The effect of suggested program for circuit weight training on the level of some physical, physiological and skills variables for Table Tennis players

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Abstract:

The aim of this research is to Designing training program thru circuit weight training and observe the effect of this suggested program on the level of some physical, physiological and skills variables for Table Tennis players, the researcher used the experimental method for the experimental one group.

The research sample was been selected from players of Alseeb sporting club in Oman. The sample of the research was (10) players, the researcher applied physiological, physical and skills abilities tests after that he applied the training program thru circuit weight training over a period of (12) weeks, then he performed measurements on physical , physiological and skills abilities test .

The results revealed that there were statistical differences between the Pre-measurement, Tracer- measurement and the post-measurement regards physiological variables, physical abilities and skills variables the researcher recommended to use the circuit weight training over preparation period.

Key words:

circuit weight training, Physical abilities, physiological variables, skills, table tennis.

Introduction:

Table Tennis is among the sports which were clearly positively affected by the progress in different sports sciences and by the advances in methods of preparation of the players. All of these has helped to raise the standard of the players physically and in skills and planning and helped them to reach the highest level for competition. (3 : 20)

Nowadays Table Tennis games are much more competitive and tough and so the training in the field, solely, is not enough, and this showed very clear in many international table tennis competitions. (4: 20)

Thus, it became essential not to be satisfied with having skill training, only, of different skills of Table Tennis. The

complex nature of table tennis with its physical, skills, planning, and intellectual demands would necessitate variable and comprehensive skills and capabilities in order to reach a high level of performance in the field.(6: 20)

As we know progress of science has become the distinctive feature of the era, for its contribution in finding many scientific solutions for many problems in all fields of life in general, and the field of physical fitness in particular. Consequently, the means of training developed, and adopted the principle of integration between the difference science and knowledge that aim at bringing the player to the level that enables him to achieve the highest sports achievements in the field of his specializations within his technical capacities. (11 : 88)

The training process aims at bringing the individual to the highest sports performances. To achieve the required sports performance, we shall know the starting point and end to set the training programs suitable for the condition of the sports person and to know to what extent has the sports level of the individual reached (12:25).

With the scientific progress, that circuit weight training was found to be one of the best methods of training in terms of affecting in increased or to develop an element of physical fitness in accordance with the type and conditions of performance and the specialized activity (8:35).

Some notes attracted the attention of the researcher through its readings and navigation in the National Information Network and attending many table tennis training sessions and meeting many table tennis coaches. These notes became the backbone for this study. In brief, they are:

1.The trainers do not focus enough on weight training.

2.There is a great lack of physical training programs especially weight training programs and There are whole sports teams who never practiced a weight training program during their whole sports life. (7: 35)

3.There is no codification of training loads in weight training; It is jurisprudential especially when it comes to training of basketball players. This, indirectly, affects the

training process and the programs which in turn lead to poor technical level of the players and failure to achieve the desired results.

4.Weight training is one of the essential components to succeed in preparing table tennis players. Every player should keep a condensed daily schedule for weight training in addition to the skills training.

According to what was mentioned, and in the light of the importance of controlling and well preparing the training programs and to direct them well because they have a direct influence on the level of skill performance in table tennis, and because the researcher believes that the domain of preparing table tennis players still needs many more comprehensive studies, he tried to find out "The effects of a suggested program for circuit weight training on some physiological and physical variables in table tennis players".

Aims of the research:

To design a proposed program for circuit weight training for table tennis players, in an attempt to find out:

1.The effect of the proposed program on the level of some physical variables under study.

2.The effect of the proposed program on the level of some physiological variables under study.

3. The effect of the proposed program on the level of some skills variables under study.

Terminology of study:

circuit weight training is a method or system that has its theoretical and scientific origins, conditions, and fields as well . (9: 24)

Methodology:

The researcher used the empirical approach because it is suitable for the nature of this study where it relied on the experimental design of the measurements (Pre-, tracer, and Post-) of one experimental group.

Sample:

The research sample was been selected from players of Alseeb sporting club in Oman. The sample of the research was (١٥) players, (١٠) players were selected to conduct exploratory studies, and (10) players for basic study, the researcher applied physiological, physical and skills abilities tests after that he applied the training program thru circuit weight training over a period of (12) weeks, then he performed measurements on physiological, physical and skills abilities test.

Table (1)

Statistical characterization of the sample in the variables (Length, weight, Age and Training age) (N=15)(5 exploratory studies & 10 basic study)

Variables	Measuring Unit	Mean	Median	St. Deviation	Skewness
Age	Year	24.6	24	2.098	0.615
Length	CM	175.1	175	4.207	-0.307
Weight	KG	75.1	75	4.301	0.725
Training Age	year	9.5	9	1.457	0.316

Table (1) Shows the modality of the distribution of the sample in the variables (Length, weight, Age and Training Age) where the torsion coefficients are limited to (±3).

Table (2)

Statistical characterization of the sample in the variables (Muscular power, Performance Endurance, pulse, Vital capacity, Counter Drive and the Loop) (N=15) (5 exploratory studies & 10 basic study)

Variables	Unit	Mean	Median	St. Deviation	Skewness
Muscular power	Meter	19.5	19	1.060	0.100
Performance Endurance	Second	50.4	50	1.352	0.454
Heart rate During Rest	Pulse/M	79.2	80	2.411	-0.951
Vital capacity	Liter	٢.٨	٣	٠.٨٦٥	٠.٩٦٢
Forehand counter drive	Rept.	٧.٦	٨	١.٤٠٤	٠.٧٧٢-
Backhand counter drive	Rept.	٦.٩	٧	١.٥٣٤	٠.١٤٦-
Forehand Loop	Rept.	٤.٩	٥	٠.٥٩٣	٠.٠٠٤-
Backhand Loop	Rept.	٤.٥	٤	١.١٢٥	٠.٤٢٥-

Table (٢) Shows the modality of the distribution of the sample in the variables (Muscular power, Performance Endurance, pulse, Vital capacity, Counter Drive and the Loop) where the torsion coefficients are limited to (±3).

The proposed program for circular weight training:

According to the set goals of the program with its 3

stages and the degrees of training loads, the schedule was set for 12 weeks, at the rate of 3 units of circular weight training every week. Thus, the proposed program included 36 units. The duration of each ranged from 90 – 120 minutes. Then, the researcher applied the proposed circular weight training on the sample during the sport season 2017 / 2018 starting from Sunday 8 / 10 / 2017 to Thursday 28 / 12 / 2017. The program was applied under the supervision of the researcher and his assistants.

Legalize the intensity of the training load

Using (Karvonen) method of heart rate in training as follows:

The maximum heart rate HR max = 220 – age= beat / min. (2:39)

And the researcher using **polar watch** to rate the loads.

Methods of data collection:

Reference survey:

The researcher conducted a survey of studies and scientific references in table tennis, sports training science and the science of sports physiology that was available to the researcher in order to identify the global and professional variables in operation of the research, as well as identify options in measuring these variables, as well as visited a survey of scientific references specialized in the sport of table tennis, defines basic skills in the sport of table tennis.

The tools used in the research:

Polar watch to regulate the training load in terms of the pulse - the thermometer to measure the length "in centimeters" - the device for the thrower of the table tennis balls- a medical scale to measure the weight "in kilograms"- table tennis- table tennis balls- cones- medical balls 1.5 kilograms weight- chalk- stopwatch- meter distance tape measure - long ropes- hammer- tires of different weights- medical balls of different weights- kettlebell– Rubber band- different weights- training mattresses.

Physical, physiological and skills tests used in the study:

-Throwing a medical ball weighing 1.5 kg ... to measure muscular power (modified by the researcher) .

-Table test ... to measure performance endurance. (Edited by the researcher)

-Polar watch ... to measure the Heart rate pulse.

-Dry spirometer test ... to measure vital capacity.
- Forehand counter drive test ... to measure Forehand counter drive.
- Backhand counter drive test ... to measure Backhand counter drive.
- Forehand Loop test ... to measure Forehand Loop drive.
- Backhand Loop test ... to measure Backhand Loop drive.

Scientific Transactions for Tests:

Validated Tests:

The validity of the tests was calculated by calculating the validity of differentiation by applying them to two groups of (5) players each. The first group represents Al-Seeb Sports Club players from the same research community and outside the research sample, and the participants in the League Table Tennis (Distinguished Group), while the second group represents the junior and non-performance category. Al-Seeb Club players in the Table Tennis Championship (the undifferentiated group) on Sunday 1/10/2017, and the following table shows the significance of the differences between the two groups in the all tests.

Table (3)

The significance of the differences between the two distinct and non-distinguishing groups in physical, physiological and skill tests (N1=N2=5)

Variables	unit	Distinct G.		non-distinguishing		Average Difference	T.Test
		Mean	S.DEV	Mean	S.DEV		
Muscular power	Meter	٢٠	١.٢٢٥	١٥	٠.٤٤٧	٥.٢	*٧.٨٣٩
Performance Endurance	Second	٥١.٢	١.٣٠٤	٤٤.٢	١.٣٠٨	٧	*٩.٨٩٩
Heart rate During Rest	P/M	٧٨.٤	٢.٠٧٤	٨٥.٦	١.٥١٧	٧.٢	*٦.٢٢٠-
Vital capacity	Liter	٤.١	٠.٨٩٤	٢.٤	٠.٥٤٨	١.٧	*٣.٤٧٠
Forehand counter drive	Rept.	٨.٤	٠.٥٤٨	٥.٦	٠.٥٤٨	٢.٨	*١٤.٠٠
Backhand counter drive	Rept.	٦.٢	٠.٤٤٧	٣.٢	٠.٨٣٧	٣.٠	*٦.٧٠٨
Forehand Loop	Rept.	٦.٢	٠.٨٣٧	٢.٠	٠.٧٠٧	٤.٢	*٢١.٠٠
Backhand Loop	Rept.	٤.٢	١.٠٩٥	١.٨	٠.٨٣٧	٢.٤	*٣.٥٣٩

"T" tabulated value at (0.05) = 2.306

Table (٣) showing there is statistically significant differences between the (**Distinct group**/ **non-distinguishing group**) groups in the variables under study, which shows deference between the two groups in these variables since the calculated "T" value is more than the tabulated "T" value. So that the tests can be used.

Stability for Tests:

To find the stability of tests, the researcher applied the test and repeat it with time interval of six days, and the researcher used Pearson's simple correlation coefficient to find the correlation coefficient between the results of the first and second apply.

Table (4)

Correlation coefficient between the results of the first and second apply of the tests under research N= (5)

Variables	unit	First Apply		Second Apply		R Value
		Mean	S.DEV	Mean	S.DEV	
Muscular power	Meter	٢٠	١.٢٢٥	٢٠.٤	٠.٨٩٤	*٠.٩١٣
Performance Endurance	Second	٥١.٢	١.٣٠٤	٥٠.٨	١.٠٩٥	*٠.٩١٠
Heart rate During Rest	P/M	٧٨.٤	٢.٠٧٤	٨٠.٠	٠.٧٠٧	*٠.٨٥٢
Vital capacity	Liter	٤.١	٠.٨٩٤	٤.٢	١.٠٩٥	*٠.٨٦٨
Forehand counter drive	Rept.	٨.٤	٠.٥٤٨	٨.٨٠	٠.٨٣٧	*٠.٧٦٤
Backhand counter drive	Rept.	٦.٢	٠.٤٤٧	٥.٦٠	٠.٨٩٤	*٠.٨٧٥
Forehand Loop	Rept.	٦.٢	٠.٨٣٧	٦.٤٠	٠.٨٩٤	*٠.٨٦٩
Backhand Loop	Rept.	٤.٢	١.٠٩٥	٤.٢	١.٣٠٤	*٠.٨٤٠

It is evident from Table (4) that the value of correlation coefficients between the first and second apply of physical , physiological and skills tests ranged between (0.764 - 0.913), and these values are statistically significant at a significance level (0.05), which indicates that they have high stability coefficients and the stability of the tests.

Statistical processing:

The researcher used the statistical program with the following statistical data: (Mean- Median- standard deviation- simple correlation coefficient Person – one-way analysis of variance **Anova** - LSD test).

The researcher took (0.05) to be statistically significant.

Results:

Table (5)
One-way Anova of the pre-, tracer, and post for sample measurements in the physical, physiological and skill variables under study N=10

Variables	Source of the contrast	Freedom Degree	Sum of squares	Mean squares	Anova Value
Muscular power	Between Groups	2	٢٠٧.٢	١٠٣.٦	*٩٧.١٢٥
	Within Groups	27	٢٨.٨	١.٠٦٧	
	Total	29	٢٣٦.٠		
Performance Endurance	Between Groups	2	١١٦.٨٦٧	٥٨.٤٣٣	*٥٥.١٦٤
	Within Groups	27	٢٨.٦٠٠	١.٠٥٩	
	Total	29	١٤٥.٤٦٧		
Heart rate During Rest	Between Groups	2	١٣١.٦٦٧	٦٥.٨٣٣	*٢٥.٦٤٩
	Within Groups	27	٦٩.٣٠٠	٢.٥٦٧	
	Total	29	٢٠٠.٩٦٧		
Vital capacity	Between Groups	2	١٦.٢٦٧	٨.١٣٣	*١٧.٧١٠
	Within Groups	27	١٢.٤٠٠	٠.٤٥٩	
	Total	29	٢٨.٦٦٧		
Forehand counter drive	Between Groups	2	٧٣.٨٦٧	٣٦.٩٣٣	*٦٢.٣٢٥
	Within Groups	27	١٦.٠٠٠	٠.٥٩٣	
	Total	29	٨٩.٨٦٧		
Backhand counter drive	Between Groups	2	٥٥.٢٦٧	٢٧.٦٣٣	*٥٧.٨٣٧
	Within Groups	27	١٢.٩٠٠	٠.٤٧٨	
	Total	29	٦٨.١٦٧		
Forehand Loop	Between Groups	2	٢١٤.٠٦٧	١٠٧.٠٣٣	*٩٩.٩٩٧
	Within Groups	27	٢٨.٩٠٠	١.٠٧٠	
	Total	29	٢٤٢.٩٦٧		
Backhand Loop	Between Groups	2	٢٦٢.٤٦٧	١٣١.٢٣٣	*٨١.٠٨٢
	Within Groups	27	٤٣.٧٠٠	١.١٦٩	
	Total	29	٣٠٦.١٦٧		

"F" tabulated value at (0.05) = 3.350

Table (5) shows that there are statistically significant differences at a level of significance (0.05) between the measurements of the pre, tracer, and post research sample in all the physical and physiological variables under study, and to clarify the significance of the differences

between these measurements ... The researcher will calculate the lowest significant difference using the LSD test.

Table (٦)

The significance of the differences between the averages of the measurements of the pre, Tracker and post for research sample in the physical, physiological and skills variables of the sample under study

Variables	Measures	Mean	Deference between Means			LSD Value
			M1	M2	M3	
Muscular power	Measure 1	18.4		*١.٦	*٦.٢	0.786
	Measure 2	20			*٤.٦	
	Measure 3	24.6				
Performance Endurance	Measure 1	٥٢.١		*١.٩	*٤.٨	0.783
	Measure 2	٥٠.٢			*٢.٩	
	Measure 3	٤٧.٣				
Heart rate During Rest	Measure 1	٨١.٨		*١.٥	*٥.٠	1.220
	Measure 2	٨٠.٣			*٣.٥	
	Measure 3	٧٦.٨				
Vital capacity	Measure 1	٢.٨		*٠.٨	*١.٨	0.516
	Measure 2	٣.٦			*١.٠	
	Measure 3	٤.٦				
Forehand counter drive	Measure 1	٧.٢		*١.٤	*٣.٨	0.586
	Measure 2	٨.٦			*٢.٤	
	Measure 3	١١				
Backhand counter drive	Measure 1	٥.٣		*١.٣	*٣.٣	0.527
	Measure 2	٦.٦			*٢.٠	
	Measure 3	٨.٦				
Forehand Loop	Measure 1	٥.٦		*١.٠	*٦.١	0.788
	Measure 2	٦.٦			*٥.١	
	Measure 3	١١.٧				
Backhand Loop	Measure 1	٣.٧		*٢.٣	*٧.١	0.823
	Measure 2	٦.٠			*٤.٨	
	Measure 3	١٠.٨				

Table (6) indicates that there are statistically significant differences at the level of significance (0.05) between the averages of the measurements of the pre, tracer and post research sample. In the physical, physiological and skills variables in favor of the

mean of the dimensional measurement.

Discussion:

It is evident from the results of Table (5) that there are statistically significant differences at the level of significance between the measurements of the pre, tracker and post research sample in the physical, physiological and skills variables, which are: (Muscular power, Performance Endurance , Heart rate During Rest , Vital capacity, Forehand counter drive, Backhand counter drive, Forehand Loop, Backhand Loop) of the sample in question.

To clarify the significance of the differences between these measurements, the researcher calculated the lowest meaning difference using the **LSD** test to determine the significance of the differences between these measurements, as Table (6) indicates that there are statistically significant differences at the level of significance (0.05) between the averages of the measurements of the pre, tracer and post research sample. In the physical, physiological and skills variables in favor of the mean of the dimensional measurement.

The researcher attributes these incident differences to the construction of the training program using circuit weight training that was applied during the special preparation period and the preparation for competitions on table tennis players for the sample under study under consideration based on our standard, which gives a positive indication of improvement in The level of physical, physiological and skills variables of the sample under study.

It is evident from Table (6) that showing there is statistically significant differences between the (pre, tracer and post) measurements for the post measurement .

This result is consistent with what the results of the study of Anttonne (2007) (1), Wilmore (1994) (15), Kerbs (2000) (10), Wolstenholm et al. (2004) (14), Mustafa Cannon (2005) (13) indicate that weight training programs lead to an increase and improvement in Physical and skill level in .

Through the above ... the researcher believes that the significance of the differences occurring between the averages

of the research sample measurements is the subject of the research sample to the proposed circular weight training program under consideration.

And which relied in its design on the scientific rules and foundations to develop and improve the level of muscle strength and the physiological and skill variables under study.

This result verifies the validity of what was stated in the hypothesis, which states that "there are statistically significant differences between the averages of the pre-, tracer- and post-measurements in the level of some physical, physiological and skill variables under study in favor of the post-measurement."

conclusions:

According to the goals and nature of this study, and within the sample of the research and the methodology applied therein, as per the data collected by the researcher and the results of statistical analysis, the researcher reached the following conclusions:

1- Training with circuit weight program is effective in the improvement of some physical variables for table tennis players.

2- Training with circuit weight program is effective in the improvement of some physiological variables for table tennis players.

3- Training with circuit weight program is effective in the improvement of some, skills variables for table tennis players.

Recommendations:

The recommendation that were based on the nature of the study, the sample, the method used and the results of statistical analysis ... the researcher was able to identify recommendations that benefit work in the field of training Table tennis players as follows:

1- Legalizing the training programs loads in light of the tribal and consecutive measurements, in order to ensure the possibility of a positive impact for these programs.

2- Paying attention to stretching and flexibility exercises (before, after) performing weight training exercises.

3- Paying attention to the technical performance "performance technique" for weight training, in order to avoid the occurrence of injuries and to make full use of the exercise performance.

4- We need to continue training with weights during the preparation period and during the competition period to ensure Performance continues to improve.

5- Directing the results of this study, the training program used, and the steps for its implementation to workers in the field of training table tennis players ... so that they can benefit from these results.

6- The necessity of conducting more research and studies on weight training on samples of different sex and age.

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