

## **The effect of using vibration training on some physical and skilful variables for students at faculty of physical education – Minia university**

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### **Abstract**

The research aims at recognizing the effect of using vibration training on some physical and skilful variables for students at faculty of physical education Minia university. The researcher used the experimental method .The research purposive sample consisted of (20) students divided into two groups of (10) students, one is an experimental group ,the other is a control group from second graders on university year 2013/2014 . The researcher applied the training program for (10) weeks as much as (3) training units weekly .The results showed that the suggested raining program has a positive effect on the level of performing physical and skilful variables under research and that differences between improvement percents were on behalf of the experimental group. The most important recommendations are interesting in vibration training as a basis for developing physical fitness in sport field in general and basketball in particular for it's effect on skilful performance . Also ,interesting in vibration training and related it with different body parts in the light of the nature and requirements of every specialized sport for it's effective impact on performance and conducting other researches to recognize the effect of vibration training by using Power Plate to rehabilitate sport injuries for athletes .

### **Introduction :**

Physical education is considered one of the most important life aspect in which relied in solving it's multiple problems on the scientific method . Basketball as considered one of the most important games in the field of

physical education has been developed and progressed due to following scientific methods in the field of training in order to raise it's different elements to reach the highest competition level . To achieve this , requires the right

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scientific planning to develop and raise the level of elements contributing in physical , skilful and tactical performance .

There is a relationship between the level of basketball athlete performance and his strength level since the increase of muscular power will improve the individual level of the athlete and consequently the team as a whole .

Amer Allah El Basaty (1998 ) considers that sport training aims at achieving a high level of achievement in specialized sport activity . This is done by raising the level of athlete training state and it comprises from (training state – skilful state – tactical state – cognitive state – mental state ) . Training state is a term expressing all athlete abilities and indicating the extent of aptitude and competency of body systems during training and competitions . Athlete training state depends on the degree of developing it's components . The more the level of these components increases, the more athlete level increases . ( 6:18 ) .

The level of training state has been developed and

maintained throughout training processes to prepare the athlete by using varying exercises of different directions by which it's type , form and characteristics is determined according to the different periods of training . Physical preparation is considered one of the most important elements of preparation or one part of general preparation directed towards developing fitness elements and raising the competency of functional body systems and organs . It's aim is generally restricted in acquiring particular and general physical and functional bases with the type of sport activity to construct high levels and achieve adaptation for competition requirements through Quantitative and Qualitative exercises that are appropriate with athlete level and his age stage as well as the type of activity . These exercises continue all over full sport season . (15:21,22) .

Methods of training muscular strength vary in which appear an effective effect in developing physical and skilful performance , particularly modern methods by which the researcher attempts to address , that is

using vibration exercises . Medhat Saleh (2004) adds that muscular power for legs muscles must be available to perform skills of basketball such as jumping as an independent element or when it relates with other technical skills where results of some researches indicated that the athlete performs between 100 to 130 jumps in the match , in addition to speed take off and side movements (4:23 ).

This quick progress in all life aspects , especially the type of quick life recently led to thinking in training methods . This accorded with what Falempin & In Albon ( 1999 ) indicated to the interest in vibration exercise as one of successful methods in improving muscular strength and balance for high levels athletes (13: 3-9) .

Bongiovanni et.al (1990) indicates that the start of using vibration training is due to Russians when they used an apparatus of vibration training in space vehicles because the smallness of these vehicles space , the willing to maintain muscular power and reduce muscular amyotrophy for astronomers who suffer from

inability to move in their vehicles for long periods. ( 23 )

Falempin & In Albon ( 1999 ) added that vibration training has an effective effect on both circulation and lymphocytic because vibration is a process of a contraction and diastole inside muscular fibers and consequently the process of Pump inside the muscle . Vibration exercise has a positive effect on the ends of the nerve centers and nerve tissues in muscles , joints and tendons .( 13:3-9 ) .

Both James et.al ( 1995 ) indicate that vibration exercise has an effective effect on muscular strength where muscular fibers contract and extend with high speeds increasing and decreasing muscular efficiency and has also an effective effect on increasing muscular strength . He emphasizes on preventing vibration training in cases of pregnancy , recent acute infections, diabetics, heart patients and Permanent headaches patients (15:46) .

Weineck (2002) states that the aim of training is increasing transverse syllable of the muscle, consequently increasing it's muscular strength (28:255).

Niewiadomski et.al (2005) (19) that vibration training can be a substitute for high intense resistance training to develop skeletal muscles strength (19: 320) .

Results of both Bosco et al (2000) (10) , Luo et al . (2005) (17) studies indicate that vibration training (power plate) sends excessive vibration to the body that catalyzes sensory receptors of muscular fibers to activate muscles and increase contraction to improve balance , power , muscular capacity and it's development leading to improve balance and power of extensor muscles (10: 449-454) (17:23-41) .

From previous mentioned, it is shown the importance of vibration training for developing balance and muscular strength for muscles . So, the researcher conducted this study to recognize the effect of vibration training in developing some physical and skilful variables under research for students at faculties of physical education **The Aim of the research :**

This research aims at recognizing the effect of using vibration training on

developing some physical and skilful variables under research for students at faculties of physical education .

**Hypotheses of the research :**

1- There are statistically significant differences between means of the pre – post measurements for the experimental group in physical and skilful variables under research and the percent of improvement was on behalf of post measurement for the research sample .

2- There are statistically significant differences between means of the pre – post measurements for the control group in physical and skilful variables under research and the percent of improvement on behalf of post measurement was for the research sample .

3- There are statistically significant differences between means of post measurements for experimental – control groups in physical and skilful variables under research and the percent of improvement was on behalf of post measurement for the experimental group .

**Terms used in the research :**

Vibration training (a method of neural muscular to increase

and improve balance and muscular strength )

Material and Methods :

Procedures of the research :

Method of the research :

The researcher used the experimental method for it's appropriateness of the research nature . One of the experimental designs was used for two groups , one is an experimental and the other is a control .

**Community and sample of the research :**

Community of the research was represented in students at faculty of physical education - Minia university .

The researcher selected the sample purposively from second graders of ( 20 ) students from total research community of ( 247 ) . They were divided into two groups of (10) students , the method of vibration training was followed with the experimental group and the conventional method was followed with the control group .

The researcher found conformity and equivalence between groups in development ratios ( age - height - weight ) , some physical variables and some skilful variables .

**Table (1)  
Arithmetic mean , median , standard deviation and skewness coefficient for variables under research for the experimental – control groups (n=20)**

Variables	Measurement unit	The experimental group (n=10)				The control group (n=10)				
		mean	median	Standard deviation	skewness	mean	median	Standard deviation	skewness	
development ratios	Age	Year	11.20	11.40	0.22	1.89	11.27	11.1	0.28	1.80
	Height	Cm	178.1	178.0	2.34	0.01	179.9	179	2.09	1.04
	Weight	Kg	70.70	71	2.79	0.22	70.40	70.0	2.80	0.97
Physical abilities	Power for arms	Kg	22.0	22.0	2.20	0.00	22.0	22.0	2.97	1.01
	Broad jump	Cm	191.0	190	7.76	0.08	191	190	8.31	0.37
	Power for legs	Gk	29.2	29	2.79	1.70	28.2	28	2.42	1.90
	Vertical jump	cm	27.1	27.0	3.42	0.70	26.4	26	2.37	0.97
	Throwing a medical ball of 3 kg.	M	2.99	2.79	0.17	1.87	2.61	2.79	0.41	0.02
	Throwing overhead	M	2.82	2.80	0.18	0.01	2.87	2.70	0.19	1.74

**Follow Table (1)**

**Arithmetic mean , median , standard deviation and skewness coefficient for variables under research for the experimental – control groups (n=20)**

Variables		Measurement unit	The experimental group (n=10)				The control group (n=10)			
development ratios			mean	median	Standard deviation	skewness	mean	median	Standard deviation	skewness
	Age	Year	18.20	18.40	0.32	1.89	18.27	18.1	0.28	1.80
	Height	Cm	178.1	178.0	2.34	0.01	179.9	179	2.09	1.04
	Weight	Kg	70.70	71	2.79	0.32	70.40	69.0	2.80	0.99
Skilful variables	Shoulders flexibility	Cm	74.9	73.0	3.42	1.23	74.9	72.0	3.82	1.88
	Sit and stretch	Cm	24.7	23.0	2.40	1.47	23.9	23.0	2.74	0.44
	Chess pass	Score	10.7	10.0	1.19	0.01	10.9	11	1.04	0.29
	Dribble and receive	Time/sec	17.9	19	1.04	3.16	18.2	19	1.20	1.92
	Underhand shot	numbers	7.0	7.0	0.92	0.00	7	0.0	0.77	1.94
	Free throw	numbers	2	3	1.00	0.00	2.00	2	1.06	1.10
	Feet movements	Time / sec	14.4	14.0	0.92	0.33	14.7	14.0	0.90	0.77

It is shown from table (1) the following :

Values of skewness coefficients of development ratios and variables under research for experimental – control groups are restricted between (+3:- 3) indicating distribution normality of the research sample in these variables .

**Table (2)**  
**Significance of statistical differences between experimental – control groups in variables under research ( n= 20)**

Variables	Measurement unit	Experimental group ( n= 10 )		Control group ( n=10 )		Value of calculated (t)	Significance level	
		mean	Standard deviation	mean	Standard deviation			
development ratios	Age	Year	18.20	0.32	18.27	0.28	0.14	Non significance
	Height	Cm	178.1	2.34	179.9	2.09	1.00	Non significance
	Weight	kg	70.70	2.79	70.40	2.80	0.23	Non significance
Physical abilities	Power for arms	kg	32.0	2.20	33.0	2.97	0.81	Non significance
	Broad jump	cm	191.0	7.76	191	8.31	0.13	Non significance
	Power for legs	kg	39.2	4.79	38.2	4.42	0.46	Non significance

**Follow Table (2)**

### Significance of statistical differences between experimental – control groups in variables under research ( n= 20)

Variables	Measurement unit	Experimental group ( n= 10 )		Control group ( n=10 )		Value of calculated (t)	Significance level	
		mean	Standard deviation	mean	Standard deviation			
Vertical jump	cm	٢٧,١	٣,٤٢	٢٦,٤	٤,٣٦	٠,٣٨	Non significance	
Throwing a medical ball of 3 kg.	M	٤,٨	٠,١٧	٤,٦	٠,٤١	١,٣٠	Non significance	
Throwing overhead	M	٤,٨٢	٠,١٨	٤,٨٦	٠,١٩	٠,٤٦	Non significance	
Shoulders flexibility	Cm	٧٤,٩	٣,٤٢	٧٤,٩	٣,٨٣	٠,٠٠	Non significance	
Sit and stretch	Cm	٢٤,٧	٢,٤٥	٢٣,٩	٢,٧٤	٠,٦٥	Non significance	
Skilful variables	Chess pass	score	١٠,٧	١,١٩	١٠,٩	١,٠٤	٠,٣٨	Non significance
	Dribble and receive	Time/sec	١٧,٩	١,٠٤	١٨,٢	١,٢٥	٠,٥٥	Non significance
	Underhand shot	numbers	٦,٥	٠,٩٢	٦	٠,٧٧	١,٥٥	Non significance
	Free throw	numbers	٢	١,٠٠	٢,٥٥	١,٥٦	٠,٦٥	Non significance
	Feet movements	Time/sec	١٤,٤	٠,٩٢	١٤,٧	٠,٩٠	٠,٧٠	Non significance

It is shown from table ( 2 ) the following

There are no statistically significant differences between the experimental – control groups in both development ratios and physical and skilful abilities under research indicating to their equivalence in these variables before the experiment .

Firstly : methods of collecting data

Including the following :

- Development ratios ( height – weight – age)
- Tests of physical abilities .

- Skilful tests .

Tests of physical and skilful abilities :

The researcher used a set of scientific references and previous studies in the field of basketball sport . Physical tests were determined (contain 3) and skilful tests (enclosure 4) Scientific coefficients for physical and skilful abilities :

Validity of physical abilities tests :

Discrimination validity was used to find tests validity by

applying it on two equal groups, one of (10) distinctive athletes in basketball sport and the second of (10)

indistinctive athletes on 15/11/2013 . Table (3) shows this .

**Table (3)**  
**Differences significance between practioners and non practioners in tests of physical and skilful abilities under research ( n=20 )**

Variables	Measurement unit	Practioners (n= 10)		Non practioners (n=10)		( t ) value	Statistical significance	
		mean	Standard deviation	mean	Standard deviation			
Physical abilities	Power for arms	Kg	31.70	1.800	22.30	2.10	10.09	significance
	Broad jump	Cm	191.30	4.71	100.10	21.12	0.02	significance
	Power for legs	Kg	38.20	4.42	21.80	1.78	10.32	significance
	Vertical jump	Cm	24.00	2.600	17.70	1.80	7.31	significance
	Throwing a medical ball of 3 kg.	M	4.24	0.008	2.22	0.24	10.01	significance
	Throwing overhead	M	4.34	0.370	2.00	0.22	17.09	significance
	Shoulders flexibility	Cm	70.10	4.071	40.10	4.76	11.36	significance
	Sit and stretch	Cm	22.70	2.492	16.00	1.36	7.00	significance
Skilful variables	Chess pass	Score	10.80	0.700	0.30	0.46	21.80	significance
	Dribble and receive	Time /sec	12.70	0.800	7.90	0.83	12.23	significance
	Underhand shot	Numbers	7.70	1.02	3.90	0.70	7.00	significance
	Free throw	Numbers	0.20	0.70	2.30	0.74	9.91	significance
	Feet movements	Time /sec	11.20	0.70	4.80	0.70	20.02	significance

Tabulated (t) value at freedom degree (18) in a significance level (0.05)= 2.101

It is shown from table (3) the following :There are statistically significant differences between practioners and non practioners in tests of physical and skilful abilities under research on

behalf for practioners indicating validity of these tests and it's ability to distinguish between groups . Reliability of physical and skilful abilities tests :



To find tests reliability , the researcher used the method of applying and re- applying tests on a sample of ( 10 ) students in the research community and outside the original sample . The first application on

18/11/2013 and re-application on 25/11/2013 was conducted and correlation coefficients between the first and the second applications were found in table (4)

**Table (4)**  
**Correlation coefficients between the first and the second application for tests of physical and skilful abilities ( n=10)**

Variables	Measurement unit	The first application		The second application		Correlation coefficient	Statistical significance	
		mean	Standard deviation	mean	Standard deviation			
Physical abilities	Power for arms	Kg	31.6.	1.80.	31.4.	1.28	0.96	significance
	Broad jump	Cm	191.3.	4.71	187.4.	5.39	0.92	significance
	Power for legs	Kg	38.2.	4.42	38.4.	3.88	0.94	significance
	Vertical jump	Cm	24.0.	2.600	23.0.	2.97	0.89	significance
	Throwing a medical ball of 3 kg.	M	4.24	0.008	4.36	0.04	0.90	significance
	Throwing overhead	M	4.34	0.370	4.01	0.4.	0.94	significance
	Shoulders flexibility	Cm	70.1.	4.071	69.0.	6.22	0.87	significance
	Sit and stretch	Cm	22.7.	2.492	21.8.	1.4.	0.89	significance
Skilful variables	Chess pass	Score	10.8.	0.60.	11.1.	0.04	0.92	significance
	Dribble and receive	Time /sec	12.6.	0.80.	12.4.	0.92	0.92	significance
	Underhand shot	Numbers	7.6.	1.02	7.7.	0.9.	0.94	significance
	Free throw	Numbers	2.2.	0.6.	2.0.	0.0.	0.94	significance
	Feet movements	Time /sec	11.2.	0.70	11.6.	0.66	0.86	significance

Tabulated (r) value at freedom degree (8) and significance level (0.05) = 0.632

It is shown from table (4) the following : Correlation coefficients between the first and the second application for tests of physical and skilful abilities (under research)

ranged between (0.86 : 0.96) and they are statistically significant correlation coefficients indicating reliability of these tests .

### **Pilot study :**

The researcher conducted the pilot study and it is considered the criterion for implementing the experiment of the basic research from 8/12/2013 to 10/12/2013 on (10) students inside the original community and outside the original sample to know the extent of students understanding for using vibration apparatus in purpose of :

- 1- Experimenting a single training unit for recognizing the extent of sample members understanding of skills and the potential of implementing them and it's appropriateness for application
- 2- Training assistants on applying tests used in the research .
- 3- Assuring used instruments and apparatus safety and suitability and forms of collecting data .
- 4- Determining used instruments and apparatus .  
Procedures of implementing the research :

### **1- Pre measurement :**

The pre- measurement was implemented on both the experimental – control research groups from 10/2/2014 to 18/2/2014

### **2- The basic experiment :**

After determining the research sample , it's variables , and ascertaining the scientific coefficients of tests , standardization the used apparatus, training assistants through the pilot study , the researcher conducted the basic study from (20/2/2014 to 10/5/2014). The training program lasted (10) weeks as much as (3 training units) every week . The numbers of the training units were (30 training units). The time of the training unit ranged between (30- 45 minutes) .

The training content of the program (enclosure 5) :

The training content of vibration training program included (80) trainings shown in enclosure (5) distributed on (30) training unit .

Time planning for implementing the program :

The period of implementation (10) weeks , units numbers (3 training units weekly on (Monday , Tuesday , Thursday) in total of (30 training units) where load contents were as follows :

Serial	Week	Set numbers	Capacity	Effect period	Intensity	Rest
1	First	3	2	30 sec	30 hz	30 sec
2	Second	3	2	30 sec	35 hz	30 sec
3	Third	4	3	30 sec	35 hz	30 sec
4	Fourth	3	3	45 sec	40 hz	30 sec
5	Fifth	4	3	45 sec	40 hz	30 sec
6	Sixth	3	3	45 sec	40 hz	30 sec
7	Seventh	4	4	45 sec	35 hz	30 sec
8	Eighth	4	4	60 sec	50 hz	30 sec
9	Ninth	4	4	60 sec	50 hz	30 sec
10	Tenth	4	4	60 sec	50 hz	30 sec

1- Post measurement :

Post measurement was conducted in physical and skilful tests for basketball sport skills ( under research ) from 10/5/2014 to 15/5/2014

4- statistical Analyses :

- Arithmetic mean
- Standard deviation
- ( t ) test
- Correlation coefficients
- Coefficient of easiness and distinction
- skeweness coefficients
- improvement rate .

Results:

Firstly : presenting the results : In the light of the research hypotheses , the researcher will review the obtained results according to the following order :

1- There are statistically significant differences

between means of both the pre-post measurements for the experimental group in physical and skilful variables ( under research ) and improvement percent on behalf of the post measurement for the research sample .

2- There are statistically significant differences between means of both the pre-post measurements for the control group in physical and skilful variables (under research) and improvement percent on behalf of the post measurement for the research sample .

3- There are statistically significant differences between means of two post measurements for the experimental – control groups in physical and skilful variables ( under research ) and

improvement percent on for the experimental group  
behalf of the post measurement

**Table (5)**  
**Differences significance between means of the pre- post**  
**measurements for the experimental group and improvement**  
**percent in variables under research ( n=10 )**

Variables	Measurement unit	Mean of pre measurement	Mean of post measurement	Square of standard deviation for differences	Mean differences	Value of (t)	Significance level	Improvement percent	
Physical variables	Power for arms	kg	٣٢,٥	٤٤,٣	١١٥,٦٠	١١,٨٠٠	١٠,٤١	significance	٣٦
	Broad jump	Cm	١٩١,٥	٢٠٢,٨	٧٩٢,١٠	١١,٣٠٠	٣,٨١	significance	٦
	Power for legs	kg	٣٩,٢	٥١,٧	٣٠٢,٥٠	١٢,٥٠٠	٦,٨٢	significance	٣٢
	Vertical jump	cm	٢٧,١	٣٤,٣	١٣,٦٠	٧,٢٠	١٨,٥٢	significance	١٩
	Throwing a medical ball of 3 kg.	m	٤,٧٩٨	٦,٣٦٣	٢,٠١	١,٥٧٠	١٠,٤٧	significance	٣٣
	Throwing overhead	m	٤,٨٢	٦,٨٦	٣,٨١	٢,٠٤٠	٩,٩١	significance	٤٢
	Shoulders flexibility	cm	٧٤,٩	٨٤,٥	٢٠٤,٤٠	٩,٦٠٠	٦,٣٧	significance	١٣
	Sit and stretch	cm	٢٤,٧	٣٢,٤	٩٨,١٠	٧,٧٠٠	٧,٣٨	significance	٣١
Skilful tests	Chess pass	score	١٠,٧	١٨,٣	٥٠,٤٠	٧,٦٠٠	١٠,١٦	significance	٧١
	Dribble and receive	Time /sec	١٧,٩	١٣,٧	٣٦,٦٠	٤,٢٠	٧,٠٦	significance	١٧
	Underhand shot	numbers	٦,٥	١١	١٨,٥٠	٤,٥	١٦,٩٥	significance	٨٥
	Free throw	numbers	٧	٦,٤٤	٢٧,٦٠	٤,٤٤	١٤,٨١	significance	٨٩
Feet movements	Time/sec	١٤,٤	١١,٣	١٢,٩٠	٣,١٠	٨,١٩	significance	٢٢	

Tabulated (t) value at freedom degree (9) and significance level (0.05) = 1.833

It is shown from table (5) the following: There are statistically significant differences between the pre – post measurements for the experimental group in some physical and skilful abilities and improvement percent on behalf of post measurement . The researcher attributes improvement in the results of physical and skilful tests under research for the experimental

group to the positive effect of vibration training program . This accords with what Kelderman (2001) (16), Sanaderm (2003) (25) ,Luo et al. (2005) (17) indicated that vibration training has a positive effect in improving balance and muscular strength and power . This depends on the training method through functioning intensity and volume in exercises and the

training program in order to assure greater improvement in balance and power of thigh muscles groups . Rubin et al. (2001) (24 ) , Torvinen et al. (2002) (26) stated that full body vibration is a method of neural and muscular training improving muscular strength , body balance and bones mechanical competency where these mechanical stimuli are transferred to the body where it stimulates sensory receptors .

This causes activation motoneurons . This accorded with results of Renaat , Matthieu (2005) (23) study that vibration training displayed improvement and increase in power of upper – lower extremes where maximum power increased with 8.1% to 16.1% for the experimental group after 10) weeks of training assuring the positive effect of vibration training .

**Table (6)**  
**Differences significance between means of the pre- post measurements for the control group and improvement percent in variables under research ( n=10)**

Variables	Measurement unit	Mean of pre measurement	Mean of post measurement	Square of standard deviation for differences	Mean differences	Value of (t )	Significance level	Improvement percent	
Physical variables	Power for arms	kg	32.0	44.3	110.60	11.80-	10.41	significance	36
	Broad jump	Cm	191.0	202.8	792.10	11.30-	3.81	significance	6
	Power for legs	kg	39.2	01.7	302.00	12.00-	6.82	significance	32
	Vertical jump	cm	27.1	34.3	13.60	7.20	18.02	significance	19
	Throwing a medical ball of 3 kg.	m	4.798	6.363	2.01	1.07-	10.47	significance	33
	Throwing overhead	m	4.82	6.86	3.81	2.04-	9.91	significance	42
	Shoulders flexibility	cm	74.9	84.0	20.440	9.60-	6.37	significance	13
	Sit and stretch	cm	24.7	32.4	98.10	7.70-	7.38	significance	31
Skillful tests	Chess pass	score	10.7	18.3	00.40	7.60-	10.16	significance	71
	Dribble and receive	Time /sec	17.9	13.7	31.60	4.20	7.06	significance	17
	Underhand shot	numbers	6.0	11	18.00	4.0	16.90	significance	80
	Free throw	numbers	2	6.44	27.60	4.44	14.81	significance	89
	Feet movements	Time/sec	14.4	11.3	12.90	3.10	8.19	significance	22

Tabulated (t) value at freedom degree ( 9 ) and significance level ( 0.05 ) = 1.833

It is shown from table (6) the following : There are statistically significant differences between means of the pre – post measurements for the control group in some physical and skilful abilities and improvement percent on behalf of post measurement . The researcher attributes this progress in physical and skilful variables (under research) to control group members attendance in study , as well as implementing their training program involving

drills used in learning and training skills .

The researcher attributes also this progress to control group members competency since attendance and continuity in practice , in addition to continuous competition between athletes to offer the best physical and skilful performance has a great influence in raising the level of physical abilities in which it's effect was reflected in developing skilful aspects .

**Table (7)**  
**Differences significance between means of two post measurements for the experimental and control groups and improvement percent in variables under research**

Variables	Measurement unit	Experimental group		Control group		( t ) value	Statistical significance	Differences in improvement percent %	
		mean	Standard deviation	mean	Standard deviation				
Physical variables	Power for arms	Kg	٤٤,٣	٢,٩٣	٤٠,٦	٤,٠٠	٢,٦٩	significance	19
	Broad jump	Cm	٢٠٢,٨	٣,٩٤	١٩٥,٥	٧,٥٧	٣,٠٨	significance	4
	Power for legs	Kg	٥١,٧	٢,٣٧	٤٧,٦	٣,٢٩	٣,٦٥	significance	7
	Vertical jump	Cm	٣٤,٣	٣,٨٠	٢٨,٨	٤,٦٩	٣,٢٩	significance	10
	Throwing a medical ball of 3 kg.	M	٦,٣٦	٠,٤٣	٥,٣٦	٠,٥٠	٥,٤٧	significance	17
	Throwing overhead	M	٦,٨٦	٠,٥٣	٥,٤٦	٠,٥٩	٦,٣٦	significance	30
	Shoulders flexibility	Cm	٨٤,٥	٢,٧٣	٧٩,٤	٣,٦٧	٤,٠٢	significance	7
	Sit and stretch	Cm	٣٢,٤	٢,٥٠	٢٧,١	٢,٨٤	٥,٠٥	significance	18
Skilful tests	Chess pass	Score	١٨,٣	١,٩٥	١٦,٨	١,٤٠	٢,٢٥	significance	17
	Dribble and receive	Time /sec	١٣,٧	١,٤٢	١٥,٦	١,٩٦	٢,٨٣	significance	3
	Underhand shot	Numbers	١١	١,٤١	٨,٦	٠,٩٢	١١,٨٥	significance	٤٢
	Free throw	Numbers	٦,٤٤	١,٦٠	٤,٥٦	٢,٢٠	٣,٤٥	significance	٤٥
Feet movements	Time /sec	١١,٣	٠,٩٠	١٢,٦	٠,٨٠	٣,٨٩	significance	8	

Tabulated ( t ) value at freedom degree ( 18 ) and significance level ( 0.05 ) = 2.101

It is shown from table (7) the following : There are statistically significant differences between means of two post measurements for the experimental and control groups in some physical and skilful abilities and improvement percent on behalf of the experimental group.

The researcher attributes increase of improvement percent for the experimental group than the control group to the effect of vibration training program . This accords with what Bosco et.al (2000) , Luo et .al (2005) (17) indicate that vibration training on power plate sends excessive vibration of the body and muscles to catalyze receptors for activating a great number of muscular fibers and increasing muscular contraction for developing balance and muscular strength . Michiles N. Mahieu (2009) (14) stated that whole body vibration constitutes an interesting integrated form of training inside the range of training on strength , as well as Paradisis , Elias Zacharogiannis Giorogos study (2007) (14) that running speed for the experimental group improved at a distance

0-10 m in a significance way with 4.9% and improved at a distance 50-60 m in a significance way with 2.2% after 6 weeks of training and improvement in explosive power better than the control group .

Conclusions :

In the limits of the research problem and it's importance and in the light of it's goals , hypotheses and the sample nature and in the frame of statistical treatment , interpreting and discussing the results , the researcher found the following conclusions :

1- There is a perceived improvement in physical and skilful variables under research for the experimental group where percents ranged between (6%: 42%) and improvement in skilful variables under research where percents ranged between ( 17% : 89 % )

2- There is an improvement in physical and skilful variables under research for the control group where percents ranged between ( 2% : 25%) and improvement in skilful variables under research where percents ranged between (14% : 54 %)

3- There are differences in improvement percentages between the experimental – control groups in physical and skilful variables under research where differences in improvement percents for physical variables ranged between (4%:30%) and improvement in skilful variables under research where percents ranged between (3%:45%) on behalf of the experimental group .

4- Vibration training group mastered on the control group in post measurements for physical and skilful variables and this is due to the program of vibration training by using Power Plate .

#### **Recommendations :**

1- In the light of the research goals , limits and conclusions , the researcher found a set of recommendations that are :

2- Interested in vibration training as a basis for developing physical fitness in sport field in general and basketball in particular for it's effect on skilful performance .

3- Interested in vibration training and relating it with different body parts in the light of the nature and requirements of every

specialized sport for it's effective impact on performance .

4- Conducting other researches to recognize the effect of vibration training by using Power Plate to rehabilitate sport injuries for athletes .

5- Conducting other researches to recognize the effect of vibration training related with basic skills for different sports and recognize it's effect on actual performance during competition .

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