

The Effect of Functional Training on The Central Strength of The Muscles of The Hitting Hand Arm and The Digital Level of The Volleyball Aces Skill

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Abstract: The first chapter included the introduction and the importance of the research through the functional efficiency, the level of central strength and physical training methods through the latest methods to achieve training achievements, while the second chapter included the researcher's use of the experimental method with the experimental and control groups system to suit the nature of the research, while the research sample was selected by the random method and consisted of (20) players of the Karkh Volleyball Club for the season 2023-2024, The third chapter included the presentation and discussion of the results of the pre and post tests of the research sample in the two variables (back muscles and legs) and providing a database of the arithmetic averages of the strength of the stabilizing muscles of the body and the skill of the aces in volleyball as an indicator for comparison and legalization of training loads for volleyball players, as for the fourth chapter, the researcher concluded that the arithmetic averages of back muscle strength reached (82. (77) where the percentage of improvement reached (12.01%) in favor of the post-measurement and this confirms its importance, and the arithmetic means of the strength of the leg muscles reached (7.33) where the percentage of improvement reached (14.78%) in favor of the post-measurement and this confirms its importance and recommended the use of databases for the arithmetic means of body-stabilized muscle strength tests as an indicator of ground training processes and comparison with abducted age groups, as well as the importance of the ability of volleyball players to perform body-stabilized muscle strength tests and ground training for the participating muscles.

Keywords: Functional Training, Digital Level, Volleyball

Introduction

Muscular endurance, muscular strength and flexibility are the most important qualities of physical preparation that are relied upon during the ground stranger out of water, and despite the increased reliance of special physical preparation programmers during the recent period on specialized movements in the field of technical performance based on the principle of specificity, this does not mean neglecting the importance of general physical preparation, as special physical preparation cannot achieve the desired development unless it relies on a strong background of general physical preparation, and general physical preparation is the new trend. Therefore, general physical preparation,

especially at the junior level, should be emphasized, as general physical preparation helps to prevent injuries during preparation periods.

Functional floor training is special training aimed at developing and strengthening the group of muscles involved in the performance, which is the origin of movement and the goal of explosive ability during functional performance (strike rate / arm length / player's ability) to output speed through initiation and rotation and one of the goals of physical training is the importance of the central stabilizing zone of the body, which includes muscles (straight line / body axis rotation / tension and thrust / shoulder stability)

and all scientific research recently with great interest in measuring functional efficiency, central strength level and physical training methods through the latest in the state of the art.

The centre of the body is defined as a box of abdominal muscles in front, thigh muscles, spinal muscles in the back and diaphragm at the top. This box contains many muscles that stabilize the spine and pelvis and stabilize the performance of the motor sequence when performing functional movements.

Research Problem

From this point of view and through the presence of the researcher in volleyball matches, he noticed that there is a great weakness in the majority of players in the ability to carry out the duties of the technical performance of volleyball players, start and rotation and each of the technical requirements that include the rate of repetition of the blow, the length of the blow and its efficiency and the final result, which includes achieving the lowest possible time during the performance of the skill of serving aces. The researcher found through the reference review of specialized references and the international information network that there is great weakness in most age stages as a result of not having the ability to move the body and move both the upper and lower limbs with high efficiency in one frame during the directions of the brain.

Research Objectives

1. Identify the effect of functional training on the variables of the central strength of the volleyball aces skill
2. Identify the study variables according to the effect of physical training on the skill performance of the volleyball aces skill

Research hypotheses:

- 1) What is the significance of the differences between the pre-measurement and post-measurement of the central strength variables of the volleyball aces skill
- 2) What are the percentages of improvement of the study variables according to the effect of functional training on the skill performance of the volleyball aces skill

Research Areas:

1. Spatial area: The indoor hall of the Karkh Volleyball Club
2. Temporal domain: For the period from (11/10/2023) to (14/5/2024)

3. Human Subjects: Karkh Volleyball Club youth volleyball players for the 2023-2024 season
 - eld courts in the sports academy.

Methodology

1. Procedures: The researcher used the experimental method with two experimental and control groups because of its suitability to the nature of the research.
2. Research population: The research population consists of the players of Karkh Volleyball Club for the 2023-2024 season
3. Research sample: The research sample was selected by purposive sampling method and consisted of (20) young players

Table 1. Statistical description of the research sample and sample normality in the main variables

Flattening	Twisting	Range	The biggest score	Lowest score	Standard Deviation	Medium	The arithmetic mean	Unit of measure	Variable	T
- 1.41	- 0.78	2	22	20	0.43	21.02	20.12	Year	Age	1
- 1,49	0.13	5	175	170	7.78	174.13	171.02	cm	Length	2
- 1.11	- 0.03	3	73	70	4.63	71	71.90	kg	Weight	3
- 0.32	0.07	4.17	24.33	20.16	1.21	21.12	21.32	m ² / kg	Body Mass Index	4

Table (1) shows the arithmetic mean, median, standard deviation, minimum and maximum value, range, skewers and kurtosis for the basic variables, and that the skewers coefficient ranged from (0.03 - to 0.78 -) and the kurtosis coefficient ranged from (0.32 - to 1.49 -). All skewers and kurtosis coefficients fell between (0.32 - to 1.49 -) indicating the moderation of the sample in all basic variables.

Table 2. Statistical description of the research sample and sample moderation in back and leg muscle strength

(n=20)										
Flattening	Twisting	Range	The biggest score	Lowest score	Standard Deviation	Medium	The arithmetic mean	Unit of measure	Variable	T
- 1.19	- 0.37	39	91	52	12.44	75.17	69.11	kg	Back muscle strength	1
- 1.22	- 0.20	42	93	51	13.97	73.44	70.04	kg	Leg Muscle Strength	2

Table (2) shows the arithmetic mean, median, standard deviation, minimum and maximum value, range, torsion and flattening of the strength of the muscles of the trunk and legs, and that the torsion coefficient for the two variables was (0.20 - 0.37 -) and the flattening coefficient was (1.19 - 1.22 -) respectively, and the torsion and flattening coefficients are between (± 3), which indicates the moderation of the sample in the strength of the muscles of the back and legs.

Table 3. Statistical description of the research sample and sample moderation in the variables of the centre area

(n=20)										
Flattening	Twisting	Range	The biggest score	Lowest score	Standard Deviation	Medium	The arithmetic mean	Unit of measure	Variable	T
1.98	- 0.43	15	96	81	3.61	89	87.01	Degree	Muscle Strength of the Centre	1
- 1.10	- 0.51	1	2	1	0.72	2	2.17	Point	Leg Muscle Strength	2

Table (3) shows the arithmetic mean, median, standard deviation, minimum and maximum value and the range of twisting and flattening for the variables of the centre area, and that the coefficient of twisting for the variables of the strength and stability of the centre area was (0.43 - to 0.51 -) and the coefficient of flattening (1.19 - to 1.98) respectively, and the coefficients of twisting and flattening fall between (± 3), which indicates the moderation of the sample in the strength and stability of the centre area.

Table 4. Statistical description of the research sample and moderation of the sample in the variables of overwhelming transmission

Flattening	Twisting	Range	The biggest score	Lowest score	Standard Deviation	Medium	The arithmetic mean	Unit of measure	Variable	T
- 1.11	0.01	9	151	142	151.9	145.33	147.11	Newton	Transmission Power	1
- 1.10	0.09	5	25	20	3.29	23.61	20.21	Strike	Number of Serving Strokes	2
0.37	-1.04	1	3	2	3.11	2.01	2.11	Stroke/min	Serve Rate	3

Table (4) shows the arithmetic mean, median, standard deviation, minimum and maximum value, range, torsion and flattening of the arm strike variables and that the torsion coefficient ranged between (1.04- to 0.09) and the flattening coefficient between (1.11- to 0.37) and all torsion and flattening coefficients fall between (± 3) which indicates the moderation of the sample in all variables

Data collection methods:

Previous scientific studies and research:

1. International Information Network (Internet)
2. Devices and tools used in the research

in light of the research requirements and the targeted data from:

1. Muscular strength measurements.
2. Anthropometric measurements of height and weight.

The required tools are divided as follows:

1. Casio stopwatch
2. Volleyball court
3. Racetameter to measure height in centimeters and weight in kilograms
4. Electronic dynamometer to measure muscle strength.
5. Tape measure
6. Volleyball (10)

Tests used in the research:

After researching references, scientific papers and the international information network, the tests suitable for the nature of the research on the strength of the muscles of the centre were identified as follows:

1. Height test using a rastameter.
2. Weight test
3. Testing the strength of the stability of the muscles of the central part of the body.
4. Testing the strength of the leg muscles with a dynamometer.
5. Back muscle strength test with a dynamometer.

Volleyball Serving Accuracy Test: (1,Ahmed, 1997)

- ◆ **Objective of the test:** - Measuring the accuracy of long serves.
- ◆ **Equipment:** - Volleyball court, 10 volleyballs (10)
- ◆ **Performance specifications:** - From the place designated for the serve, the tester performs the serve towards the other half of the court so that five serves are allocated to zone A, ten to zone B, and ten to zone C.

- Scoring :

- ✧ Three points for each valid serve in which the ball lands inside the marked square.
- ✧ Two points for each correct serve in which the ball falls inside the square adjacent to the marked square.
- ✧ The highest score for the test (45 points)

Exploratory study:

The researcher applied the exploratory experiment on Monday (20/10/2023) on a sample of Karkh Sports Club from outside the sample on a sample of (3 players):

- Piloting the assistants to conduct tests and measurements for volleyball players.
- The measurement form was prepared
- The scientific coefficients of the tests were ascertained.
- The time period for conducting the measurements for the tests of stabilizing muscle strength and central strength was set at the end of the general preparation period in the evening on two days according to the schedule for conducting the tests.

Defining the training programme:

1. The training programme was implemented during the general preparation period, the duration of the programme is (3) months (12) weeks
2. The training is carried out through a training programme dedicated to the development of the central strength of the muscles involved in the volleyball aces
3. Training unit time from 90 to 125 minutes The total number of units is 36 training units.

Application of the experiment on the main research sample

The main experiment was conducted on Thursday (18/1/2024) and the aforementioned tests were conducted on the sample in the pre-test and post-test on the members of the research sample.

Result and Discussion

Presentation of the results of the pre and post tests of the research sample in the two variables (back and leg muscles)

Table 5. Significance of differences between the mean of the two measurements (pre and post) of the research sample in the strength of the back and leg muscles

(n=20)

sig	t	Differences		Meta-testing		The pre-test		Unit of measure	Variable	T
		Standard deviation	My Account Center	Standard deviation	My Account Center	Standard deviation	My Account Center			
0.00	- 4.67	9.61	- 9.12	11.32	82.77	11.17	73.12	kg	Back muscle strength	1
0.00	- 6.31	8.71	- 10.44	7.33	81.23	13.95	71.03	kg	Leg Muscle Strength	2

It is clear from table (5) that the value of (t) for the two variables of back and leg muscle strength was (6.31 to 4.67) with a significance level (Sig) of (0.00) which is less than (0.05) indicating the existence of statistically significant differences (0.05 significance level) between the two tests (pre- and post-tests) of the research sample in both the strength of the vaginal muscles and the strength of the leg muscles in favor of the better mean, which is here the mean of the post-measurement

Table 6. Percentage of improvement of the research sample in back and leg muscle strength

Percentage of improvement	Meta-testing		The pre-test		Unit of measure	Variable	T
	Standard deviation	My Account Center	Standard deviation	My Account Center			
%12.01	11.32	82.77	11.17	73.12	kg	Back muscle strength	1
%14.78	7.33	81.23	13.95	71.03	kg	Leg Muscle Strength	2

Table (6) shows the arithmetic mean (m) and standard deviation (p) for each of the two measurements (before and after) and the cause of improvement for the research sample in the strength of the back and legs muscles and that the percentages of improvement in the strength of the back and legs muscles were between (12.01% to 14.78%) for each of them respectively, so the strength of the legs muscles improved better than the strength of the muscles of the vagina.

Table 7. significance of differences between the mean (before - after) measurements of the research sample in the variables of the centre area tribal measurement

(n=20)

sig	t	Differences		Meta-testing		The pre-test		Unit of measure	Variable	T
		Standard deviation	My Account Center	Standard deviation	My Account Center	Standard deviation	My Account Center			
0.00	- 5.91	3.57	- 4.36	2.46	92.11	3.31	87.26	kg	Muscle Strength of the Centre	1
0.20	- 1.27	0.71	- 0.17	0.67	2.37	0.69	2.16	point	Stability of the centre muscles	2

p < 0.05

It is clear from table (7) that the value of (t) for the strength of the centre muscles was (5.91) with a significance level (Sig) of (0.00), which is less than (0.05) indicating the existence of statistically significant differences at a significance level of (0.05) between the two measurements (pre and post) of the research sample in the strength of the centre area in favor of the better average, which is here the average of the post measurement. It is also clear from Table (6) that the value of (t) for the stability of the centre area was (1.27 -) with a significance level (Sig) of (0.20), which is less than (0.05), indicating that there are no statistically significant differences at a significant level (0.05) between the two tests (pre - post) of the research sample in the stability of the

Table 8. percentage of improvement of the research sample in the variables of the centre area

Percentage of improvement	The pre-test		Meta-testing		Unit of measure	Variable	T
	Standard deviation	My Account Center	Standard deviation	My Account Center			
%4.75	2.46	92.11	3.31	87.26	degree	Muscle Strength of the Centre	1

From table (8), the arithmetic mean and standard deviation of both tests (pre and post) and the percentage of improvement for the research sample in the strength of the centre muscles was (4.75%).

Table 9. Significance of the differences between the mean of the two tests (pre and post) for the research sample in the variables of arm strokes

(n=20)										
sig	t	Differences		Meta-testing		The pre-test		Unit of measure	Variable	T
		Standard deviation	My Account Center	Standard deviation	My Account Center	Standard deviation	My Account Center			
0.00	9.09 -	0.37	142.71	1.51	153.7	1.47	148.11	Newton	Transmission Power	1
0.00	8.75 -	0.23	88.67	1.46	83.12	1.33	81.21	Strike	Number of Serving Strokes	2
0.01	1.87	0.21	2.98	0.28	3.38	0.23	3.33	Stroke/min	Serve Rate	3

p < 0.05

It is clear from Table (9) that the value of (t) for the variables of serving power was (8.75 to 1.87) with a significance level (Sig) ranging from (0.00 to 0.01) which is less than (0.05) indicating the existence of statistically significant differences at a significant level (0.05) between the two tests (pre - post) of the research sample in the variables of serving hits the best average, which is here the average of the post-measurement.

Table 10. Percentage of improvement of the research sample in the variables of aces (n=20)

Conclusion

- 1) Developing a training curriculum with metered loads of varying intensity for 100m hurdlers.
- 2) It has been shown that the introduction of training methods with metered loads of varying intensities that work on physical or chemical abilities, as it has a significant impact on the development of the abilities used.
- 3) Agility and flexibility training contributed to the development of anaerobic capacity and increased muscle mass.
- 4) The training used according to metered loads of varying intensities increases the adaptability of the nervous system to high training loads and increases its resistance to fatigue.

Recommendations:

- 1) The need to legalize training curricula for different activities based on loads of varying intensity because of its importance in increasing the physical and biochemical potential of athletes.

- 2) The variety of training methods and techniques to raise the level of the player and his ability to develop these abilities and the acceptance of players to high intensity and high volumes of training and increase the factor of excitement and away from boredom.
- 3) The necessity of using exercises that approach the nature of the actual game for its great and prominent impact.
- 4) The need to adopt biochemical indicators as indicators to legalise training loads of varying intensity.

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