, handball, strength endurance characterized by speed, physical variables)

Introduction

Many countries have been interested in developing the physical fitness of their players. This stems from the principle that fitness is the basis upon which the preparation and building of players of different levels is based. This is evident when we see modern handball, which is characterized by fast pace almost throughout the match and under different playing conditions.

This development in level, whatever its aspects, must be based on scientific and accurate foundations and corresponds to the level of the sample to which the training curricula or exercises for which it is prepared are applied. Therefore, each sample must have a training method and a training style that differs according to the level in terms of physical, skill and tactical performance. One of the most appropriate methods that are compatible with team games is the method of periodic training with low quality and high intensity.

Al-Basati finds that interval training is used in most, if not all, sports, and affects the anaerobic and aerobic capacities. Thus, this type of training depends on the phosphagen system for energy production, as well as the lactic acid and oxygen systems. It also contributes to the process of adaptation with its effective effect by controlling its variables in sports activities [**1**].

From the principle of privacy, the method or exercises should have been chosen on the basis of which the variables are targeted the are sought to be developed. One of these methods is the change in the ratios of work to rest, which is very important to be used in developing the physical variables of handball practitioners. As the players at the age of over 40 years old, has been installed with the skill, and this has become a feature that distinguishes them and is very difficult to change. This skill has taken a long time with them while practicing the game of handball. Therefore, it is important that we strive to maintain or develop their physical aspects through the use of work periods coupled with rest according to the goal of the exercise.

Training programs with appropriate repetitions according to the appropriate intensity and appropriate comfort for each exercise is one of the solutions that coaches resort to in order to bring their players to the best level. This is confirmed by (Krzysztofik, Wilk, Wojdała, & Gołaś) in that training programs include selection of exercises, sets, repetitions, intensity, duration of repetitions and appropriate rest. As for the more advanced programs, they provide details and may include advanced techniques that develop the training process **[2].**

The basis of training is to search for the problem and attempt to overcome the obstacles that we may encounter during training. From this aspect, this category is targeted, which the coaches kept away from, as they do not participate in competitions and do not represent clubs in the future, but the goals of training are higher and greater than competition. Moreover, from the principle that sport is for all and that this group is an important segment of society, especially if we know that at the present time tournaments have started at the level of large age groups under the name of "Pioneers of Sports", therefore, we had to look at the best ways to develop their level of physical variables. This is true if we know that the skill they have is stored in the motor program and its effects can be forgotten during training, and that the periodic training method is one of the methods that researchers find important and successful if it is used in a codified manner with this category. As the method and strategy for physical fitness is to improve performance and most of the gold medal winners and advanced in the Olympics at the beginning of the twentieth century, whose successes and victories contributed to the support and development of interval training (Sage Surefire) **[3].**

This is what has prompted the researchers to use variable exercises for work and rest, and exercises that create suspense and excitement, especially since this group is thirsty for exercise in order to satisfy their desires, fill their spare time as well as raise their physical ability. This is an attempt by researchers to move away from the norm in training to achieve the effectiveness of handball.

The Study Aims at:

- Preparing exercises in variable ratios for periods of work and rest (1:1) and (1:2) and its reflection on the development of some physical variables for players practicing handball at the ages of 40-50 years.

- Recognizing the reflection of exercises in variable ratios for periods of work and rest in the development of some physical variables for handball players aged 40-50 years.
- Identifying which periods and rest rates are better in developing some physical variables for handball players aged 40-50 years.

Hypotheses:

- There are statistically significant differences between the two experimental groups for the pre and posttests in the development of some physical variables for handball players aged 40-50 years.
- There are statistically significant differences between the two experimental groups for the two posttests in the development of some physical variables for handball players aged 40-50 years.

Method and Tools:

The researchers used the experimental method by designing the two experimental groups with pre and posttests due to their clear impact on solving the research problem.

The research community is represented by handball players in Salah Al-Din governorate, as they represent four different clubs, numbering to(54) players. As for the sample of the research, it is the players who represent Al-Dour Sports Club, numbering to (14) players by (25.925%) of the total research community. This percentage is good in the implementation of the items of the exercises intended for them. Goalkeepers are excluded only because their training, skills and even physical variables are not similar with the players, so the total number of players is (12) players. They are divided into two experimental groups. The first training group, numbering (6) players, uses the ratio of work to rest (1: 1), while the second training group, numbering (6) players, uses the ratios of work to rest (1:2). Table (1) shows the research community and its sample.

Table (1): The distribution of the research community and its sample

Percentage	No. of players	Community details and sample	No.
%100	54	Players representing 4 clubs in Salah Al-Din Governorate	1
%25.925	14	Research sample	2
%11.111	6	First experimental group	3
%11.111	6	Second experimental group	4
%3.703	2	Excluded players	5

Pre-test

The researchers have conducted the pre-test on the two (experimental) groups on Wednesday, 12/1/2021, in the inner hall, Salah Al-Din Al-Ayyubi Forum Hall / Al-Dour District, in the presence of the assistant work team. The conditions of the pre- test are fixed in terms of place, time and method in which the pre- tests are carried out, in addition to recording the results of the players in a form for data collection. The investigated physical variables are recorded in a special form to be processed statistically after the exercise.

Exercises used in the research:

A set of exercises is prepared and implemented in a low-intensity interval training manner with work-to-rest periods in a ratio of (1: 1) for the first training group, and (1: 2) for the second training group. These exercises aim to develop some physical variables. The exercises are implemented by three training units per week, for six training weeks, and thus the total number of training units is (18) training units . The low intensity interval training method is used to suit the sample level. The training units include assembly and general and private warm-up to enter the main part of the training units, and the exercises are carried out as shown in Table (2).

Table (2): The time of the exercises, the number of repetitions, the totals and the type of rest used

Type of rest	Work to rest ratio	No. of groups	number of repetitions	Time of exercises
Negative	1 : 1	2	5-3	1.30 -2 seconds
Positive	2 : 1			

The exercises were carried out from Sunday 5/12/2022 until Thursday 13/1/2022 with a load ripple (2:1). Tables (3) and (4) show a model of the training units used in the research.

Table (3): The ratio of work to rest periods (1: 1) from the implemented exercises that the researchers used in the training units of the first training group

target intensity%	Work time + rest time per second	Total rests per second	Total work per second	Groups rest time per second	No. of groups	Rest between repetitions per second	Repetition	Target exercise time in seconds	Purpose of the exercise
60-80	1260	720	540	180	2	90	3	90	Speed endurance
60-80	1360	760	600	180	2	100	3	100	Force endurance
60-80	300	180	120	180	1	-	1	120	General endurance
	2920								Total
	48.66								Total in seconds

Table (4): shows from the exercises that the researchers used in the implemented training units of the second training group that the ratio of work to rest periods is (1: 2)

target intensity	Work time + rest time	Total rests per	Total work per	Groups rest time	No. of	Rest between	Repetitio	Target exercise	The purpose of the exercise
60-80	1620	1080	540	180	2	180	3	90	Speed endurance
60-80	1760	1160	600	180	2	200	3	100	Strength endurance
60-80	300	180	120	180	1	-	1	120	General endurance
	3680								Total
	61.33								Total in seconds

Post- test:

The researchers have conducted the post-test on the two (experimental) groups on Saturday, 08/Jan./2022. The researchers have maintained the same conditions as well as the sequence of tests that are applied in the pre-test.

Results:

Table (5) Arithmetic means, standard deviations, calculated (t) value, (sig) value and significance level for the pre and posttests of the physical variables of the first experimental group

Significance	Sig level	(T) value	Post		Pre		Unit of measurement	Test	No.
			B	A	B	A			
significant	0.021	2.894	4.45	33.425	4.15	27.352	second	Abdominal muscles strength endurance	1
significant	0.001	3.628	0.58	38.22	1.71	35.40	meter	Strength endurance for the leg muscles	2
significant	0.032	2.86	1.16	42.89	1.24	44.26	second	Long speed endurance	3
insignificant	0.098	1.66	1.74	25.65	1.67	25.45	second	Strength endurance characterized by speed for the legs	4

(*) Significant if the significance level is > (0.05).

Table (6) Arithmetic means, standard deviations, calculated (t) value, (sig) value and significance level for the pre and posttests of the physical variables of the second experimental group

significance	Sig level	(T) value	post		Pre		Unit of measurement	Test	No.
			B	A	B	A			
significant	0.004	3.137	4.26	36.685	4.17	27.364	Second	Abdominal muscles strength endurance	1
significant	0.036	3.108	0.43	37.06	1.37	35.69	Meter	Strength endurance for the leg muscles	2
significant	0.001	3.66	1.14	40.34	1.25	44.39	second	Long speed endurance	3
significant	0.04	3.89	1.89	23.88	1.79	25.61	Second	Strength endurance characterized by speed for the legs	4

(*) Significant if the significance level is > (0.05).

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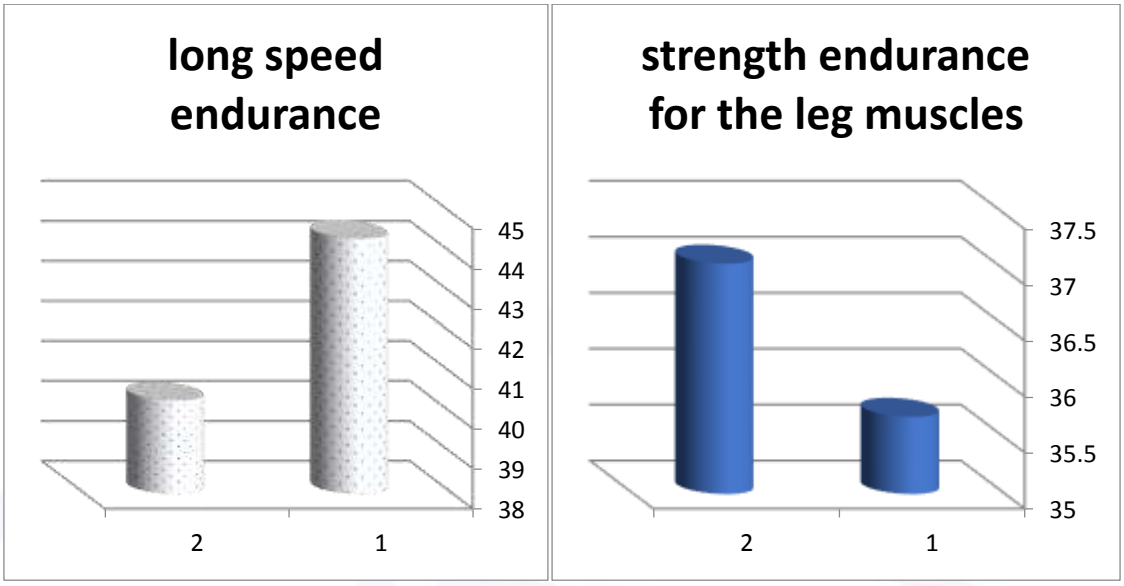

Figure (1): The extent of change between the posttests of the investigated variables

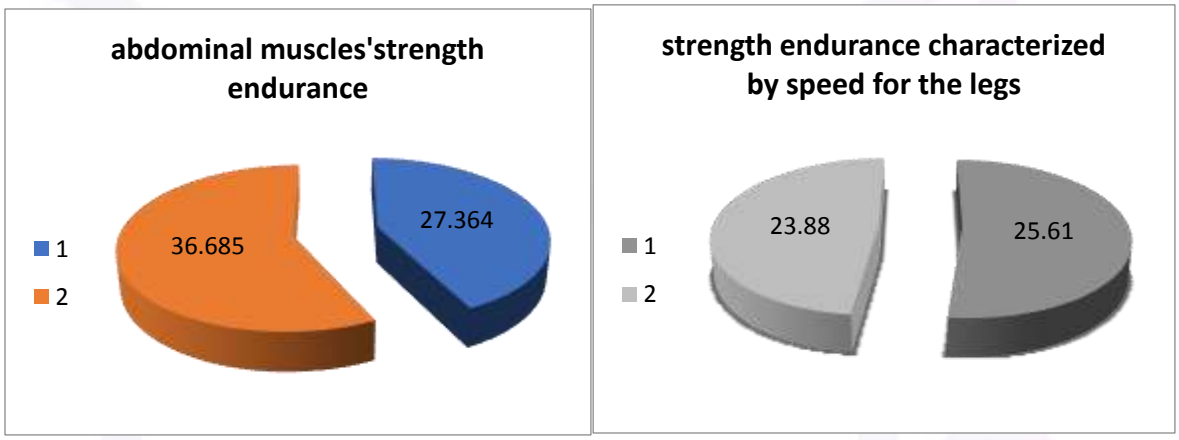

Figure (2): The difference in percentages between the two post tests for the investigated variables

Discussion:

When we observe tables (5) and (6) for the two experimental groups, it turns out that all physical variables have reached the degree of significance in the investigated physical variables, except in one variable for the first experimental group that has not reached the degree of significance, which is the endurance of the force characterized by the speed of the two legs. This development gives positive results in that the exercises used by the researchers have affected the level of the sample. The endurance exercises of medium and gradual intensity in training according to the ratios between work and rest are well received by the

research sample, which has led to the development of these variables. Al-Rabadi believes, "What is important in developing speed endurance is the gradual use of intensity from low to medium" [**4**].

Therefore, when training, it is necessary to pay close attention to work periods and the appropriate rest periods. This leads to changes in the level of the individual when these ratios are of a primarily physical benefit. This is what the researchers intend in the exercises that are used. In this regard, (Radwan) sees that the processes that occur during rest periods of exercise are of great importance as are the performance of the exercise itself, because incomplete recovery between repetitions of training leads to a decrease in athletic achievement [**5**].

With regard to the importance of rest in rationing the training load, Al-Jabali reports that the correct exchange between training and rest is one of the basic and necessary factors for players to reach high sporting levels. The training process as a whole is a mixture of arousal and recovery, and it is wrong for the trainer to understand the training process as a set of stimuli only, without paying attention or taking into account rest periods. When the player performs the training loads, a set of functional processes occur to the body that are linked to each other, and the body's work begins to restore recovery immediately after the completion of the performance of those training loads **[6]**.

Therefore, researchers find that work periods associated with specific ratios of rest periods give a physical effect as well as a physiological effect that leads to adaptation and thus stabilization of training according to the level of the sample. This is what is reached in the development of the variables that are targeted to the individuals of the research sample.

Abu Al-Majd indicates that a state of compatibility must be provided between rest periods and physical load and the functional state of the body during training, taking into account the physiological impact of the exercise on the players. It must also be taken into account that in the event that there are large differences between the rest levels and the abilities of the players, the same rest levels should also differ in accordance with the abilities of these players **[7].**

Table (7) Arithmetic means, standard deviations, calculated (t) value, (sig) value and significance level for the post-test of physical variables for the first and second experimental groups

Significance	Sig value	Calculated (T)	Second experimental group		First experimental group		Unit of Measurement	Test	No.
			B	A	B	A			
Significant	0.025	3.617	4.26	36.685	4.45	33.425	Second	Abdominal muscles strength endurance	1
significant	0.04	3.897	0.43	37.06	0.58	38.22	Meter	Strength endurance for leg muscles	2
significant	0.002	3.031	1.14	40.34	1.16	42.89	Second	Long speed endurance	3
Significant	0.021	4.28	1.89	23.88	1.74	25.65	Second	Endurance of strength characterized by speed of the legs	4

(*) Significant if the significance level is > (0.05).

It is noted from Table (7) for the post-tests between the two experimental groups, all the variables made a significant difference. The first experimental group outperformed the second experimental group in the variables of strength endurance of the legs muscles of the and short speed endurance. However, the second experimental group excelled in the variables of strength endurance of the abdominal muscles and the strength endurance characterized by speed for the muscles of the legs. This superiority between the two groups is due to the importance of work-to-rest ratios used in the exercises and the actual development of these variables. This is consistent with what Al-Dabbagh referred to regarding the rest period between repetitions, the time period between totals, or the pauses between periods of actual playing for a particular match. During this period, the body's systems and energy production systems attempt to prepare for the next stress period [**8**].

The issue is not related to periods of work or training only. Also, it is indispensable for rest periods that follow training periods, as one complements the other in the training process. The most important thing is to employ these capabilities in a manner consistent with the trained sample and the level it has reached, in order for these used exercises to match its levels. Abdul-Fattah finds in this regard that "if the training processes exhaust the stored energy, then in the rest period the energy will be rebuilt and compensated, and the two processes are both indispensable" [**9**].

The researchers believe that it is very necessary to have rest periods that fit the work periods, but rather they should be commensurate with the levels of the sample and the goal on which these exercises are set. Every elaborate work needs a goal that researchers aspire to achieve and reach, and this can only come with the integration of the load from all sides.

This is what is stated by many researchers in the various previous studies in the use of multiple methods to achieve the objectives of the research, including [**10**]. Researchers differ in the mode of exercise and its multi-purpose methods, including finding more than one means to reach the end.

Conclusions

- The use of work proportions according to the quality of rest has given suspense to the exercises during their application.
- The exercises prepared by the researchers have developed all the experimental variables and for both groups, except for the first group in the variable of strength endurance characterized by speed.
- The first experimental group, which uses a work-to-rest ratio (1:1), achieved a remarkable development in the variables of force endurance for the muscles of the legs and long velocity endurance in the posttests between the two groups.
- The second experimental group, which uses a work-to-rest ratio (1: 2), achieved superiority in the variables of strength endurance of the abdominal muscles and the characteristic force endurance in speed in the post tests between the two groups.

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