



Original Article

Assessment of Core Stability Exercise and its Effect on the Physical Abilities and Skill Performance of National Wushu Kung Fu Team

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Abstract

Trunk stability is used to describe how the muscles in the trunk maintain the balance and stability of the spine and the body in general. Wushu competition depends mainly on the trunk area and the surrounding muscles as well as the full control of the muscles and joints working for the motor performance. The author observed the low physical and skill capabilities of Wushu athletes under 18 years. Therefore, the aim of the study was to test the effect of core Stability Exercise and its Effect on the Physical Abilities and Skill Performance of National Wushu Kung Fu Team. The training program designed for twelve weeks, (4) training units per week, (8) Wushu athletes under 18 years old. The results indicated that the proposed training program using trunk stability exercises had a positive impact on improving the physical abilities. In addition, the proposed training program using trunk stability exercises had an impact on improving the physical and studied skill abilities "Wushu", where the value of Wilkeson (Z) calculated for the physical and skill test "high jump" (-2.57) which means that the differences between the pre- and post-measurements are real and in favor of the post-measurement. The author recommended by keeping core stability exercises as a routine and invent exercises that related to the technical performance of Wushu skills.

Keywords: *Assessment, Core stability, Wushu Kung Fu.*

Introduction

The world is witnessing scientific and cognitive progress in various fields and new knowledge of scientific principles and technical development helps in developing programs and developing solutions to many problems related to the sports field, and developed countries are working to benefit from the results of scientific studies and research, believing in the value of sport as a civilized phenomenon that indicates the extent of progress reached by countries, which is reflected in its impact on the victories and medals achieved in various championships.



Sports training is the comprehensive process of purposeful improvement of sports performance, which is achieved through a planned program for the preparation of competitions, which is an organized practice process characterized by dynamism and continuous change and must be managed by a specialized coach whose leadership role is to create an appropriate framework through which the player and the team can develop and develop their potential capabilities, and sports training in these years has acquired its position as an academic science, and it has become not limited to addressing it in the programs of educational stages only, but has received studies Sports training studyis of increasing interest in graduate programs in many scientific communities worldwide. (Mohamed, 2002)

Legalization of training represents the basic base of sports training, but is considered one of the most important factors that constitute the concept of the process of sports training and the basic construction to achieve higher levels, and for this reason will not stop research and scrutiny in the field of training legalization, but the continuation of standardized training has an important role in raising the efficiency of vital organs in the body, which leads to raising the level of performance of the individual athlete, and in order for these devices to perform their work efficiently must enjoy the individual athlete a degree of physical fitness and physiological Enable him to continue to perform the practiced activity. (Abdel Fattah, 1996)

With the continuous progress in the training process, there are many ways and methods of organized sports training, as well as the exercises used, which have a significant impact on development, and the main concern of all those interested in sports training has become research and development of the sports training process and try to avoid shortages and deficiencies in training programs and innovate training methods and modern exercises to develop all aspects of the sports form, including these exercises Trunk stability training "the essence of training" "Core stability".

The term trunk stability is used to describe how the muscles in the trunk maintain the balance and stability of the spine and the body in general. (Mahmoud, Amira Hassan Mahmoud, 2009)

The stability of the trunk is the ability to control the position and movement of the pelvis optimally to allow the generation of force and transfer movement to the extremities of the body and control them in all sports activities to achieve stability in the lumbar spine, pelvis and thigh.(Ballisteros & Leviz, 1991)

The trunk muscles are the main physical and muscular center for the distribution of movement in the body because if we pass a longitudinal line from the head to the legs and a transverse line from the middle, the two lines meet at a point in the middle of the body, which is the abdomen and the opposite area, which is the back, and the evidence for this is if the student moves the arms or legs, he feels the movement of the trunk muscles, and thus makes him feel his physical and muscular center, which leads to easy movement control, and therefore centering is considered. (Mahmoud, Amira Hassan Mahmoud, 2009)

The attention of the author has been drawn to the low physical and skill capabilities in Alushu under 18 years, which may be due to the lack of use of trunk stability exercises that aim



to achieve stability and muscular balance of the trunk area and due to the dependence of the Wushu competition mainly on the trunk area and the surrounding muscles and because the nature of that competition depends primarily on full control and control of the muscles and joints working in motor performance, so the author hopes that this scientific study may contribute to helping Trainers and specialists in the field of Wushu Kung Fu in improving and developing the digital level of junior Wushu by proposing exercises to achieve stability for the trunk area on some physical abilities Physical abilities and skills of juniors in Wushu.

The current study aims to assess core stability exercises and test its effect on some physical abilities and skills of emerging Wushu .

Study Hypotheses:

- 1- There are statistically significant differences between the pre-and post-measurements of the participants group of the study in some physical abilities in favor of the post-measurement.
- 2- There are statistically significant differences between the pre- and post-measurements of participants group of the study in the skill capabilities in favor of the post-measurement.

Materials and Method

The author used the experimental method and case study using pre-and post-measurements for one group to suit the nature of the research.

Participants

The author selected the participants of the main study in a deliberate way from the junior national team for season 2022/2023, they were (8) athletes. Outside the main study group, in order to test the scientific transactions and for pilot studies, there were (20) athletes from different clubs of Sadat City (Al-Nojoom Sports Club - Al-Salam Sports Club - Al-Andalus Club) under 18 years old.

Table 1 Groups of Participants Characterization

Groups	Main Study	Pilot studies	Number of juniors
1	8	8	16
2	-	8	8
3	-	4	4
4	8	20	28

The reasons of choosing this groups of participants were that all the members of group are young Wushu and registered in the Egyptian Federation of Wushu Kung Fu, availability of



tools and devices as well as the training place , regularity of players in terms of training dates, and the participants’ positive attitude toward the proposed training program.

Homogeneity of the participants groups:

The author conducted homogeneity among the members of the study group before applying for the training program. The variables are:

- Basic variables (age - weight - height - training age).
- Physical variables.
- Skill variable (physical and skill abilities).

The author prepared a form for registering personal data and the results of the tests. That form included " name - age - height - weight - training age - pre and post measurements test form " .

Table 2 The value of the skewness coefficient of the experimental group in the variables of age, height and weight (n = 8)

Statistics Variables	Experimental Group				
	Units	Q	±	median	Skewness
Age	year	17	0	17	0
Length	poison	179.25	8.29	177.5	0.62
Weight	kg	72	8.68	69	0.73
Training age	year	5.5	0.53	5.5	0

Standard error of the Skewness coefficient = (0.75)

It is clear from Table (2) that the value of the Skewness coefficient of the experimental group has been limited between (+3) and (-3), which indicates the homogeneity of the experimental group in these variables.

Table 3 The value of the Skewness coefficient of the experimental group in the tests of the performance level of the southern boxing style of the junior Wushu Kung (n = 8)

Variables	Tests	Units	Mean	median	SD	coefficient
Level Assessment Form of Southern boxing style performance	Quality (5) QM Grades	Deg	2,40	2,70	0,73	-1,23
	Overall performance (5) OP scores	Deg	3,10	3,00	0,56	0,54
	Total Score	Deg	5,50	5,70	0,85	-0,71

It is clear from Table (3) that the value of the Skewness coefficient of the experimental group has been limited between (+3) and (-3), which indicates the homogeneity of the experimental group in those tests.



Table (4) The value of the Skewness coefficient of the experimental group in physical tests (n = 8)

Special physical abilities	Tests	Units	Mean	median	SD	Skewness	
Distinctive power with speed	(Legs)	Vertical jump	Cm	24,50	23,00	0,83	5,44
	(Arms)	Push an iron ball to the farthest distance	Cm	304,2	327,30	-1,54	45,13
Endurance	Strength	Sitting from lying down bending knees (60s)	Nr	42,50	41,00	0,65	6,88
	Speed	Sitting from lying down bending knees (30s)	Nr	24,20	25,00	-0,66	3,65
Flexibility	Bottom and side touch (30s)	Nr	27,20	24,50	23,00	0,83	
Agility	Zigzag running between hurdles	Sec	20,10	304,2	327,30	-1,54	
Balance	Dynamic Balance	Deg	60,15	42,50	41,00	0,65	
Co-ordination	Rope jump	Deg	3,10	24,20	25,00	-0,66	
Adaptation of body positions in space	Walk down the aisle	Deg	7,10	24,50	23,00	0,83	

It is clear from Table (4) that the value of the Skewness coefficient of the experimental group has been limited between (+3) and (-3), which indicates the homogeneity of the experimental group in those tests.

Tools and devices

- Medical Balls
- Balance Panels
- Chalk
- Mattresses
- Rustameter
- Digital stopwatch 1/100 fps
- Cones
- Hurdles

Pilot Studies

Preliminary Survey

The author conducted this study from 6/3/2023 to 9/3/2023 on (4) athletes of Al-Andalus Club under 18 years. The aim was to identify the difficulties that the author and assistants may face during the application, and to ensure the validity of the tools and devices used in the study.



The most important results were ensuring the validity of the tools and devices used in the study and train the assistants on applying the tests and recording the results.

Second Pilot Study

The author conducted this study from 11/3/2023 to 17/3/2023 on (8) athletes of Al-Nojoom Sports Club under 18 years old, and on (8) athletes of Al-Salam Sports Club under 18 years. The aim was to test scientifically the validity, reliability and stability of the studied physical variables and physical and skill capabilities.

Table 5. Significance of the differences between two groups of the Pilot study participants (distinguished and non-distinguished) in some physical abilities' tests specific for the southern boxing style of junior Wushu Kung Fu (n1 = n2 = 8)

Special physical abilities	Tests	Units	distinguished		non-distinguished		Value "T"	
			Mean	SD	Mean	SD		
Power	(Legs)	Vertical jump	Cm	22,10	3,30	17,90	3,20	3,76*
	(Arms)	He pushed an iron ball to the farthest distance	Cm	296,3	49,12	233,1	38,65	3,63*
Endurance	Strength	Sitting from lying down bending knees (60s)	Nr	37,40	5,66	24,60	4,58	4,12*
	Speed	Sitting from lying down bending knees (30s)	Nr	20,60	4,12	15,50	3,53	3,68*
Flexibility		Bottom and side touch (30s)	Nr	37,20	37,20	3,35	34,10	2,40
Agility		Zigzag running between hurdles	Sec	15,70	15,70	0,71	18,90	2,48
Balance		Dynamic Balance	Deg	61,10	61,10	9,60	46,70	12,74
Co-ordination		Rope jump	Deg	3,20	3,20	1,42	1,90	1,02
Adaptation of body positions in space		Walk down the aisle	Deg	7,10	7,10	0,56	5,40	1,14

* Tabular value of "T" at (0.05) = 2.10

It is clear from Table (5) that there are statistically significant differences between the two groups of the survey study participants (the upper quartile and the lower quartile) where the calculated value of "T" was greater than the tabular value of "T" at (0.05), which indicates the validity of the studied tests.



Table 6. Significance of the differences between two groups of the survey study participants (distinctive and undistinguished) in an evaluation form The level of performance of the southern boxing style of the junior Wushu Kung Fu (n1 = n2 = 8)

Evaluation Form Southern boxing style performance level	Units	Featured Collection		Unmarked		Value "T"
		Mean	SD	Mean	SD	
Quality (5) QM Grades	Deg	2,60	0,51	2,40	0,39	2,32*
Overall performance (5) OP scores	Deg	2,65	0,41	2,45	0,48	2,81*
Total Score	Deg	5,25	0,73	4,85	0,71	3,64*

* Tabular value of "T" at a significant level (0.05) = 2.10

It is clear from Table (6) that there are statistically significant differences between the upper quartile and the lower quartile, where the calculated value of "T" was greater than the tabular value of "T" at (0.05), which indicates the validity of the evaluation the studied form.

Coefficient of stability

The author used the test application and reapplied it to calculate the stability coefficient on the survey study participants under the same conditions and instructions, and re-applied a week after the first application

Table 7. Correlation coefficient between the two applications (first and second) for the survey participants group in the evaluation form the studied tests for performance level of the southern boxing style of the Wushu Kung Fu juniors (n = 10)

Evaluation Form Southern boxing style performance level	Units	First application		Second application		Correlation coefficient
		Mean	SD	Mean	SD	
Quality (5) QM Grades	Deg	2,66	0,39	2,59	0,31	0,710*
Overall performance (5) OP scores	Deg	2,87	0,40	2,80	0,32	0,650*
Total Score	Deg	5,53	0,62	5,39	0,48	0,709*

* Value of "t" at a significant level (0.05) = (0.444)

It is clear from Table (7) that the values of the correlation coefficients are statistically significant between the two applications (the first and the second) of the the participants of the Pilot study in the form for evaluating the level of performance of the southern boxing method for the junior Wushu Kung Fu under research, where the values of the correlation coefficient ranged between (0,650 0,710), which are limited to (± 1), and that these values are a statistical function at the level of significance (0.05), which indicates the stability of the evaluation form.



Table 8. Correlation coefficient between the two applications (first second) of the Pilot study participants in some tests Physical abilities spesific for the southern boxing style of the Wushu Kung Fu junior (n = 10)

Special physical abilities	Tests	Units	First Application		Second Application		Correlation coefficient	
			Mean	SD	Mean	SD		
Power	(Legs)	Vertical jump	Cm	22,2	3,14	22,10	2,76	0,664*
	(Arms)	Push an iron ball to the farthest distance	Cm	286	50,21	288	49,44	0,752*
Endurance	Strength	Sitting from lying down bending knees (60s)	Nr	35,1	8,03	35,55	7,64	0,640*
	Speed	Sitting from lying down bending knees (30s)	Nr	21,3	4,42	22,25	4,11	0,568*
Flexibility		Bottom and side touch (30s)	Nr	38,5	38,5	2,66	39,10	2,42
Agility		Zigzag running between hurdles	Sec	18	18	2,17	17,50	2,12
Balance		Dynamic Balance	Deg	54,1	54,1	14,30	55,10	12,55
Co-ordination		Rope jump	Deg	3,10	3,10	1,14	3,25	0,74
Adaptation of body positions in space		Walk down the aisle	Deg	6,30	6,30	1,20	6,50	1,12

* Value of "t" at (0.05) = (0.444)

It is clear from Table (8) that the values of the correlation coefficients are statistically significant between the two applications (the first second) of the Pilot study participants in the tests of some physical characteristics of the southern boxing style of the junior Wushu Kung Fu under research, where the values of the correlation coefficient ranged between (0.512-0.752), which is limited between (± 1), and that these values are a statistical function at the level of significance (0.05), which indicates the stability of these physical tests.

Training Program

The author surveyed the opinions of the experts to determine the most important general and special physical abilities of the Wushu competition



1- Objective of the program

The training program aims to identify the impact of trunk stability training through the main part of the program on some physical abilities and physical and skill abilities for juniors in Al-Wushu under 18 years of the national team in the preparation period for the sports season.

2- Foundations of developing the training program:

- a. Taking into account the objective of the program .
- b. Suitability of the content of the program to the level and capabilities of the research participants groups .
- c. Taking into account the training program for the individual differences of the members of the research participants groups .
- d. Providing the capabilities and tools used in the program .
- e. The flexibility of the program and its acceptance of the international application.
- f. The element of suspense for the exercises within the program should be available .
- g. gradation of exercises from easy to difficult and from simple to compound .

3- The content of the training program

The training program includes sets of general and special physical preparation training, skill preparation exercises and "Core Stability" training

4- Steps to develop the training program

The author conducted a reference survey for some scientific references and the results of the reference survey resulted in the following:

- a. Combines the general and special physical preparation exercises included in the training program
- b. Collect the skill preparation exercises included in the training program
- c. Collecting the trunk stability exercises included in the training program
- d. The time period for the training program has been set at twelve weeks, starting from
- e. The number of weekly training units has been determined at (4) training units per week.
- f. The time of the daily training unit was determined from (90) minutes for each training unit .
- g. The pregnancy cycle used during the training program was determined (3:1) through training loads (medium - high - maximum).
- h. The warm-up time in the daily training unit was set at (15) minutes in each unit training.
- i. The closing time in the daily training unit was set at (5) minutes for each training unit " Taking into account that the time of both warm-up and closing in the training unit is outside the time of the unit "

5- The foundations of developing trunk stability exercises in the program

- a. Ensure that the practice environment is calm and the place is safe and free of any obstacles.
- b. Perform each training in a calm and controlled manner.



- c. Attention to form and function is the most important factor for this
- d. The program and there is no stage in which quality must be sacrificed to achieve quantity "No stage should quality be sacrificed for Quantity".
- e. You must imagine, think and scrutinize Think about each exercise carefully for each Training as a cognitive part .

6- Program Components: The general division of the training program is as follows

The first stage : It lasts four weeks and its goal is general preparation.

The second stage: its duration is five weeks and its goal is special preparation.

The third stage: its duration is three weeks and its goal is to prepare for the competitions.

Table 8. Scientific aspects of the training program

Data	Number of weeks	Number of weekly units	Training unit time (minutes)	Training time Weekly	Total (minutes)
First stage	4	4	90	360	1440
Second stage	5	4	90	360	1800
Third stage	3	4	90	360	1080
Total training time during the program					4320

Table 9. General time distribution of the training program

Content	First stage	Second stage	Third stage	Total
Number of training days	16	20	12	48
Number of days off	12	15	9	36
Number of intervals of training with medium load	4	4	4	12
Number of training periods with high load	8	10	6	24
Number of training periods with maximum load	4	4	4	12

Relative distribution of physical and skill preparation on the weeks of the program:

The author also conducted a survey of the opinions of the experts in order to determine the relative distribution of physical and skill preparation on the weeks of the program.



Table 10. Relative distribution of physical preparation and skill preparation on the program stages

Content	First stage	Second stage	Third stage
Physical preparation	70%	50%	40 %
Skill preparation	30%	50%	60 %

Table 11. Time distribution in minutes for physical preparation and skill preparation on the stages of the program

Content	First stage (minutes)	Second stage (minutes)	Third stage (minutes)	Total (minutes)
Physical preparation	1008	900	432	2340
Skill preparation	432	900	648	1980

Main Study

Pre- measurements

The pre-measurements were conducted for the (8) participants of the Study, at the Olympic Center, the training headquarters of the national team was from 20/3/2023 to 21/3/2023.

Training Program

The program was implemented using trunk stability training and on the junior Al-Wushu under 18 years old for a period of (12) weeks from 28/3/2023 to 19/6/2023 by (4) training units per week.

Post measurements

The Post measurements of the physical and skill variables were carried out after applying the training program by the same way that was done in the pre-measurements, from 22/6/2023 to 23/6/2023.

Statistical Treatments

According to the objectives and hypotheses of the study, the author used the following statistical treatments:

Arithmetic mean, T-test to calculate the significance of difference, Standard deviation, Median, Skewness, Pearson's simple correlation coefficient, and Percentage.



Results and Discussion

First the results of the first hypotheses which discuss the statistical significance differences between the average of the two measurements (pre-post) and the effect of the training program using core stability exercises on some physical characteristics of the southern boxing style of junior Wushu Kung Fu

It is clear from Table (12) that there are significant differences at a significant level (0.05) between the average measurements (pre-post) I have a research participants group in some physical characteristics of the southern boxing style of junior Wushu Kung Fu under research in favor of the post-measurement.

Table 12. The significance of the differences between the average of the two measurements (pre-post) in some physical characteristics Southern boxing style for junior Wushu Kung Fu (n = 8)

Special physical abilities	Tests	Units	Pre-measurements		post-measurements		Value "T"	
			Mean	SD	Mean	SD		
Power	(Legs)	Vertical jump	Cm	31,4	8,87	36,10	5,22	2,80*
	(Arms)	Push an iron ball to the farthest distance	Cm	330,2	11,9	341	4,59	3,70*
Endurance	Strength	Sitting from lying down bending knees (60s)	Nr	51,0	3,80	56,80	1,32	5,30*
	Speed	Sitting from lying down bending knees (30s)	Nr	28,3	1,64	29,50	1,08	4,13*
Flexibility		Bottom and side touch (30s)	Nr	26,2	26,2	2,04	28,80	1,14
Agility		Zigzag running between hurdles	Sec	20	20	1,75	18,85	1,23
Balance		Dynamic Balance	Deg	76	76	8,43	89,50	3,69
Co-ordination		Rope jump	Deg	3,90	3,90	0,88	4,80	0,42
Adaptation of body positions in space		Walk down the aisle	Deg	7,60	7,60	0,45	8,96	1,10

* Tabular value of "T" at a significant level (0.05) = 2.10

The performance of some exercises stability trunk stability of stability on the ground requires the player to perform muscle contractions fixed continuously as well as the participation of the abdominal muscle group in many exercises stability trunk, which led to



improve the strength endurance of the abdominal muscles of the members of the research participants group.

The training of the stability of the trunk on unstable surfaces such as Swiss balls and swaying boards to put the players in a continuous change in the positions of the body during the performance of the exercises, which led to improving the level of balance and agility of the members of the study participants group.

It also affected the training of the stability of the trunk to increase the stability of the muscles of the lower back, abdomen and pelvis, which provides a stable base from which strength can be generated to the extremities of the body legs and arms stronger and faster, which has affected the improvement of the level of strength characteristic of speed for the legs of the members of the study participants group

The trunk stability exercises using non-stationary tools have an effective effect on improving the level of strength characteristic of speed, and this is consistent with what the author did during the training program using non-fixed tools such as "Swiss ball - balance boards" during the application of the program.

And Core leads to the muscles in it to work together to carry out more powerful and effective movements and a more balanced body and tight internal and external muscles with good control of the limbs. (Abu Zeid, 2002)

These results are consistent with the results of previous studies that were available to the author, especially of an experimental nature that there is almost agreement on the effectiveness of the proposed programs on the physical aspects, and the descriptive study that examined the relationship between the trunk and its impact on performance such as the study of Clarke (2009), which found in its results that improving the performance of the trunk area leads to improvements and gains transmitted impact on the physical abilities and skill of the high jump. (Clarke, 2009)

And trunk stability training works to strengthen the trunk area, so it is sometimes called lumbar stability training, as it contributes to improving flexibility, balance, agility and strength endurance (Abdel Fattah & Radwan, 1993). Thus, the first hypothesis of the study is fully achieved.

Second the results of the statistical significance differences between the average of the two measurements (pre-post) from the effect of the training program using trunk stability exercises on the level of performance of the southern boxing method for junior Wushu Kung Fu:



Table 13. The significance of the differences between the average of the two measurements (pre-dimensional) in the level of performance Southern boxing style for junior Wushu Kung Fu (n = 8)

Evaluation Form Southern boxing style performance level	Units	Pre-measurement		Post-measurement		Correlation coefficient
		Mean	SD	Mean	SD	
Quality (5) QM Grades	Deg	3,80	0,25	4,04	0,22	4,27*
Overall performance (5) OP scores	Deg	3,45	0,25	3,53	0,21	2,35*
Total Score	Deg	7,25	0,48	7,57	0,32	4,23*

* Tabular value of "T" at (0.05) = 2.10

It is clear from Table (13) that there are significant differences at the level of significance (0.05) between the average measurements (pre-measurements) I have a study participants group in the level of performance of the southern boxing style of junior Wushu Kung Fu under study in favor of the dimensional measurement,

These results are consistent with the findings of the study of Ahmed Ibrahim (1995) that the age stage of (9-12) of the best stages of age for the development of most motor abilities such as strength characterized by speed, flexibility, agility, muscular endurance, speed, Coordination. (Abdel Maksoud, 1997)

Malina that motor performance improves with age during this stage, but the pattern of development is not regulated with the same age functional gender. (Omar, 2013)

Thus, the second hypothesis of the research, which states that there are statistically significant differences between the average of the two measurements (pre-post) of the effect of the training program using qualitative exercises on the level of performance of the southern boxing method of junior Wushu Kung Fu in favor of post-measurement.

The application of trunk stability exercises contributes to improving athletic performance by providing the basis on which the upper and lower limbs rely in contraction to speed up or slow down the movements of body parts. (Al-Sukkari et al., 2001)

The importance of trunk stability exercises that allow the spine to transfer strength to and from the extremities of the body neutrally without participating in the performance and this is very important for most sports activities, and these exercises contribute to raising the level of physical fitness and the level of skill performance as well as its role in the treatment and prevention of injuries. (Abdel Fattah & Radwan, 1993)

The low level of stability of the trunk may lead to the lack of effective transfer of kinetic energy and thus expose the muscles and joints working in the performance of skills to more pressure and then the possibility of injury. (Abdel Maksoud, 1997)



Conclusion

Within the limits of the study participants group and its characteristics and available capabilities and according to the objectives and assumptions assumed by the author and the tools used and through statistical treatments of data and discussion and analysis of the results it was possible to reach the following conclusions:

- 1- The proposed training program using trunk stability exercises by the author on the study participants group had a positive impact on improving the physical abilities under research, where the value of Wilkxon (Z) calculated for physical tests was limited between (-0.42, -2.60), and this means that the differences between the pre- and post-measurements are real and in favor of the post-measurement.
- 2- The proposed training program using trunk stability exercises by the author on the study participants group had an impact on improving the physical and skill abilities "Wushu" under research, where the value of Wilkeson (Z) calculated for the physical and skill test "high jump" (-2.57) and this means that the differences between the pre- and post-measurements are real and in favor of the post-measurement.

Recommendations

Depending on the data and information that could be reached and guided by the conclusions and within the limits of the study participants group, the author recommends the following:

- 1- Interest in activating the role of trunk stability training in the rest of the Wushu Kung Fu competitions in general and in the Wushu competition in particular, because of its effective impact on the physical aspects and the transfer of its impact on the skill aspects and physical abilities and skill.
- 2- Attention to strengthening the muscles of the core of the body as one of the complementary aspects of the fitness program.
- 3- Interest in making and designing exercises for the trunk with deriving its ideas from the main skills of the rest of the Wushu Kung Fu so that it serves the parts of that skill functionally and directly.
- 4- Invent multiple forms of tools that can be employed in trunk exercises that will affect physical abilities and other technical skills.

References

- Abdel Fattah, A. E. A. (1996). *Carrying Training, Athlete health, Pros and Risks*. Dar Al-Fikr Al-Arabi.
- Abdel Fattah, A. E. A., & Radwan, M. N. E.-D. E.-S. (1993). *Physiology of Physical Fitness*. Dar Al-Fikr Al Arabi.
- Abdel Maksoud, E.-S. (1997). *Theories of Sports Training - Training and Physiology of Force*. Book Center for Publishing.
- Abu Zeid, I. K. (2002). *Fundamentals of Statistics in Physical Education*. United Press



Center.

- Al-Sukkari, K. I., Brekaa, M. G., & Al_Ashmawy, A. M. (2001). *Management of The Training of The Musculoskeletal System of The Human Body*. Monshaat Al-Maaref.
- Ballisteros, J. M., & Leviz, J. (1991). *Foundations and Principles of Education and Training in Athletics* (O. Refaat & M. Fathy (eds.)). International Association of Athletics Federations, Regional Development Center in Cairo.
- Clarke, L. (2009). *A comparison study between core stability and trunk extensor endurance training in the management of acute low back pain in field hockey players*.
- Mahmoud, Amira Hassan Mahmoud, M. H. (2009). *Modern Trends in the Science of Sports Training*. Dar Al-Wafa for the World of Printing and Publishing.
- Mohamed, H. K. (2002). The Effect of Plyometric Training on The Development of Muscular Ability of The Legs And The Accuracy of Shooting in Basketball. *Scientific Journal for Research and Studies, Faculty of Physical Education in Port Said, Suez Canal University*, 3, 191:210.
- Omar, H. A. H. (2013). *The Effect of Hypermedia on Learning The High Jump by The Fosbury Method for Deaf and Hard of Hearing Secondary School Students At Al-Amal School in Qena*. South Valley University.