

## **The effect of contrast training on the dimensions of the heart, muscular ability and some complex skills of handball players**

**\*Prof. Dr. / Hossam Saad Al-Sayed Selim**

### **Abstract:**

This research aims to identify the effect of Contrast training on the dimensions of the heart, muscular ability, and complex skills of handball players. One of the most important results was the effect of the differentiated training program positively on the variables of the dimensions of the heart, muscular ability and the complex skills under research for handball players, and one of the most important recommendations was the use of Contrast training for handball players because of its importance in improving the dimensions of the heart and developing the muscular ability and skill level of handball players .

**Keywords: contrast training**

### **Introduction and research problem:**

In nowadays, the world is witnessing a great development in various fields of life, as many phenomena have been subjected to scientific research, as the best way to address many problems, and there is no doubt that one of the most important of these areas is the sports field, as this development was clearly reflected on it, which led to an increase in competition Between different countries to achieve achievement in the sports field, so that the world championships and the Olympics have become a stage in which champions and athletes display their ingenuity to show their new achievements in the arts of sports performance and kinetic creativity.

Training with its various shapes has become a process that has its role in contemporary societies. It has become an area for competition between all sectors of society. It has

even become a field for competition between different countries and peoples as one of the important means to raise the level of performance of players. At various levels, sports training is a planned educational process based on sound foundations that works to reach the player to the ideal performance during matches and competitions (2: 31).

And Brad McGregor (2006) finds that the continuous and increasing emphasis on reaching athletic achievement has led scientists to search for training methods that have positive effects on performance, and Contrast training is one of these methods that has drawn attention recently (12: 41).

And Talha Hossam El-Din and others (1997) see that the muscle work when done according to two different training systems, the training is differentiated, and the training using weights and plyometrics in the same

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\* Assistant Professor, Department of Theories and Applications of Sports and Racquet Games, Faculty of Physical Education for Boys and Girls, Port Said University

training unit has been called Contrast training, and this type of training allows to achieve a high load that exceeds what is allowed Plyometric training alone and thus helps to extract the largest possible amount of ability (38: 91).

Smilios, et al. (2005) that the Contrast training using loads of light and medium intensity, which have a positive effect on the strength characteristic of speed, provided that weight training exercises are performed before the plyometric training in the training unit, taking into account that the rest periods range between 3-4 s (22: 23).

Brad McGregor (2006) adds that Contrast training is one of the modern training methods in the sports field, and that the studies that dealt with its physical and physiological effects on young and adult players differed in their results due to the different method of dealing with it in the sports field (12: 125).

And "Amr Hamza" (2008) believes that weight training is considered a complement to plyometric exercises, as weight training helps to stimulate many muscle fibers and develop both speed and strength, and thus ability, but this is not sufficient to achieve the maximum muscle ability, as it may not develop ability The player has to switch from shortening contraction to lengthening contraction, and here comes the role of plyometric exercises that help the player take advantage of the amount of muscle fibers excited by weight training, and thus the speed of transition from shortening contraction to lengthening

contraction, and therefore the use of both weights and plyometrics together achieves the best results (8: 14).

And "William" (2002) adds that training methods that Contrast the strategy of weight training and plyometric exercises are gaining wide popularity, as this method works to improve muscular ability (41: 42).

Chip Sigmon (2003) sees that Contrast training is used to Contrast weight training and plyometric training in order to link strength and explosive power, as it gives preference to weight training or plyometric training alone, in order to improve speed and explosive power (13: 32).

Eduardo et al (2012) and Stojnovic et al. (2012) believe that plyometric training is the link between muscle strength and ability, and the results of their studies showed that the combination of plyometric training and weights led to a significant increase in the level of ability Regular training using weights for a period of six weeks led to an increase in the height of the vertical jump from stability by (3.3 cm), and plyometric training led to an increase of (3.8 cm), while the Contrast training of both types for the same period leads to an increase of (10.7 cm). , and this is what makes muscular ability a distinctive physical characteristic in training through the integration and compatibility of the ratio between strength and speed of the player (17: 2641), (35: 379).

And "Alekesandar kukuric et al" (2009) see that complex training or Contrast training is a good fitness training strategy that Contrast s weight training and plyometric training, and

they recommended in the results of their research that the mechanically similar plyometric training should alternate between a group with weight training in the same training to improve muscular ability and athletic performance (5: 174).

Handball is one of the strongest and fastest group games. The idea of a modern handball requires a high skill performance, where the mobility of players on the field requires a great deal of strength, speed, endurance and precision as well as the ability to accomplish and control the ball throughout its handling periods. In addition to the evolution of the game law by either deleting or adding material that increases the effectiveness of the playing speed, leaving the player in constant motion throughout the game time resulting in the emergence of new offensive or defensive game methods and plans. So those interested in handball and students must plan the training with the aim of comprehensive, integrated preparation (physical, skill, plans, psychological, mental).

Physical preparation plays a key role in this preparation the better the fitness the player can use his technical skills and carry out his planning duties efficiently. A modern handball game requires a player to be physically fit. The necessary physical qualities of a handball player have become an important aspect of the training plan. The idea of a modern handball is quick to play and skill in technical performance and plans. The basic base for achieving the player's qualities is the development and development of physical qualities (25:73,74).

"Yahya al-Hawi" (2002) indicates that the preparation of skills is concerned with the acquisition by players of basic and technical skills for the activity practised, under the conditions and possibilities of competition situations, including the proper performance of private movements in accordance with technical rules with the economy in time and effort. The level of physical condition means the possibility of raising the level of performance for the movements of the activity practised (42:112)

Ihab Abdel Fattah (1992) considers that the motor skills of sports activity are at the heart of the performance of this activity, which must be mastered by the player in order to be able to fulfil his claimed role during the matches, assisted by the efficiency of his physical, skill, linear and psychological preparation (Contrast d) without overlooking any other aspect (18:32)

He adds "Sobhi Hasanin," "Hamdi Abdel Monim." Physical performance and skilled performance can be found through a specific and clear process, namely, the development of the necessary physical components and the degree to which the basic motor skills of the activity are formed. Physical preparation is therefore considered to be one of the most important elements of success in demonstrating motor activity in an integrated manner with its special exercises, which are commensurate in terms of muscle work with activity (32:3).

"Ali Taha" (1999) indicates that skilled performance is linked to physical performance as a result of the

nature and quality of performance, as well as individual differences between players' abilities, all to the interest in training season planning, modules and component periods (7:257).

Mathematical training is important in bringing about different physiological changes across all parts of the body. The level of athletic performance is provided whenever these changes are positive so that the physiological adaptation of the different organs of the body to perform the physical load and to carry out the performance at high efficiency with the economy of the effort is achieved. One of the most important of these physiological changes occurring is those related to the circadian system, especially changes in cardiac functioning, since exercise leads to increase in heart size at.

"Ahmed Al-Ahl" (2019) shows that mathematical training is conducive to various physiological changes involving all organs of the body, and the higher the performance level, the more positive these changes will be, thus achieving physiological adaptation of the body's organs to perform physical load and to withstand performance to high efficiency (4: 5) .

And "Amr Hamza" (2008) believes that the heart is the pump that works to pump oxygenated blood to all parts of the body, and in this way the body's organs get their needs of oxygen and nutrients that help produce energy and movement (8: 15).

And "Shepherd" (1996) indicates that the expression of the sports heart and the extent of the integrity of the enlarged heart can be

identified by modern means of measurement using the echo, i.e. echoes, or by magnetic resonance, and that these modern devices draw an accurate picture of the minute things in the heart in terms of The expansion of its chambers and blood vessels, and he adds that the hypertrophy of the athlete's heart appears in cases of both endurance and strength sports (34: 31).

Bahaa Salameh (2016) states that the cardiac circulatory system is one of the most important systems in the human body, and the differences in the thickness of the heart muscle are directly related to the spatial pressure in the walls of the four chambers of the heart, and the left ventricle is the strongest in relation to the four chambers of the heart during systole because the ventricle The left side pumps blood to all parts of the body (10: 37).

Through the researcher's follow-up to the international handball championships, he found that it has become characterized by a rapid pace and an increase in maneuvers between attackers and defenders during matches, and handball is one of the games that need advanced individual skills because it is directly affected by physical qualities, especially the muscular ability that the player depends on when performing all skills The offensive and defensive game, and the player's success in accomplishing his skill duties depends on the level of muscular ability he achieves. The essential correlation between physical and skill abilities.

The researcher also noted that despite the multiplicity of studies in the

field of handball in all physical, skill, physiological and other aspects, an important factor was overlooked and considered the important link, where the basis on which the performance efficiency and the ability to communicate inside the stadium is built, which is the periodic system represented in The heart, and this is what prompted the researcher to conduct this study to find out the effect of Contrast training on the dimensions of the heart, muscular ability and the complex skills of handball players.

**research aims :**

This research aims to identify the effect of Contrast training on the dimensions of the heart, muscular ability, and complex skills of handball players.

**Research hypotheses :**

There are statistically significant differences between the tribal and remote measurements of the research sample in the variables of the dimensions of the heart, muscular ability and the complex skills under research for handball players and the percentage of improvement in favor of the dimensional measurement.

**Search terms:**

**Divergent training:** A training method in which the performance of the training group with weights with a high intensity is alternated immediately followed by the performance of the training group with plyometric exercises of various intensities, bearing in mind that the working muscle

groups and the kinetic path of performance are similar to the performance of the group of plyometric exercises with the group of training with weights (12: 125).

**Research plan and procedure:**

**Research Methodology :**

According to the nature of the research, in order to achieve its objectives and to test its hypotheses, the researcher used the experimental method by using the experimental design for one group in a pre and post measurement method.

**research community :**

The research community represents handball players in Al-Ahsa governorate for the 2021/2022 training season.

**The research sample :**

The researcher selected the research sample in a deliberate way from handball players in Hajar Club - Eastern Province - Al-Ahsa Governorate - Kingdom of Saudi Arabia, and the sample number was (12) players.

**The distribution of the research sample individuals is moderately distributed:**

The researcher made sure of the moderation of the distribution of the members of the research sample in light of the following variables: growth rates "age, height, weight" and variables of heart dimensions, muscular ability, and complex skills under study and table (1) illustrates this.

**Table (1)**  
**Arithmetic mean, median, standard deviation, and torsion coefficient of growth rates, heart dimensions, and muscular ability and complex skills variables under investigation for the research sample (n = 12)**

Variables		measruing unit	The research sample (n = 12)			
			Average	Mediator	standard deviation	skew modulus
Growth rates	Age	Year	15.08	15.5	0.51	-2.43
	Length	Poison	157.58	157.5	2.15	0.12
	weight	kg	53.00	52	1.91	1.57
Dimensions of the heart variables	LVV	Jim	62.94	63.53	1.28	-1.38
	RHR	n/s	75.33	74.5	1.15	2.17
	I V SD	millimeter	9.28	9.27	0.06	0.86
	LVEDD	millimeter	45.13	44.95	1.09	0.49
	LVPWT	Millimeter	7.39	7.42	0.10	-0.89
physical variables	Long jump from stability	poison	166.08	167	1.83	-1.50
	vertical jump	poison	54.5	55	1.78	-0.84
	3kg medicine ball push	poison	4.82	4.81	0.05	0.64
skill	Contrast offensive and defensive skills	Degree	24.83	24.89	0.28	-0.70

It is clear from Table (1) that the values of the torsion coefficient of the research sample in each of the growth rates, the variables of the dimensions of the heart, and the muscular ability and complex skills variables in question for the research sample were confined between (+3, -3), which indicates the moderation of the distribution of players in those variables.

#### **Data collection methods:**

First: Arab and foreign references: The researcher reviewed the specialized scientific references "Kamal al-Din Darwish and others"

(2019) (25), "Zaki Muhammad" (2004) (43), as well as previous studies related to the field of research, such as the study of "Muhammad Abd el-Mawgod" (2016)(29), "Abd el Rahman Rajab". (2016)(1), "Marwan Abdullah" (2012) (27), "Argus, Christos et al." (2012) (9), "Sundus Al-Shukili et al." (2011) (36), "Mohammed Al-Safi" (2009) (31), "Clark RA et al." (2006) (15), Smilios Ilias, et al. (2005) (22), Kasikcioglu E, et al. (2004) (26), Taha A Basyony (2004) (37), Ezzat Mahrous (2004) (19), Duthie, G.M.,et al." (2002) (16), "Triposkiadis, S et al." (2002) (39), "Vinereanu D, et al."

(2002)(40), "Muhammad Abdo, Sami Muhammad" (2002)(30) to benefit from them when conducting this research.

**Second: Scientific devices and tools:**

1. Restameter Pe 3000 for measuring height and weight.
2. Medical scale to measure body weight.
3. Weights of different weights.
4. Medical balls of different weights.
5. ECHO

The researcher calibrated the results of these devices by comparing their results with the results of other devices of the same type and in the same conditions. The comparison gave the same result, which indicates the validity and reliability of the results of the devices and their validity for use.

**Third: The tests under consideration:**

**1. Variables of the dimensions of the heart Annex (1):**

-Left ventricular Volume - Interventriular Septal thickness at end-diastole mm- LV end-diastolic dimension. Mm- Posterior wall thickness at end-diastole. Mm- Rest Heart Rate .

**2. The physical tests under discussion, annex (2):**

- Wide jump test of stability (muscular endurance)

Vertical jump test of stability (muscular endurance)

Pushing a medicine ball (3 kg) (muscular power)

3- The skill tests under discussion are attached (3):

Test your offensive and defensive skills

**Fourth: The scientific coefficients of the tests of the dimensions of the heart and the physical and skill variables under study:**

**honesty:**

The validity of the tests in question was calculated by the validity of the peripheral comparison on the exploratory research sample numbering (10) players from the same research community and outside the original sample. And the lowest quadrants represent the low-level group in those tests and their number is (5) players, and the significance of the differences between the two groups was calculated in the physical and skill tests under discussion as shown in Table (2).

**Table (2)**  
**Significance of differences between the averages of the highest and lowest quartiles in the tests under study n = 10**

exams	measruing unit	Highest Quarters		Bottom Quarters		Calculated t value	Statistical significance	
		Average	standard deviation	Average	standard deviation			
Dimensions of the heart variables	LVV	Jim	64.10	0.42	62.63	0.38	7,74	function
	RHR	n/s	76.40	0.89	74.80	0.45	4.85	function
	I V SD	millimeter	9.33	0.02	9.26	0.05	3.50	function
	LVEDD	millimeter	45.97	0.95	44.85	0.59	3.03	function
	LVPWT	millimeter	7.48	0.04	7.35	0.06	6.50	function

**Follow Table (2)**  
**Significance of differences between the averages of the highest and lowest quartiles in the tests under study n = 10**

exams	measuring unit	Highest Quarters		Bottom Quarters		Calculated t value	Statistical significance	
		Average	standard deviation	Average	standard deviation			
muscular ability	Long jump from stability	poison	167.40	1.82	165.60	0.89	2.69	function
	vertical jump	poison	55.80	0.84	54.40	0.55	4.24	function
	3kg medicine ball push	poison	4.86	0.01	4.80	0.03	6.00	function
skill	Contrast offensive and defensive skills	Degree	24.63	0.35	24.95	0.06	2.75	function

Tabular value (T) at a degree of freedom (8) and significance level (0.05) = 2,306

It is clear from Table (2) that there are statistically significant differences between the group with the highest quartiles, which represents the players with a high level in the tests under discussion, and between the group with the lowest quartiles, which represents the players with a low level in the tests under discussion and in favor of the group with the highest quartiles, which indicates that The validity of these tests and their ability to distinguish between groups.

**persistence:**

The researcher applied the tests of cardiac dimensions variables on 3,

4/7/2021 and re-applied them on 5, 6/7/2021, and the physical and skill tests in question on 8/7/2021 and re-applied them on 10/7/2021 with an interval of 3 days on an exploratory sample. It consists of (10) players from the research community and from outside the basic research sample and under the same conditions and circumstances, and finding correlation coefficients between the results of the first application and the second application to find the stability of these tests, as shown in Table (3).

**Table (3)**  
**The correlation coefficient between the first and second applications of the tests Physical and skill in question n = 10**

exams	measuring unit	The first application		The second application		correlation coefficient	Statistical significance	
		Average	standard deviation	Average	standard deviation			
Dimensions of the heart variables	LVV	Jim	63.37	0,86	63.37	0,86	1,00	function
	RHR	n/s	75.60	1.07	75.80	1,14	0.93	function
	I V SD	millimeter	9.30	0.05	9.30	0.06	0.98	function

**Follow Table (3)**  
**The correlation coefficient between the first and second applications of the tests**  
**Physical and skill in question n = 10**

exams	measuring unit	The first application		The second application		correlation coefficient	Statistical significance	
		Average	standard deviation	Average	standard deviation			
	LVEDD	millimeter	45.41	0.95	45.41	0.93	1.00	function
	LVPWT	millimeter	7.42	0.08	7.42	0.08	0.99	function
muscular ability	Long jump from stability	Poison	166.50	1.65	167.40	2.37	0.91	function
	vertical jump	Poison	55.10	0.99	55.40	1.26	0.85	function
	3kg medicine ball push	poison	4.83	0.04	4.85	0.06	0.88	function
skill	Contrast offensive and defensive skills	Degree	24.79	0.29	24.77	0.12	0.88	function

Tabular value (R) at a degree of freedom (8) and a level of significance (0.05) = 0.632

It is clear from Table (3) that the correlation coefficients between the first and second applications of the physical and skill tests in question were limited to (0.85: 1.00), which are statistically significant correlation coefficients, which indicates the stability of these tests.

#### **Fifth: The Training Program: Attachment (4)**

##### **Program foundations:**

- Measuring the level of physical performance of the physical abilities related to the level of skill performance.

- Taking into account the correct relationship between the variables of the load (intensity - intensity - volume).

Defining the objectives and duties of the training units.

- Taking into account the gradation of the intensity of the loads and alternating between the height and the

decrease in proportion to the principle of gradation with the intensity of the training loads.

Taking into account the change and diversity in plyometric and weight training exercises.

Directing exercises according to the individual entrance to the player's physical characteristics and features.

Adoption of program planning and rationing of loads on the limits and functional capabilities of each player.

- Use weight training according to the percentages extracted from the maximum level for each player.

##### **Determining the time distribution of the training program:**

The implementation of the training program took (12) weeks.

Determining the number of training units for the training program:

The number of training units per week was (3) units, the time of each of them ranged from (90-120) minutes, and the

total number of training units reached 36 training units.

**Determine the training load formation system:**

The undulating method was used in the formation of the training load during the preparation period, using the formation (1:2) during the pregnancy cycle over a period of (12) weeks (the period of implementation of the training program).

**Distribution of pregnancy degrees for the training weeks:**

The load degrees were distributed over the training weeks during the training program stages, with the average load being between (50-74%), the high load between (75-89%), and the maximum load being between (90-100%) of the player's ability limits.

**Sixth: The survey:**

This study was carried out in the period from 3/7/2021 until 10/7/2021, with the aim of discovering the difficulties that the researcher may encounter during the application and working on solving them before starting the basic experiment, as well as ensuring the aspects of implementing and applying the exercises in terms of appropriate training time and number. The repetitions for each training, where the first three units were tested on the exploratory research sample, and the results of the study indicated:

1. The researcher made sure that the research sample members understood how to perform the various exercises.
2. The validity of the devices and tools and the place used to carry out these exercises.

3. Understand and assimilate the helping hands to their duties and tasks.

4. Finding scientific coefficients for the tests under discussion (honesty - reliability).

**Steps to carry out the search:**

**Tribal measurements:** The researcher made a tribal measurement of the research sample for the variables of the dimensions of the heart using the Echo device (ECHO), in the Radiology Department of the Health Center at King Faisal University, Saudi Arabia, from 12/7/2021 to 13/7/2021, and the measurement was made for the variables Physical and skill 15/7/2021, and the researcher took into account the application of the tests for all individuals in a unified manner.

Implementation of the training program: The proposed training program was implemented for a period of (12) twelve weeks, starting from 7/18, 2021 and ending on 7/10/2021, with three training units per week on days (Sunday, Tuesday, Thursday) at (36) units for the members of the research sample, which implement the training program, Annex (4).

**When applying the different exercises, the researcher relied on the following:**

- Stabilizing the intensity of weight training throughout the program period by 75%, and the variation of the intensity used in plyometric exercises between medium, high and maximum.
- Mixing plyometric exercises and weight training for the upper and lower extremities, where a group of weight training exercises for the lower limb was performed with a group of plyometric exercises for the lower limb

and also for the upper limb, bearing in mind that the muscle groups are similar in training and the kinetic path of the exercises performed, and that the start should always be with weight training.

- At the end of the training unit, a set of stretching exercises is given with the aim of returning the muscles to a normal state.

**Post-measurements:** The researcher made a dimensional measurement of the variables of the dimensions of the heart in the period from 10/10/2021 to 10/11/2021, and measured the physical and skill variables on 10/13/2021 in the same method that was followed in the

tribal measurement and under the same conditions and conditions.

**Statistical treatments used in the research:** The researcher prepared, tabulated and analyzed the data statistically with the extraction and interpretation of results, and using statistical methods the arithmetic mean, median, standard deviation, skew coefficient, correlation coefficient, t-test, percentage of improvement (change), at the level of significance (0,05) .

**Presentation and discussion of results.**

**Table No. (4)**  
**The significance of the differences between the mean of the two measurements before and after the research sample in the variables under investigation (n = 12)**

exams	measuring unit	pre-measurement		post-measurement		Mean Differences	Standard Deviation of Differences	Calculated T-Value	Percentage Change %	
		Average	standard deviation	Average	standard deviation					
Dimensions of the heart variables	LVV	Jim	62.64	1.28	67.22	1.38	-4.28	35.90	8.21	7%
	RHR	n/s	75.33	1.15	72.67	0.78	2.67	13.78	8.26	4%
	IV SD	millimeter	9.28	0.06	9.83	0.03	-0.055	0.02	4.47	6%
	LVEDD	millimeter	45.13	1.09	48.27	0.79	-1.14	21.51	2.82	7%
	LVPWT	millimeter	7.39	0.10	8.41	0.08	-1.02	0.06	47.84	14%
muscular ability	Long jump from stability	poison	166.08	1.83	186.75	2.60	-20.67	69.44	28.50	12%
	vertical jump	poison	54.50	1.78	67.58	0.79	-13.08	27.74	28.53	24%
	3kg medicine ball push	poison	4.82	0.05	5.96	0.14	-0.87	0.07	37.78	18%
skill	Contrast offensive and defensive skills	Degree	24.83	0.28	20.47	0.43	4.36	4.06	24.86	18%

Tabular value (T) at a degree of freedom (11) and a level of significance (0.05) = 1.796

It is clear from the results of Table (4) that there are statistically significant differences between the mean of the tribal and remote measurements of the research sample in the variables of the dimensions of

the heart, muscular ability and the complex skills under research, as the calculated "t" value is greater than the tabular "t" value at the level of significance (0.05). .

The researcher attributes the improvement in the variables of the dimensions of the heart, muscular ability, and complex skills to the good and organized planning of the Contrast training program, as well as the legalization of training loads in a scientific manner appropriate to the age group of the research sample, as well as to the use of plyometric exercises as an essential part of the various exercises in order to develop the muscular ability of the players.

The researcher attributed the improvement in the variables of the dimensions of the heart as a result of the differential training, which caused the cardiac adaptation in the players, in addition to the improvement of the heart functions resulting from a change in the morphology of the heart muscle, as the left ventricle enlarged, and the use of the contrast training for a period of twelve weeks contributed to the improvement of the functions and variables of the dimensions of the heart. .

This is consistent with the study of "Ahmed Al-Ahl" (2019) (4) in that the Contrast training contributes to the improvement of the variables of the dimensions of the heart.

In this regard, "Ali Jalal" (2004) (6) indicates that one of the clearest characteristics of cardiac activity is the characteristic of the ventricle's response to an increase in its blood content. The heart, resulting in an increase in the intensity of its contraction, increases in the size of the heart and expands its chambers as a result of endurance exercises.

According to "Blair, et, al" (1996)(11) that the use of strength training would contribute to a normal adaptation of the heart muscle, especially increasing the capacity of the left ventricle, and thus increasing the amount of oxidized blood paid to the arteries to meet the requirements of physical work, resulting in a decrease Heart rate at rest.

The researcher attributes the improvement in the physical and skill variables to the use of Contrast training that was carried out in a scientific manner, good planning and rationing of training loads and suitable for the age group, which resulted in an improvement in the physical level that in turn was reflected in the skill performance, and the improvement in the complex offensive skills is due to the Contrast training program that It included many weight training and plyometric exercises, where the researcher relied when developing these exercises that these exercises are similar to the muscular work of the offensive skills of the Turkish handball, and these exercises also contributed to the development of muscle groups for the performance of handball skills.

This agrees with the results of the study of "Marwan Abdullah" (2013) (28), "Argus et al." (2012) (9), "G. Rajamohan et al." (2010) (20), "Walker et al." (2010) (33), "Muhammad al-Safi" (2009) (31), "Clark et al. " (2006) (15), "Smilios et all" (2005) (22), whose results were unanimous on the positive effect of Contrast training on physical elements and skill aspects.

This is consistent with the findings of "Ahmed Farouk" (2007) that the use of exercises that are close to the nature of the performance of game skills in terms of biomechanics and the shape and direction of muscle work through Contrast training works to develop different skills of the game such as passing and shooting (3: 19).

This is what was indicated by "Kamal Abdel Hamid, Sobhi Hassanein" (2002) that success in performing any skill requires the development of physical components that contribute to its performance in an ideal manner, and that each skill contributes to its performance according to its nature more than a physical component (24: 76).

This is in agreement with the study of Ahmed Farouk (2007)(3), Clark .R et al. (2006)(15), Jeramiah (2006)(23), and Fletcher & Hartwell (2004)(21), which all agreed on the positive effects. For different training at the skill level in different games.

The researcher believes that observing the foundations and rules of training in terms of specificity of training using exercises similar to skill performance, taking into account the motor path of performance, contributes significantly to the development of special physical abilities and improving the level of skill performance of handball players.

Through this, the hypothesis that states "there are statistically significant differences between the tribal and remote measurements of the research sample in the variables of the dimensions of the heart, muscular ability and the complex skills under study for handball players and the

percentage of improvement in favor of the dimensional measurement" is achieved.

#### **Conclusions:**

1- The effect of Contrast training program positively on the variables of the dimensions of the heart and the physical and skill variables of handball players.

2- There is an improvement in the variables of the dimensions of the heart in order as follows (left ventricle volume by 7% - pulse rate by 4% - septal wall thickness 6% - diameter of the diastolic end 7% - thickness of the posterior wall by 14%).

3- There is an improvement in muscular ability tests as follows (wide jump from stability by 12% - vertical jump by 24% - medicine ball thrust by 18%).

4- There is an improvement in the skill variables (Contrast offensive and defensive skills) with an improvement rate of 18%.

#### **Recommendations:**

In light of the research results, the researcher recommends the following:

1- The use of Contrast training for handball players because of its importance in improving the dimensions of the heart and developing the muscular ability and skill level of handball players.

2- The necessity of using the proposed program for the Contrast I training of sports teams in different games.

3- Conducting comparative studies between Contrast training and other training methods.

4- The use of contrast training as an effective method for handball players to develop muscular ability, skill

variables and heart dimension variables.

5- Interest in using this training method for various activities, especially those that depend on muscular ability, heart dimension variables, and skill variables, as it was proven from the results of this study that differentiated training improves those variables.

6- Handball coaches can rely on differentiated training in developing offensive and defensive skills, which helps to prepare in an integrated manner and allows time for the rest of the technical preparation elements.

7- Conducting similar studies on samples that differ in age, gender and exercised activity to benefit from their results.

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