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Core stability rehabilitative exercises and their effect on trunk flexibility and strength and treatment of lower back pain among fitness practitioners millimeter

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Abstract

The study aimed to prepare core stability exercises for lower back rehabilitation among fitness practitioners, to identify the effect of core stability exercises for rehabilitation and their impact on the flexibility and strength of the trunk, and to treat lower back pain among fitness practitioners. The researcher used the experimental method with a group design. One with a pre-test and a post-test due to its suitability to the problem and nature of the study. 8 players were selected from the research community, which numbered (50) players after agreeing with them to conduct the tests and apply the study experience. The study was based on the results that showed that there are differences between the pre-and post-tests and in favor of the post-tests based on the values of the arithmetic averages and the value of the SIG, which was less than 0.05, which indicates that there are differences that can be observed between the averages for all values of muscle strength. The researcher attributes this to the effectiveness of the exercises. The special qualification that was applied to the sample members, specifically to the core stability region contributed to focusing on the elements of strength and stability of the back muscles, especially the lower back, which in turn contributes to developing its basic base, as these exercises contributed to the adaptation of the core muscles in the ability to adapt and adapt to the burdens and high efforts on these muscles since the strength and stability exercises are according to different times. It works to gain more strength for the back muscles, especially the muscles working in the torso area. The researcher concluded that core stability exercises contributed to improving the level of flexibility and strength of the torso among the study sample, and also contributed to reducing lower back pain by increasing the level of flexibility and strength of the torso. I worked to put more effort into the core muscles than usual and stabilize them in this position, which in turn worked to adapt these muscles to strength training and stabilize them according to the targeted exercise position.

Keywords: Rehabilitation exercises, core stability, torso flexibility, torso strength, physical fitness, injury rehabilitation

Introduction

There are many activities practiced by amateurs and practitioners that contribute to causing some injuries. Perhaps one of them is the game of weightlifters, which is one of the requirements for development in this activity. Continuous training in carrying weights and resistance with very large loads makes the athlete's body more vulnerable to these injuries, especially in the torso area (Hlaing *et al.*, 2021) ^[10]. Or due to a performance error, which creates a large burden on the trunk. Lower back injuries are among the most common sports injuries that occur in many activities because the torso is the basic engine of movement, in addition to that, it connects the upper and lower extremities (Aluko *et al.*, 2013) ^[5]. In addition to that, the basic and active role of the spine in human movement, from bending and extending the body and turning to the sides, is why the torso The spine in particular is one of the basic axes that has a great responsibility for carrying the body's weight, as well as the process of motor transfer from the lower limbs to the upper limbs and the muscles associated with them and vice versa. Sports injuries often occur during training and are considered one of the causes of injury. Because of the pressures placed on this axis, represented by the lumbar vertebrae, which causes acute injuries or chronic pain, which in turn leads to a limitation in body movement, (Human, 2006) ^[11] indicates that lower back pain is one of the common problems

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in the world and that millions of people who suffer from lower back pain should They must choose appropriate treatment methods.

Sports rehabilitation exercises work to reduce the persistence of these injuries, especially pain because they contribute to removing cases of dysfunction of the affected part by taking care of the manifestations of weakness in some muscles and ligaments, developing and improving muscle strength and flexibility of the trunk, the degree of neuromuscular coordination, increasing the rate of tissue healing, and speeding up the elimination of adhesions and blood calcifications. Which collects inside the vertebrae of the spine (Hayden *et al.*, 2021) ^[8].

Core stability exercises aim to strengthen the muscles of the core part of the body, such as the abdominal, back, and pelvic muscles, and aim to improve balance, alignment, and general stability of the body. They contribute to preventing injuries and enhancing athletic performance. (Hibbs *et al.*, 2008) ^[9] confirms that the most important of these exercises is increasing the stability of the column. The spine, the muscles of the lower abdomen, the back, and the muscles holding the pelvis. The nature of core stability exercises is such as strength and stability training for the back muscles, in addition to providing the body with muscular balance for all the back muscles, especially the core muscles, which consist of 29 pairs of muscles, whose role is the basic process of stabilizing the spine and pelvis. The lack of strength, flexibility, and stability of these muscles makes the spine weak. The characteristic of instability makes it vulnerable to injuries and pain when performing any effort on it. It is mentioned (Abdel Razzaq, 2016) ^[1] that attention must be paid to applying the Core Stability training program for practitioners in health clubs and fitness halls, A study (Skundric *et al.*, 2021) ^[15] stated that rehabilitation programs for lower spine injuries must include the effects of basic stability exercises because they are regular exercises. After all, these exercises have a close relationship with those in professions who practice jobs, as well as those who practice some sports activities and who do not perform exercises for specific parts of the body. Thus, generating pain and health problems in these parts while practicing their sporting activity.

Therefore, the importance of the study emerged in the researcher's quest to find and employ modern exercises that are unusual in their application, such as strength and stability exercises that are required by all sporting events at the same time, represented by core stability exercises that contribute to giving the back muscles the strength and stability that every athlete must have. The problem of the research arose because the researcher is a specialist in the field of rehabilitation who continues to train in the training halls designated for weight training and physical fitness in the city of Samarra. It was found that the number of infected people in one hall was 50 during the 2022-2023 season. This is a large percentage that indicates a clear weakness in the area. The back, and from here the problem arose because the trunk muscles lacked the strength required by athletes, in addition to weak stability when performing exercises, especially exercises that are characterized by carrying large weights. Therefore, the researcher resorted to finding exercises that contribute to giving the trunk strength and stability, and perhaps following and applying core stability exercises)) It contributes to giving the trunk strength and stability and identifying the extent to which it is possible to treat or eliminate these pains and get rid of them in the future.

The study aimed to prepare core stability exercises for lower back rehabilitation among fitness practitioners, as well as to identify the effect of core stability exercises for rehabilitation and their impact on the flexibility and strength of the trunk and the treatment of lower back pain among fitness practitioners

The research hypothesis is that there are significant differences between the pre-and post-tests in the study variables.

Material y methods

Study Design

The researcher followed the experimental method by designing one group with a pre-and post-test to suit the problem and nature of the study (Ali *et al.*, 2024) ^[4].

Participants

There are some studies and research, especially those that deal with a problem in the medical field. It is difficult to determine the boundaries of the population and its sample, as the researcher finds it difficult to define some matters from a research standpoint and one of them is identifying societies, especially individuals who suffer from diseases, because it is expected every hour or day. The appearance of these pathological conditions increases or decreases, so the researcher adopted the selection of the research sample in a deliberate manner, which represented individuals practicing physical fitness who suffer from pain in the lower back in Baghdad. 8 players were selected from the research community, which numbered (50) players after agreement. With them in conducting tests and applying the study experience, their percentage was (16%) of the community.

Means, devices, and tools used: The means include collecting information

- Arab and foreign references and sources
- Note
- Tests and standards
- As for the devices and tools used in the research
- Force sensor 200- 3EK
- Dynamometer device
- HP computer (not laptop) made in China
- Chinese-made stopwatch
- Swiss ball number 8
- Rubber ropes of various strengths
- Floor rug
- Chair
- ruler
- Leather belt

Field research procedures

Determining the study variables: The researcher determined the study variables after reviewing and analyzing the content of many previous studies and scientific sources, which were as follows

- Flexibility of the torso forward.
- Flexibility of the torso back.
- Back muscle strength.
- Strength of the erector spinal muscle.
- Strength of the quadratus lumbar muscle

Determine the tests for the study variables

Trunk flexibility tests

First: Torso bending test from standing forward: (Bastawisi,

1999) [6].

Purpose of the test: To measure the flexibility of the trunk and hip in forward bending movements.

Necessary tools: a graduated ruler (100 cm long), and a bench, chair, or flat table that can bear the weight of the laboratory without causing any vibration.

Description of performance: The scale (ruler) is fixed to the edge of the bench or table, with the middle of the scale being above the edge of the bench or table and the other half below the edge. The tester takes a standing position on the edge of the bench or table with the feet touching the sides of the scale, and the tester bends the torso in front of the bottom, as The fingers are in front of the scale, and from this position the tester tries to slowly bend the torso as far as possible, making sure that the fingers on both hands are at one level.

Instructions

1. The knees should not be bent during performance.
2. The laboratory has two attempts, the best of which is recorded.
3. The torso must be bent slowly.
4. You must remain stable at the last distance the laboratory reaches

For two seconds immediately after feeling pain in the back muscles.

Recording: You give the laboratory two attempts, and the best attempt is recorded.

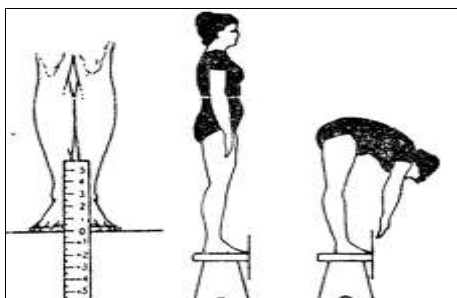


Fig 1: Shows Torso bending test from standing forward

- **Second:** Testing the trunk bending backward from standing: (Bastawisi, 1999) [6].
- **Purpose of the test:** To measure the flexibility of the spine.
- **Tools:** Leather or cloth belt, measuring tape. Instructions:
 1. The knees should not be bent during performance.
 2. The laboratory has two attempts, the best of which is recorded.
 3. The torso must be bent slowly.
 4. You must remain stable at the last distance the laboratory reaches

For two seconds immediately after feeling pain in the back muscles.

- **Recording:** You give the laboratory two attempts, and the best attempt is recorded.
- **Second:** Testing the trunk bending backward from standing: (Hassanein, 2004) [7]
- **Purpose of the test:** to measure the flexibility of the spine.

- **Recording:** The distance from the wall to the chin is measured and recorded in centimeters.

1. Tools: Leather or cloth belt, measuring tape. Performance specifications: From a standing position in front of a wall with the pelvis fixed by the belt, the tester bends the torso backward as far as possible.

Instructions

1. The feet must not be moved.
2. Each laboratory has two attempts, the best of which is credited.
3. You must stand still at the last distance the laboratory reaches

For two seconds immediately after feeling pain in the back muscles.

Recording: The distance from the wall to the chin is measured and recorded in centimeters.

1. Tools: Leather or cloth belt, measuring tape. Performance specifications: From a standing position in front of a wall with the pelvis fixed by the belt, the tester bends the torso backward as far as possible.

Instructions

1. The feet must not be moved.
2. Each laboratory has two attempts, the best of which is credited.
3. You must stand still at the last distance the laboratory reaches

For two seconds immediately after feeling pain in the back muscles.

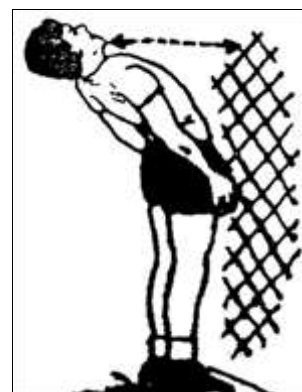


Fig 1: Shows Testing the trunk bending backward from standing

Strength tests for the back muscles

- **First: a test to measure the strength of the back muscles:** (Al-Hakim, 2004) [3]
- **Purpose of the test:** To measure the strength of the trunk and back extensor muscles.
- **Necessary tools:** A dynamometer is mounted on a suitable base for standing, and the device is attached to a 60 cm-long iron chain.
- **Description of performance:** The tester assumes a standing position on the dynamometer and then.

He bends his torso forward and down to grip the barbell. With your hands, then adjust the length of the iron chain that connects the iron bar

With a dynamometer in the form that enables the laboratory to tighten it to the top

From the position of bending the torso and straightening the knees. When the signal is given, he stands up

The test is by pulling upward, as there is a pulling movement from the torso and not from the legs, and the pulling is done slowly to produce the maximum possible force tools needed: Force sensor 200- 3EK

- **Purpose of measurement:** To measure the strength of the erector muscle
- **Unit of measurement:** kilogram
- **Description of performance:** The tester stands in a fully erect position without movement. The device is placed on the muscle.

The erector spinae, which is located on both sides of the spine, so the device begins to read the strength of this muscle Once to the right, and once to the left.

Calculating grades: Each laboratory is given two consecutive attempts, and the results of the best one are calculated.

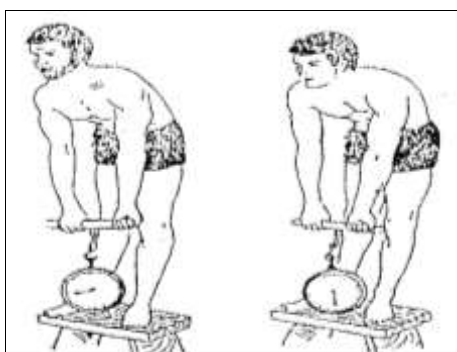


Fig 1: Shows a test to measure the strength of the back muscles

Second: Measuring the strength of the muscles working on the spine

1. Measuring the strength of the erector spinae muscle (Sacro spinalis). Tools needed: Force sensor 200- 3EK

- **Purpose of measurement:** to measure the strength of the erector muscle.
- **Unit of measurement:** kilogram
- **Description of performance:** The tester stands in a fully erect position without movement. The device is placed on the muscle.

The erector spinae, which is located on both sides of the spine, so the device begins to read the strength of this muscle Once to the right, and once to the left.

- **Calculating grades:** Each laboratory is given two consecutive attempts, and the results of the best one are calculated
- **Second:** Measuring the strength of the muscles working on the spine:

1. Measuring the strength of the erector spine muscle (Sacro spinal). Calculating grades: The laboratory tests twice for each party, and the best result is taken.

Third: Measuring the strength of the quadrates lumbar muscle

- **Tools needed:** Force sensor 200- 3EK
- **Purpose of measurement:** Measure the strength of the quadrates lumbar
- **Unit of measurement:** kilogram

- **Description of performance:** The tester stands in a fully erect position without movement. The device is placed on the quadrates lumbar muscle, which is a quadrilateral muscle that forms the posterior abdominal wall. It is located on both sides of the spine at the top of the pelvis. It bends the spine to the sides, and the device begins to read the strength of this muscle.
- **Calculating grades:** The laboratory tests twice for each party, and the best result is taken.

The two exploratory experiments

The first exploratory experiment

The researcher, in cooperation with the assistant work team (**), conducted his first exploratory experiment on Thursday (2/2/2023) in (Gym Hall for Fitness and Body Building in Samarra) at five o'clock in the afternoon, which was related to special tests on a sample consisting of (4) of the sample members and its purpose is (Saeed *et al.*, 2024) ^[14]:

- Identify and ensure the safety and how to use the devices used in tests.
- Identify and ensure the work team's ability and understanding in implementing the test items.
- Identifying the obstacles that the researcher may face and how to avoid errors that may occur during the testing process.
- Knowing the time required to conduct measurements and tests for each individual.

The second exploratory experiment

The researcher conducted his second exploratory experiment on the exercises used, core stability, accompanied by the assistant work team, at five o'clock on Sunday (2/5/2023) at (The Iron Gym for fitness and bodybuilding in Samarra) on a sample of 3 individuals from within the sample. Research and its goal are

- Identifying the suitability of the training for the study sample members.
- Arranging the exercises to suit the sample members during the training unit so as not to cause additional burdens and efforts.
- Determine the time for each exercise.

The main experiment

Pretests

The researcher conducted the tests under his supervision and with the assistance of the assistant work team at exactly four o'clock in the afternoon on Friday, February 10, 2023, at the Iron Gym for fitness and bodybuilding in Samarra. The tests included testing the strength of the back muscles using a force sensor (The strength of the erector spinae muscle). The vertebral column and the strength of the quadratus lumbar muscle) were followed by a back muscle strength test, followed by two tests of flexibility for the torso from the front and back. The assistant work team confirmed, before conducting the tests, that the sample members performed a good general and specific warm-up, especially for the torso, to avoid injury or worsening of pain.

Rehabilitation exercises designed for core stability

After reviewing many sources and research that dealt with exercises for core stability, a group of exercises for this method was prepared for the purpose of achieving the goal of achieving the goal. In forming these exercises, the situation of the sample members and the condition they suffer from in terms of the presence of pain in the lower back was taken into

consideration. Therefore, the intensity of all exercises was within the limits of pain, so as not to cause aggravation and increase the appearance of pain in them. The exercises' vocabulary was applied over a period of two months, with 3 training units and a total number of 24 training units. The training units were applied starting on Sunday, corresponding to 2/12/2023, until the last training unit on Thursday, corresponding to 4/13/2023, as the researcher relied on the training process based on the method of high-intensity interval training, in a way that is compatible with the capabilities of the sample members and their physical level. A group of exercises was formed based on the number of repetitions, time, and rest between repetitions and groups while noting that these exercises were given within the limits of pain, as the performance was for 15 seconds of work corresponding to it. 30 seconds of rest, 6 repetitions for each set, while the load components for the rest of the weeks were formed according to the same principles followed and the time of the training units ranged between (24 minutes - 30 minutes).

Post-tests

The researcher gave a 24-hour rest period after completing the application of the qualifying units on the study sample, and the test was administered on Saturday, April 15, 2023, as the researcher was keen to create all the environmental, psychological, and research conditions in which the pre-tests were conducted, after which the private data was obtained. By testing and subdividing it into special forms for statistical treatment.

Statistical methods

The researcher used statistical methods relevant to the study, relying on the statistical bag Spss (Value (t) Calculated, Arithmetic mean, Standard deviation) (Adham Ali *et al.*, 2022) [2]

Results

Displaying the results of the pre-and post-tests for the variables under study in the research sample.

Table 1: It shows the arithmetic means, standard deviations, calculated (t) value, sig value, and the type of significance between all the results of both the pre-and post-tests for the variables under study

Variables	Measuring unit	Pretest		Posttest		Value (t) Calculated	Sig value	Type indication
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Flexibility of the torso forward	Cm	2.984	0.284	9.847	0.630	6.248	0.000	Moral
Flexibility of the torso back	Cm	4.628	0.419	8.333	0.217	4.990	0.000	Moral
Back muscle strength	Kg	68.516	6.644	80.166	7.128	6.238	0.000	Moral
Force sensor of the right erector muscle	Kg	10.583	3.287	16.083	4.151	5.892	0.000	Moral
Force sensor of the right erector muscle	Kg	11.333	2.163	15.833	2.886	4.913	0.000	Moral
Force sensor for the quadratus lumbar muscle	Kg	12.484	4.048	16.972	3.896	3.891	0.011	Moral

Discussion

Discussing the results of the pre-and post-tests of the variables under study among the research sample

Through Table (1), which shows that there are differences between the pre- and post-tests and in favor of the post-tests, based on the values of the arithmetic averages and the SIG value, which was less than 0.05, which indicates that there are differences that can be observed between the averages for all values of muscular strength, and the researcher attributes this to the effectiveness of The special rehabilitation exercises that were applied to the sample members, specifically to the core stability area, which contributed to focusing on the elements of strength and stability of the back muscles, especially the lower back, which in turn contribute to developing their basic base These exercises contributed to the adaptation of the core muscles in the ability to adapt and adapt to the burdens and high efforts on these muscles, since strength and stability exercises according to different times work to gain more strength for the back muscles, especially the muscles working in the torso area, and this was confirmed by a study (Lovelace, 2012) [12], indicated that the strength of the core muscles contributes to increasing both stability and balance, which in turn are important in torso movements and other movements that require muscular strength, especially for the chest, shoulder girdle, and arms, since the torso is the basis for the process of transferring force and movement between the two limbs. "Lower and upper", While a study 6 (Tsukagoshi *et al.*, 2011) [17] indicated that it is necessary for athletes to be exposed to special exercises in the core area because it gives the back muscles strength, stability and balance. In addition, the strength of the torso area must be strong because it contains a large number of muscle groups

that may reach 29 pairs of muscles (Slade & Keating, 2006) [16]. Therefore, they recommended the necessity of strengthening this area through core exercises so that the player can control his body, as well as reducing motor transmission errors so that motor performance is more compatible and smoother and does not cause pain or injuries in the lower back area, as often occurs as a result. Weight training or as a result of incorrect performance (Hibbs *et al.*, 2008) [9] pointed out, core stability exercises represent a recent trend in the field of medicine, sports rehabilitation, and preparing athletes, as they aim to increase the coordination process between the work of the muscles surrounding the spine, abdomen, back, and glutes. In addition, these exercises are limited to preventing the occurrence of injuries. Alleviating back pain and maintaining body shape" (Marshall *et al.*, 2011) [13].

Conclusion

- Core stability exercises contributed to improving the level of flexibility and strength of the torso among the study sample
- Core stability exercises contributed to reducing lower back pain by increasing the level of flexibility and strength of the torso
- Core stability exercises put more effort than usual on the core muscles and stability in this position, which in turn made these muscles adapt to strength training and stability according to the targeted exercise position

Considering the conclusions, the researcher recommends the following

- The necessity of adopting core stability exercises as part

of rehabilitation curricula for back pain.

- The need to pay attention to developing preventive training programs for the core muscles because of their importance in many sports movements and events.
- The necessity of creating programs using other training methods that address strength, stability, and flexibility and comparing them with core stability exercises.

Conflict of Interest

The authors declare that there are no conflicts of interest.

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References

1. Abdel Razzaq MQ. The effect of using core stability exercises to develop the muscles surrounding the spine and to relieve lower back pain. *J Sports Sci. Appl.* 2016, 87.
2. Adham Ali O, Hamid Ahmed W, Saeed Abd AQ, Nafi Hummadi J. Effect of a proposal of exercises on the development of basic motor abilities in men's artistic gymnastics. *SPORT TK-Revista EuroAmericana de Ciencias Del Deporte.* 2022, 27. DOI: 10.6018/sportk.539131.
3. Al-Hakim AS. Tests and Measurement. National Library; c2004.
4. Ali O, Mushref A, Hummadi J, Awad A. The effect of a proposed training curriculum to develop some special physical abilities and the accuracy of the movement scoring skill for the Ramadi football club players. *Retos.* 2024;61:193-200. DOI: 10.47197/retos.v61.107271.
5. Aluko A, DeSouza L, Peacock J. The Effect of Core Stability Exercises on Variations in Acceleration of Trunk Movement, Pain, and Disability During an Episode of Acute Nonspecific Low Back Pain: A Pilot Clinical Trial. *J Manipulative Physiol Ther.* 2013;36(8):497-504.e3. DOI: 10.1016/j.jmpt.2012.12.012.
6. Bastawisi A. Foundations and theories of sports training. Dar Al-Fikr Al-Arabi; c1999.
7. Hassanein MS. Measurement and Evaluation in Physical Education and Sports. Vol. 6. Dar Al-Fikr Al-Arabi for Printing and Publishing; c2004.
8. Hayden JA, Ellis J, Ogilvie R, Malmivaara A, van Tulder MW. Exercise therapy for chronic low back pain. *Cochrane Database Syst Rev.* 2021, 2021(10). DOI: 10.1002/14651858.CD009790.pub2.
9. Hibbs AE, Thompson KG, French D, Wrigley A, Spears I. Optimizing Performance by Improving Core Stability and Core Strength. *Sports Med.* 2008;38(12):995-1008. doi: 10.2165/00007256-200838120-00004.
10. Hlaing SS, Puntumetakul R, Khine EE, Boucaut R. Effects of core stabilization exercise and strengthening exercise on proprioception, balance, muscle thickness and pain related outcomes in patients with subacute nonspecific low back pain: a randomized controlled trial. *BMC Musculoskelet Disord.* 2021;22(1):998. DOI: 10.1186/s12891-021-04858-6.
11. Human KF. Anatomy and Physiology. 3rd ed. Benjamin-Cummings; c2006.
12. Lovelace B. Training for volleyball resources eBook. www.barrylovelace.com; c2012. Available from: <https://www.barrylovelace.com>.
13. Marshall PW, Desai I, Robbins DW. Core Stability Exercises in Individuals with and without Chronic Nonspecific Low Back Pain. *J Strength Cond Res.* 2011;25(12):3404-3411. DOI: 10.1519/JSC.0b013e318215fc49.
14. Saeed S, Khalaf Y, Ali O. A comparative study in the management of reducing organizational conflict between secondary school principals and supervisors from the point of view of sports teachers in Ramadi Education. *Glob Health Int. J Health Sci Public Health Pharm.* 2024;1(3):1-10. doi: 10.70062/globalhealth.v1i3.17.
15. Skundric G, Vukicevic V, Lukic N. Effects of Core Stability Exercises, Lumbar Lordosis and Low-Back Pain: A Systematic Review. *J Anthropol Sport Phys Educ.* 2021;5(1):17-23. DOI: 10.26773/jaspe.210104.
16. Slade SC, Keating JL. Trunk-Strengthening Exercises for Chronic Low Back Pain: A Systematic Review. *J Manipulative Physiol Ther.* 2006;29(2):163-173. DOI: 10.1016/j.jmpt.2005.12.011.
17. Tsukagoshi T, Shima Y, Nakase J, Goshima K, Takahashi R, Aiba T, *et al.* Relationship between core strength and balance ability in high school female handball and basketball players. *Br J Sports Med.* 2011;45(4):378.1-378. DOI: 10.1136/bjism.2011.084038.191.