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Dr. Emad Khalif Jaber Al-Aaseemi

Lecturer, College of Physical Education and Sports Sciences, University of Wasit, Iraq

Dr. Baha Muhammad Taqi Almusawi

Professor, Lecturer, College of Physical Education and Sports Sciences, University of Wasit, Iraq

A therapeutic regimen using Pilates exercises to strengthen the axis muscles and its effect in relieving lower back pain

Dr. Emad Khalif Jaber Al-Aaseemi and Dr. Baha Muhammad Taqi Almusawi

Abstract

The study aimed to prepare a treatment regimen using Pilates exercises to strengthen the axis muscles to relieve lower back pain for people suffering from lower back pain and to identify the effect of the therapeutic regimen in relieving lower back pain. The Specialized Center for Physiotherapy and Physical Rehabilitation in Al-Kut Sports Club and their ages were between (45-55) years, and a questionnaire was prepared to measure the level of pain in the lower back area, where it was presented to the research sample and answered before starting the implementation of the program and after its completion and unloading the verbal answers And treated statistically, the researchers concluded the following:

1. The therapeutic regimen has a positive effect in relieving lower back pain among the research sample.
2. The study reported that Pilates exercises directed for therapeutic purposes have a positive effect in relieving lower back pain by strengthening the axis muscles.
3. The researchers recommended the following:
4. Generalizing the therapeutic system to physiotherapy centers in Iraq as a treatment system that relieves lower back pain and strengthens the axis muscles.
5. The use of Pilates exercises for people with lower back pain because of its effective effect in improving the balance of the body, increasing its flexibility, and strengthening the muscles. They are comprehensive exercises that rehabilitate the body from all sides.
6. Organizing joint scientific and practical courses between specialists in sports medicine and physiotherapy to bring the scientific views of these therapeutic sports systems closer, as they have become one of the most requested exercises in fitness centers around the world.

Keywords: Pilates, axle, pain, back

Introduction

Lower back pain is one of the main obstacles to the activity of the individual, as the accompanying lower back pain does not give stability and comfort, and prevents him from performing various professional and life tasks. The spine is a complex machine and any injury, no matter how small in the cartilage, ligaments, or muscles, can cause pain syndrome The lower back, in addition to the injury to the nervous tissue, is the first line of defense for the musculoskeletal system of the human body, which is the muscles, where the imbalance of muscular forces, and the weakness of the abdominal muscles lead to pressure on the vertebrae, and they become compressed and approach one another, and this is what loses the cartilage between the vertebrae its flexibility and the defect is considered In the function of the axis muscles, one of the most common causes of these causes is the weakness of daily movement and the lack of exercise. The function of the axis muscles is to hold the spine in the correct position, and the wrong alignment of the body affects the proper texture of the back, which gradually transfers its effect with the passage of time on the safety of backbones. One of the means of treating and relieving this pain or delaying its appearance is through specialized exercises and therapeutic sports systems represented by Pilates exercises, which are physical and therapeutic exercises at the same time. It was adopted by dancers in the United States, as a way to get rid of injuries.

Corresponding Author:

Dr. Emad Khalif Jaber Al-Aaseemi

Lecturer, College of Physical Education and Sports Sciences, University of Wasit, Iraq

“And to restore flexibility, cohesion and strength to the axial muscles, ligaments, and muscles that stabilize the joint and vertebrae, as well as a balanced nutrition, and the treatment may not be limited to exercise and nutrition only in some cases, and this matter is estimated by the treating physician” (Ahmed, 2002) ^[1]. The importance of research is focused on preparing a therapeutic regimen that includes Pilates exercises directed at treating lower back pain, by strengthening the axis muscles, to contribute to alleviating and reducing the health problems facing people in their public lives.

Research problem

Looking at the emergence of modern diseases through the rapid technological developments that the world is currently witnessing, which is offset by the lack of movement by people as a result of these developments and the consequent complications and weakness in the muscles, especially the axis muscles, and lower back pain may develop into a herniated disc as a result of lifting weight or sudden movement, as well as about the lack of directed sports systems interested in this case, as far as the researchers know, so the researchers decided to prepare a therapeutic sports system that is practiced at home or anywhere to strengthen the axis muscles and relieve lower back pain in the research sample.

Research aims

1. Preparing Pilates exercises through a therapeutic exercise regimen to relieve and treat lower back pain.
2. Recognize the effect of the therapeutic regimen in relieving and treating lower back pain by strengthening the axis muscles.

Force search

1. The therapeutic exercise regimen has a positive effect in relieving lower back pain and strengthening the axis muscles.

Research areas

1. The human field: Persons who visit the Specialized Center for Physiotherapy and Physical Rehabilitation in Al-Kut Sports Club, who suffers from lower back pain.
2. Spatial domain: for the Specialized Center for Physiotherapy and Physical Rehabilitation in Al-Kut Sports Club.
3. Time range: from 1/11/ 2021 to 5/1/ 2022.

Previous and similar studies

1. Rogers K, Gibson AL (2009) ^[6], conducted a study aimed at identifying the effectiveness of Pilates exercises on the thickness of the shoulder and back muscles and improving general fitness. The researchers used the experimental method, and the study sample included (17) individuals. The most important results indicated that Pilates exercises significantly increased the thickness of the shoulder and back muscles, which led to an improvement in general fitness.
2. (Sherine Youssef, 2010) ^[7] conducted a study aimed at identifying the effect of Pilates exercises on the physical variables associated with (kinetic sensation, flexibility, strength of abdominal muscles, strength of back muscles, strength of muscles of the legs) and the level of nervous stress. And to improve the level of skill performance (stop strike, time strike), and the researcher used The experimental approach, and the research sample included

(34) students, from the fourth year students, at the Faculty of Physical Education for Girls in Zagazig, and the most important results indicated that the proposed Pilates exercises have a positive effect on improving the psychological aspect, and reducing the nervous stress that the students were exposed to, as well as it has a positive effect on improving performance.

3. Kloubec JA *et al.* (2010) ^[4], conducted a study aimed at identifying the effect of Pilates exercises on the abdominal, pelvic and upper extremity muscles and their effect on balance and the body's ability to maintain a proper posture. The researcher used the experimental method, and the research sample included (50) individuals. The most important results indicated that Pilates exercises increased the endurance of the abdominal muscles, the flexibility of the pelvic muscles, the endurance of the upper body muscles, and the increase in the body's ability to balance and maintain a stable body position for a long time.

Research Procedures

Research Methodology

The researchers used the experimental method for its suitability and the nature of the research.

The research sample

The research community included the injured people who had lower back pain, and the sample was chosen in a deliberate manner from the persons who visited the Specialized Center for Physiotherapy and Physical Rehabilitation in Al-Kut Sports Club, and their number was (15) and their ages ranged from (45-55) years.

Field research procedures

After the research idea, the two researchers prepared a therapeutic sports system, which includes Pilates exercises based on scientific sources and previous and similar studies, and then it was presented to a group of experts in the field of sports medicine, physical therapy and training physiology. They made their observations on it in Appendix (1), and the two researchers also prepared a questionnaire containing a set of questions through which the level of lower back pain among the affected people is identified. This form was prepared based on similar research and specialized scientific sources as shown in the appendix. (2). Then the form was presented to the same experts mentioned above, who evaluated and revised this treatment system from a scientific point of view, and made their amendments to the questions expressing the level of pain. The pain questionnaire, the researchers coordinated with the reviewers of the Specialized Center for Physiotherapy and Physical Rehabilitation in the Kut Sports Club, through which the research sample will be contacted, after explaining the idea of the study and the therapeutic sports system. With the help of physiotherapists in physiotherapy and rehabilitation centers in the process of examination and diagnosis of the condition of the patient with lower back pain to involve them in the research, then the researchers dealt with cases that are referred by therapists, in physiotherapy and rehabilitation centers. Where first the questions of the questionnaire related to lower back pain are answered, then the first week of the curative sports system for Pilates exercises begins, as it is explained to the injured and how to perform them and clarification for any inquiries regarding exercises and the method of performance, and so the work continued throughout the research period, and after

each member of the sample For the duration of the therapeutic exercise regimen, the lower back pain questionnaire is repeated on the same paragraphs again, in order to know the effect of the therapeutic regimen of Pilates exercises in the level of pain.

Therapeutic regimen of Pilates exercises

After the preparation of a therapeutic regimen that includes Pilates exercises, as previously explained in the previous paragraph, one of the procedures was adopted in the research as a major variable. If the therapeutic sports system consists of (8) weeks, each week contains (5) therapeutic sports units for each day of the week, and a therapeutic sports unit except on Friday and Saturday, and the time of the therapeutic sports unit ranges from (30) minutes to (45) minutes, according to the gradation of intensity, size and rest times between exercises, and between the repetitions of a single exercise, as well as the number of exercises for each unit, the total units of the therapeutic sports system will be (40) therapeutic sports units. (Fixed force and mobile force) to strengthen the muscles of the body from the abdomen, pelvis, back, etc. and exercises fixed flexibility and mobile flexibility to give the body flexibility and high strength and balance exercises as it coordinates the body appropriately, and gives the body the ability to streamline physical movement and relieve joint and muscle pain, back pain and column pain. (Michael, 2001) ^[5], was arranged in a way that ensures the safety of the axis muscles working in the exercises from fatigue and taking into account all the circumstances surrounding the time and place and the available tools and taking into account the gradation from difficulty to ease. An exercise in the therapeutic system to facilitate the understanding and method of performing each exercise, if the exercises were practiced by the research sample (at home) as well, because they are simple exercises

devoid of complexity and this is the goal of the sports system that this system has been practiced by individuals in general, and the follow-up of the exercise performance from the review table of the Physiotherapy and Rehabilitation Center, and Appendix (1) shows the therapeutic system of exercises (Pilates).

Statistical methods and data processing

The raw data was processed after converting the verbal answers to numerical, to be values expressing the level of pain, where a value of (1) was given for the answer (no pain), a value of (2) was given for the answer (weak pain), and a value of (3) was given for The answer (medium pain), and a value of (4) was given for the answer (severe pain), to the questions directed to the research sample in the pain questionnaire. Then the total answers to all the questions were obtained for each member of the research sample, before the therapeutic sports system and after the completion of the system. After that, the researchers processed the data statistically, using the law (T) for interrelated samples of equal numbers to identify the significance of the differences between the two tests (the title).

Me and the dimension) through the pain questionnaire, the lower numerical mean will be the better, as the lower the value expressing pain, the less the pain level.

Statistical means:

The researchers used the following statistical methods:

1. Arithmetic mean.
2. Standard deviation.
3. Law (T) of Correlated Samples (Wadih, 1996) ^[8]

Results

Table 1: It shows the raw scores of the variables (age, weight and height) of the research sample individuals.

T	Age	Weight	Height
1	46	72	168
2	50	71	172
3	55	69	168
4	53	73	169
5	51	81	174
6	54	73	173
7	48	76	172
8	54	78	175
9	45	69	172
10	47	65	171
11	50	75	169
12	52	72	174
13	54	74	169
14	48	77	170
15	49	65	173

Table (1) shows the raw scores for the variables (age, weight and height) among the research sample members. The ages of the injured ranged between (45-55) years, while their weights

ranged from (65-81) kilograms, and their heights ranged between (168-175) centimeters.

Table 2: It shows the arithmetic means and standard deviations of the variables (age, weight and height) among the research sample members

Statistical variables	Age	Weight	Height
Arithmetic mean	50.4	72.66	171.26
standard deviation	3.73	4.82	4.20

Table (2) shows the arithmetic means and standard deviations of the variables (age, weight, and height) for the research sample individuals. The mean for ages was (50.4) years, with a standard deviation of (3.73), and the mean for weights was

(72.66) kg, with a standard deviation of (4.82), and the mean for heights was (171.26) cm, with a standard deviation of (4.20).

Table 3: Shows the arithmetic means and standard deviations of the low back pain questionnaire before and after the implementation of the treatment regimen.

lower back pain dimensional	lower back pain tribal	Variables Statistical means
23.87	56.65	Arithmetic mean
1.96	5.17	standard deviation

Table 4: Shows the (T) values calculated between the lower back pain questionnaire between pre-post for the lower back region, as well as the (T) value calculated between the post- and post-lumbar pain questionnaire for the lower back region

Between the dimensional and the dimensional for lower back pain	Between pre and post for lower back pain	Variables Statistical means
3.13	28.97	Calculated T-values

The value of (T) tabular at an error rate of (0.01) and corresponding to the degree of freedom (14) is (2.28). It is clear from table (3) the values of the arithmetic means and standard deviations of the questionnaire of the level of lower back pain, before and after, and the values were highly significant, as well as the table shows (4) The (T) value calculated between the two posttests for lower back pain to know the effect of the therapeutic regimen towards relieving lower back pain. The arithmetic means to find out which one is better, we found that the arithmetic mean value of the post-test of the lower back pain questionnaire is (23.87) which is less than the arithmetic mean value of the pre-test which is (56.65), and since the lower value is the criterion of improvement, as the lower the score, the lower the level of pain, therefore, the therapeutic exercise regimen had a clear effect in relieving the level of pain. The researchers attribute that the high moral value of the differences indicates the effectiveness of the therapeutic system in relieving pain, and some doctors confirm, "It is possible to reduce or relieve joint pain of the lower extremities, and lower back pain, by following special exercises, while adhering to healthy postures in sitting and at work, With the use of medical shoes" (Ahmed, 2002) ^[1], the researchers noticed, through the questions directed to the research sample, that everyone resorts to the treatment of lower back pain to pain-relieving drugs, and they did not go to physical therapy as an important way to treat this pain, despite the confirmation of studies and research The importance of physical therapy in treating lower back pain, and strengthening the axis muscles surrounding the spine. This indicates the weakness of the educational aspect in the treatment, and perhaps the reason is not the injured person but the treating doctor as if the treatment was only with medicines, and this is confirmed by studies and research where (you can rely on Pilates exercises to treat back pain, without the need for medicines and analgesics, as they are exercises that target the muscles of the trunk, back, and stomach, and works to lengthen all the muscles of the body, through the full range of movement. This combination of strengthening and lengthening helps in obtaining strong, long, thin muscles, and these exercises improve strength, muscle tone, flexibility, and balance for the body. It is based on body weight, and without the need for additional equipment and devices (Denise, 2002) ^[2], and the lack of exercise in general leads to weakness in the axis muscles, and leads to the emergence of pain in the lower back as a result of carrying excessive weight incorrectly or sudden movement. Where (these exercises depend on the basic strength or the so-called intrinsic strength, as it depends on the development of balance in the body to reach the deep muscles represented in the axis muscles (inner abdomen and back), and train them so that

Table (3) shows the mean values and standard deviations of the lumbar region pain questionnaire, before starting the implementation of the therapeutic sports regimen and after implementing it. Where the arithmetic mean for lower back pain before the treatment regimen was (56.65) degrees, with a standard deviation (5.17), while the arithmetic mean after the arithmetic treatment regimen was (23.87) degrees, and with a standard deviation (1.96).

They focus on basic strength, balance and flexibility) (Dian, 2006) ^[3].

Conclusions

1. The therapeutic exercise regimen had a positive effect in relieving lower back pain among the research sample.
2. This study revealed that Pilates exercises directed for therapeutic purposes have a positive effect in relieving lower back pain by strengthening the axis muscles.

Recommended

1. Dissemination of the therapeutic sports system to physiotherapy centers in Iraq as a therapeutic system that relieves lower back pain.
2. The use of Pilates exercises for people with lower back pain, because of their effective effect in improving the balance of the body, increasing its flexibility, and strengthening the muscles. They are comprehensive exercises that rehabilitate the body from all sides.
3. Organizing joint scientific and practical courses between specialists in sports medicine and physical therapy to bring the scientific and practical points of view of these therapeutic sports systems closer, as they have become one of the most required exercises in fitness centers around the world.






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Appendix 1: Therapeutic sports system for exercises Pilates

<i>T</i>	<i>Name and perform preventive exercises</i>	<i>pictogram</i>
1	<p>Pelvic Curl exercise <i>(His steps: to lie on the back and bend the knees so that they are almost straight with the ground and then extend the hands straight on both sides of the body, the width of the sports mat. Then press the hands on the ground and raise the upper part of the body to the top. Keep the feet steady. Keep the back Tightened, head .on the floor Repeat the exercise 3 to 5 times</i></p>	
2	<p>SwanPrep <i>and His steps: Lie on your stomach. Then put your hands adjacent to the sides of the body. Bend the elbows so that they are directly under the shoulders. And keep the feet extended back straight. Then raise the upper body using the hands so that you feel a lengthening in the spine and tension in the muscles .Repeat the exercise 3 to 5 times</i></p>	
3	<p>Child <i>His steps: kneeling, and sitting on the heels of the feet, so that the soles of the feet are up. Then bring the feet together. And open the knees and bend forward and the knees at least the distance of the hips. Then bend the body on the thighs so that the forehead touches the ground. Extend the arms forward, so that you feel an elongation in the spine. Then breathe deeply and keep relaxed, not tightening the neck, lower back, or hips. Hold this position for a while, it may take a few minutes back, or hips. Hold this position until you feel fully relaxed</i></p>	
4	<p>Standing Roll-Down <i>Steps: Stand straight and tight. Then spread the feet at the level of the pelvis. And take a breath while raising the hands and lower your back and exhale and up together behind the head. Then touch your toes with your hands, without bending your knees. Then go up to a sitting position on the chair. Return to the first position. Repeat the steps 5 times</i></p>	
5	<p>Double-leg Stretch <i>extend your feet. His steps: lie on your back and raise the shoulders a little off the ground. Tighten the stomach muscles to relieve pressure on the lower back. Then raise your hands up together and behind the head. With one movement, pull the feet over the hands towards them, then together towards the chest and return to the previous position. Repeat the exercise 10 to 15 times</i></p>	

6	<p>Scissors exercise steps: Lie on your back. Then lift the neck with the shoulders slightly off the floor. Then lift your left foot slightly off the ground. Then raise your right foot toward the ceiling. Move the hands toward the ankles. Repeat the steps with the other foot. Repeat the exercise 10 times for each foot</p>	
7	<p>exercise(Hundred s Steps: Lie on your back. Then extend your hands ' es. Lift the neck, head and shoulders slightly off the floor. at your sid Raise the feet so that the thighs form a right angle with the ground, so that the abdominal muscles are taut and the lower back is on the floor. ght toward the And extend the hands forward and raise them strai .knees. Then repeat the exercise 100 times</p>	
8	<p>Swan exercise (His steps: lie on the stomach. Lift your feet slightly off the ground so that it does not put pressure on the lower back. Raise her than the feet. Then the head and chest a little higher to a level hig start moving the hands without bending the elbows forward, then bring them back so that they form the letterW In English, repeat the .exercise from 5 to 8 times</p>	
9	<p>Roll-Up nd exercise steps: Lying on the back. Raise the hands up. A raise the upper part of the body a little, paying attention to maintaining the muscles of the back and stomach tight. Then complete the lift by extending the hands forward towards the toes. Return to the .e exercise 5 timesfirst position and repeat the exercise. Repeat th</p>	

Appendix 2: Questionnaire form (the degree of pain in the lower back)

T	Questions	intensity of pain			
		Weak	Center	Intense	There is no
1	Is there pain when sleeping on the back?				
2	Is there pain when lying on one side?				
3	Is the pain present during regular sitting for a long time?				
4	Does the pain increase in severe cold?				
5	Is the pain present when bending the stem right or left?				
6	Is there pain when walking a long distance and standing for a long time?				
7	Is the pain present at the intersection of the legs while sitting?				
8	Is there any pain when you try to bend the stem to the ground?				
9	Is there pain when bending the stem back?				
10	Is the pain present when resting and when standing?				
11	Is there pain when the stem rotates right and left?				
12	Are there any disturbances in the urination process?				
13	Is there pain when carrying heavy things?				
14	Does pain appear when lifting the legs outstretched to the top?				
15	Is pain present when performing daily activities?				
16	Is back pain accompanied by pain in the thighs and knees?				
17	Is there pain when pressing on the lumbar region?				
18	Is there any pain right after waking up?				