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Using the Body Tech device with some physical exercises for aortic pain syndrome, it affects the range of motion and spinal deviation

Sajjad Muhammad Hassan [1] **Kamel Shanin Manahi** [2] **Zainab Abdullah Mahmoud**
University of Basra / College of Physical Education and Sports Sciences [1,2]
University of Basrah / College of Medicine [3]

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Abstract

The importance of research into using the Body Tech electrical stimulation device with physical exercises lies in getting rid of spasms occurring in some trunk muscles, as well as alleviating the pain occurring in this injury. The research aimed to use the body trainer and physical exercises to treat aortic pain syndrome and assess their effect on the range of motion and spinal deviation. The researcher employed an experimental approach with a single-group design, and the research sample consisted of players with aortic pain syndrome. A rehabilitation program was then developed for them. The most important conclusions were: The results showed that the use of the electrical stimulation device (Body Tech) led to a reduction in the pain associated with the injury and thus an increase in the range of motion in the shoulder joint. It was recommended: It is necessary to prepare the muscles of the trunk and both sides so that there is no deviation in the vertebrae of the spine. Evaluate the imbalance in the strength of the muscles of the sides of the trunk.

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1- Definition of research

1.1 Introduction and importance of research

Rehabilitation in physical injuries depends on the development of devices for physical therapy, as it works to solve many problems related to injury, as countries are racing to innovate these devices in line with the nature of injuries, as well as accelerating the treatment of these injuries as soon as possible to save time Sports return to exercise again, including electrical stimulation devices, which have evolved significantly from large-sized tabletop devices to portable devices, as well as evolved to the stage of using electrical stimulation for most of the muscles of the body using Special suits worn by the injured and muscles are stimulated using special electrodes tied to these suits in order to treat many physical injuries, including injury to muscle spasms,(Moseekh, 2022) especially injury to aortic syndrome that affects players and this injury is widespread in players, especially at some times of the year, especially in some times of the cold, and not training the back muscles and developing the muscles of the trunk, which leads to spasm of some muscles as well as the use of some physical exercises that help in breaking these spasms and from here lies The importance of research to use the physical electrical stimulation device with physical exercises in getting rid of spasms in some muscles of the trunk as well as relieving pain in this injury.

2.1 Research issue

Aortic syndrome aorta syndrome abounds in many players and many events, including football, as many players depend on the development of muscles for this event, especially the lower limb, and may neglect or not be neglected or not properly developed by all the muscles of the body as well as the wrong habits of sitting Waller Fuel for many players may lead to weakness in these muscles at the expense of the muscles on the opposite side, which leads to some temporary deviations of the column Vertebral and as a result of pain in these muscles lead to the identification of the shoulder joint associated with these muscles and weakness of the muscle strength of the muscles of the shoulder and trunk and through the researcher's knowledge of this injury and the method of treatment in the traditional way, including painkillers drugs and some primitive methods in its treatment The researcher saw the use of a modern method in the treatment of this injury that does not have harm through the use of a modern device for electrical stimulation with some physical exercises and get rid of this injury as soon as possible with the development of the trunk muscles for lack of This injury occurs again.

3.1 Research Objective:

1- Preparing rehabilitation exercises using the (Body Tech) device to treat aortic pain syndrome injury and the effect on the range of motion and spinal deviation

4-1 Research hypothesis:

1- The existence of significant differences for pre- and post-tests using the body-tech device and some physical exercises in the research variables

5.1 Research areas

1-5-1 **Human field:** (9) players for the game of football with aortic pain syndrome

2.5.1 **Time Range:** for the period from 9/1/2024 to 7/5/2024

3.5.1 **Spatial field:** Postgraduate Laboratory at the College of Physical Education and Sports Sciences at the University of Basra, Physiotherapy Center at the Consultative Center of the College of Medicine, University of Basra.

3- Research Methodology and Field Procedures:

3-1 Research Methodology:

The nature of the study is what determines the selection of the appropriate scientific research program where the choice of research methodology of the first basic steps through which the researcher initiates, the program "is the way pursued by the individual until he reaches a certain goal" (Khataiba, 1997) and due to the nature of the problem has used the researcher experimental program as it fits the solution of the research problem based on one of the forms of experimental designs with pre- and post-measurement for one experimental group.

3.2 Research sample:

The research sample was selected deliberately from the players with aortic pain syndrome in some clubs of Basra Governorate, consisting of 9 football players, and after presenting the players to the specialist doctor,* he conducted clinical examinations for the injury.

3.3 Devices and tools used in research and means of collecting information:

* Goniometer device (to measure the range of motion) ، NERVO-SCOPE device (to measure spinal deviation)، Iranian-made X-Body، A medical bed to perform therapeutic exercises ، Medical Scale ، Water spray ، Length tape measure ، Stopwatch ، Rubber bands (open, closed) ،

* Dr. Zainab Abdullah Mahmoud is a specialist in arthritis and medical rehabilitation.

Chair ، Tennis balls ، Towel to perform exercises ، Camera ، Sources and references ، Tests and measurements used ، A form specifying symptoms in football players ، Personal interviews with (academic experts, coaches, football players)

3.4 Field research procedures:

3.4.1 Identification of variables, their tests, and scientific foundations:

-Diagnosis of the type of injury:

After the initial identification of the members of the research sample through a form prepared by the researcher in advance in agreement with the supervisors, the researcher presented the population of the research sample to the specialist in anthropology and medical rehabilitation to conduct a clinical examination by asking some questions about the symptoms of aortic pain syndrome as well as conducting the necessary tests such as:

3.4.2 Research tests

1- **TEST NAME** NERVO-SCOPE:

Purpose of the test: The test aims to measure the deviation in the spine

Tools used: NERVO-SCOPE, Medical Bed

How to work: The injured person sits on the bed normally, and the researcher puts the NERVO-SCOPE device on the back of the injured person in the spine area and moves the device from the bottom of the vertebrae to the top or vice versa, as in Figure 1.

Sign up: Through the movement of the cursor, which gives the degree of deviation on the device screen, the researcher writes the score and saves it.

Figure (1)

DEMONSTRATES THE SCAN METHOD FOR NERVO-SCOPE

Range of motion tests using a goniometer

1- **Test name:** Forward Flexion.

Purpose of the test: Measure the intensity of pain by moving the arm forward from the dimensional position

Tools used: Goniometer

How to perform the test: The injured person takes a standing position with the arm raised until the feeling of pain and stopping, and the researcher who stands next to the injured person puts a goniometer to determine the range of motion reached by the injured person during the performance of the test by measuring the angle between the arm and the body of the injured and as shown in Figure (2), noting that the normal measurement of this test is 0-165).

Registration: The score is calculated by the angle indicated by the device.

Figure (2)

2- **Test name:** Arm Backwards

Purpose of the test: to measure the intensity of pain by moving the arm backwards.

Tools used: Goniometer

How to perform the test: The injured person takes a standing position with the arm raised back until the feeling of pain and stopping, and the researcher who stands next to the injured person puts a goniometer to determine the range of motion reached by the injured person during the performance of the test by measuring the angle between the arm and the body of the injured and as shown in the picture (3) note that the normal measurement of this test is 0-60).

Registration: The score is calculated by the angle indicated by the device.

Figure (3)

2- **Test name:** horizontal flexion and adduction

Purpose of the test: Measure the intensity of pain by flexing the arm horizontally and rounding inward.

Tools used: Goniometer, chair

How to perform the test: From the position of sitting on the chair bend the arm horizontally in front of the body and bring it closer to the inside until the feeling of pain and stop and the researcher who stands next to the injured put a device Junyommeter to determine the range of motion reached by the injured person during the performance of the test by measuring the external angle between the arm and the body of the injured and as shown in the picture (4) note that the normal measurement of this test 0-140).

Registration: The score is calculated by the angle indicated by the device.

Figure (4)

1-Test name: The range of motion of the elbow joint from the forward support position

Purpose of the test: Measurement of the range of motion of the elbow joint using body weight and strength of the arm and shoulder muscles

How to perform: The player takes the position of the front support on the ground so that the body is upright and the arms are fully extended, and at the start signal, the laboratory bends the elbow joint slowly, and when the pain is felt, it stops to record the angle of the elbow

Figure 5 shows

The range of motion of the elbow joint from the forward support position

3.5 Exploratory experiments:

The exploratory experiment was conducted on 9/1/2024 in the hall of graduate studies laboratories at the College of Physical Education and Sports Sciences at the University of Basra to identify the most important obstacles that researchers may face during the main experiment.

3-6 **Field experience:**

3.6.1 Measurements and pre-tests:

The measurements and pre-tests were conducted on Tuesday, 16/1/2024, at exactly nine o'clock in the morning at the Faculty of Physical Education and Sports Sciences, and the number of the tested sample was 5 out of 9 because the sample was not fully available at the same time.

3.6.2 The main experience (application of the rehabilitation program):

The main experiment for the first injured player was conducted on Wednesday 17/1/2024 at exactly four o'clock in the afternoon on the research variables, and then start using the body tech device (electrical stimulation) and physical exercises and lasted for six weeks, and the main

experiment was conducted on the last injured player on Monday 15/4/2024 at five o'clock in the afternoon and end on Monday 6/5/2024.

The researcher prepared rehabilitation exercises for the injured (•) and the program included (20) units for rehabilitation using electrical stimulation using the Body Tech device and physical exercises because of the contents of this device of several special programs and after consulting the doctor specialized in this field was distributed programs of this device on (6) weeks by two sessions a week and included special programs for treatment and muscle strengthening, where each injured player was given in the first and second week a special program to relieve pain and relieve tension in the convulsive muscles, where The gradual increase in the degrees of electric current from low to high and according to the endurance of each player to these degrees either in the third and fourth week was given another program different from the first and second week for strengthening the muscles and returning the muscle tone to the injured muscles and included the fifth and sixth week giving players special programs for the development and strengthening of muscles and be an alternative to the use of weights.

As for physical exercises, they focus in the first and second week by two units per week on stretching exercises for the injured muscles and flexibility exercises for the shoulder joint, while in the third and fourth week, they include strengthening and stretching exercises for muscles using some tools, including rubber bands and rubber balls, and the exercises were not used in the fifth and sixth week to use the electrical stimulation device only.

The fixed wheel was used in the first, second, third, and fourth weeks to increase blood flow to the muscles and maintain the player's fitness.

Table 1

Shows the arithmetic mean, standard deviation, standard error of differences, calculated (t) value, and p-value of test results for the research sample

Variables	Unit of measurement	P-value	Calculated t-value	Standard error	Post-Test		Pre-test		Significance
					Standard deviation	Arithmetic mean	Standard deviation	Arithmetic mean	
Deviation of the spine	degree	0,000	13.884	0.512	0.866	1.33	2.185	8.44	Moral
Range of motion of the shoulder behind	degree	0,000	7.867	1.197	1.43	58.66	4.94	49.42	Moral
High shoulder range	degree	0,000	5.810	1.682	1,205	163.88	6.14	154.11	Moral
The range of motion of the shoulder inside	degree	0,003	4.212	1.371	0,909	139.15	4.95	133.37	Moral
Maximum flexion of the right elbow joint at the anterior support	degree	0,000	19.054	2.285	4.40	74.11	8.42	117.66	Moral
Maximum flexion of the left elbow joint at the anterior support	degree	0,000	19.984	2.390	4.44	71.66	10.13	119.44	Moral

3.6.3 Measurements and post-tests:

The measurements and post-tests were conducted on Tuesday, 16/4/2024, at nine o'clock in the morning.

3.8 Statistical means:

- The researcher used the statistical program (SPSS) in processing and extracting data for the research.

4- Presentation, analysis, and discussion of the results.

Through Table (1) we note that the test deviations for the fur column and the existence of significant differences and in favor of the post-test and researchers attribute these differences to the effect of the use of the electrical stimulation device and some physical exercises within this research, which led to the strengthening of muscle groups of the trunk muscles and both sides, which made there is a state of balance between these muscles as well as works to tighten the muscles of the body evenly and harmonious for both sides and the state of equilibrium existing vertebrae of the spine and this is what he referred to (El-Khouly & Rateb, 1992) to "The proper strength of a person depends on the strength of his muscles, which work to make the body mechanically balanced in the face of gravity and these muscles work constantly and require a sufficient amount of strength and energy to keep the body straight and balanced through muscle tone, which is the tension in the opposite muscles, which works to put muscular balance on both sides and any defect in the muscular grace on one side producing muscle weakness or sagging pushes the muscle on the opposite side to the catabolism and tension, which causes curvature and deformation"

As for the choices for the range of motion of the shoulder joint, as we note that there are significant differences between the pre- and post-tests and in favor of the post-test, and the researchers attribute this change to the effect of the exercises used by the researchers, which relied on the development of flexibility of the shoulder joint,(Al-kubaisi et al., 2014) as well as the development of muscle strength through the program for the electrical stimulation device for the development and training of muscles, which helped a lot in the development of muscle strength in the research sample, and this is what he referred to (Abdul Ghafoor, 2020) " The role of therapeutic physical exercises that helped to obtain the affected area with a sufficient amount of strength and flexibility, which in turn led to the improvement of the angle of the joint" .

He also agrees with them, (Jassim & Hamidi, 2022) "The use of devices, which had a significant role in improving the range of motion"

As for the test of the range of motion of the shoulder joint, we note that there are significant differences between the pre- and post-tests and in favor of the post-test, and the researchers

attribute these differences to the use of the electrical stimulation device (Al-Badi Tech) and because of its treatment programs and advanced training programs in this field, which led to an improvement in the range of motion as well as an increase in muscle strength shoulder, trunk and arms at the same time through this device, and this is what was indicated by (Ali & Kamil, 2020) " The use of modern technologies in the diagnosis and treatment of this type of injury and its degrees contributes significantly to the preparation of practical and accurate rehabilitation curricula"

Also, the use of some strength exercises as well as muscle strength division programs for this device led to an increase in muscle stimulation and converted into large nerve fluids that led to a great excitation of muscle fibers and thus a visit in muscle strength, and this is what was indicated by (Hassan & Munahi, 2019) "The study also showed that the current rehabilitation programs are not only based on muscle strength exercises, but also neuromuscular compatibility training and sensory position receptors to provide stimulation of the device. Nervous so that the athlete can restore the dynamic stability required in sports competition"(Farhan & Moseekh, 2018)

"The performance of exercises, which requires the preparation of many fibers according to the type and intensity of resistance, and this is directly related to the amount of nerve signals to give maximum contraction, which can only be reached through training " (Ahmed et al., 2025)

5- Conclusions and recommendations:

1.5 Conclusions:

1- The results showed that the use of the electrical stimulation device (Body Tech) led to the relief of pain associated with the injury and thus an increase in the range of motion in the shoulder joint.

2- The use of flexibility exercises associated with electrical stimulation increased the flexibility of the joint and led to an increase in the range of motion.

3- The use of muscle leadership preparation programs in the electrical stimulation device (Al-Badi Tech) led to an increase in the strength of the trunk and shoulder muscles, which led to an increase in the range of motion in the preferred elbow.

4- The increase in muscle strength resulting from the use of a device. Electrical stimulation led to an increase in muscle strength in the weak muscles of the trunk, which led to a balance between the muscles of the trunk and both sides, which led to a reduction in deviations of the vertebrae as a result of this balance in strength.

2.5 Recommendations

1- The need to prepare the muscles of the trunk and both sides so as not to deviate in the vertebrae of the spine, imbalance the values in the strength of the muscles of the sides of the trunk.

2- Using the electrical stimulation device (Al-Badi Tech) to prepare the muscles of the body, especially when there is pain in the muscles.

3- The need to maintain the flexibility of the joints and the elasticity of the muscles for the joint to work properly.

4- Getting rid of the wrong habits in sitting and lying down that may lead to weakness in the muscles of one party or side at the expense of another limb or side of the body.

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Conflict of Interest

The authors declare that they have no conflict of interest.

Sajjad Muhammad Hassan **pgs.sajad.mohammed@uobasrah.edu.iq**

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Appendix (3)

Proposed rehabilitation exercises and their programming

Illustrative image	Performance method	Description of the initial mode of the exercise	t
	Fixing the feet on the floor – Tightening the muscles of the seat – Pulling the abdominal muscles inward slightly – Raising the arms in front of the high and the hands inward and adjacent – as shown in the picture – Stay in this position for 10 seconds and then relax.	Sitting on the first third of the chair – the distance between the feet with the breadth of the pelvis – the feet point forward and outward slightly, and on the floor, the arms hang next to the body, the palms point to the body, and the fingers are bandaged	1
	Fixing the feet on the floor – Tightening the muscles of the seat and abdomen – Pulling the abdominal muscles slightly inward – Stretching the spine – Extending the head high with the chin pulled in on the chest – Exchanging holding the left hand with the right hand behind the back – Tilt the head to the right side Pulling the left arm down to the maximum extent with the right hand with great caution – as shown in the picture – Stay in this position for 8 seconds – Return to the original position – Relax.	Sitting on the first third of the chair – the distance between the feet with the breadth of the pelvis – the feet point forward and outward slightly, and on the floor, the arms hang next to the body, the palms point to the body, and the fingers are bandaged	2

Illustrative image	Performance method	Description of the initial mode of the exercise	t
	Fixing the feet on the floor – Tightening the muscles of the seat and abdomen – Pulling the abdominal muscles slightly inward – Stretching the spine – The head in the middle of the shoulders – Holding the handkerchief or shawl with the hands from its end behind the back and head – Pulling or pulling the handkerchief or shawl up and down – as shown in the picture – Lowering the arms and relaxing.	Sitting on the first third of the chair – the distance between the feet with the breadth of the pelvis – the feet point forward and outward slightly, and on the floor, the arms hang next to the body, the palms point to the body, and the fingers are bandaged	3
 	Fixing the feet to the floor - Tighten the sitz and abdominal muscles - Pull the abdominal muscles slightly inward - Stretch the spine - Stretch the head high with the chin pulled slightly inward on the chest - Raise the arms in front of the high with the arms bent from the elbow joints behind the back so that the elbows point up and the fingers down behind the back and as far as possible - As shown in the picture - Lower the arms behind the back so that the fingers of the hands touch each other at the maximum point on the spine (back) and towards the neck so that the elbows point Outward - stay in this position for 8 seconds - lower the arms.	To sit on the first third of the chair - The distance between the feet is as wide as the pelvis - The feet point forward and outward slightly, and on the floor - The arms hang next to the body - The palms point to the body, and the fingers are bandaged.	4

Illustrative image	Performance method	Description of the initial mode of the exercise	t
	Fixing the feet on the floor - tightening the sitz muscles - pulling the abdominal muscles slightly inward - stretching the spine - placing the hands on the head - alternating bending the torso front down to touch the left knee of the leg with the right arm elbow joint - as shown in the picture - staying in this position for a period of 8 repetitions and then returning to the original position.	To sit on the first third of the chair - The distance between the feet is as wide as the pelvis - The feet point forward and outward slightly, and on the floor - The arms hang next to the body - The palms point to the body, and the fingers are bandaged	5
 	Fixing the feet to the floor - Tightening the sitz muscles - Pulling the abdominal muscles slightly inward - Stretching the spine - Placing the hands above the head - Alternating bending the upper part of the body forward in the direction of the right knee - Then from the elbows back - as shown in the picture - Staying in this position for 10 seconds and then relaxing - and repeating the above and bending the upper body forward in the direction of the left knee.	To sit on the first third of the chair - The distance between the feet is as wide as the pelvis - The feet point forward and outward slightly, and on the floor - The arms hang next to the body - The palms point to the body, and the fingers are bandaged.	6

Illustrative image	Performance method	Description of the initial mode of the exercise	t
	Fixing the feet to the floor - tightening the muscles of the sitz and abdomen - pulling the abdominal muscles slightly inward - stretching the spine - placing hands on the shoulders - as shown in the photo. (Exchange) rotation of the right elbow and upper body and head to the right, and look to the right elbow - stay in this position for several seconds and apply the above with the elbow of the left arm	The distance between the feet is as wide as the pelvis. The feet point forward and outward slightly, and on the floor, the arms are suspended next to the body, the palms point toward the body, and the fingers are bandaged.	7
	Fixing the feet to the floor - Tighten the muscles of the sitz and abdomen - Pull the abdominal muscles slightly inward - Stretch the spine - Interlace the hands and position them behind the head Neck Light rotation of the head to the right side - Slightly lower the head towards the right side of the chest - As shown in the picture - Stretch the elbows joints up to the maximum extent - Stay in this position for 8 seconds - Raise the head and lower the arms - Relax.	To sit on the first third of the chair - The distance between the feet is as wide as the pelvis - The feet point forward and outward slightly, and on the floor - The arms hang next to the body - The palms point to the body, and the fingers are bandaged.	8

Illustrative image	Performance method	Description of the initial mode of the exercise	t
	The arms are weighted forward and up with the straightness and erection of the spine - the arms are swinged back with the spine slightly bent forward - in the swing of the arms forward and up you must look at the hands while they are open and the fingers are bandaged high, but in the swinging for the back, you must look at the abdomen - as shown in the picture.	To sit on the first third of the chair - The distance between the feet is as wide as the pelvis - The feet point forward and outward slightly, and on the floor - The arms hang next to the body - The palms point to the body, and the fingers are bandaged.	9

Qualifying Program

First week Total time: 116.8 minutes

Objective: Rehabilitation of aortic pain syndrome through muscle elongation and increased muscle strength

Total Time	Rest time between workouts	Workout time	Sessions & Exercises Details	Days
25min		25 min	Electrical stimulation session using the Beditech device for 25 minutes	First
32,5 min	5s 5s 5s 5s 5s 5s	50s 40 s 40 s 40 s 50s 40 s	Exercise (1) Perform the injured for 10 seconds and repeat 5 times Exercise (2) leads the injured for 8 seconds and repeat 5 times Exercise (4) performs the injured for 8 seconds and repeats 5 times Exercise (5) leads the injured for 8 seconds and repeat 5 times Exercise (6) is performed on the injured for 10 seconds and repeated 5 times	Second

	5s	50s 25min	Exercise (7) leads the injured for 8 seconds and repeats 5 times Exercise (8) leads the injured for 10 seconds and repeat 5 times Fixed wheel exercise	
34,3 min	5s 5s 5s 5s 5s 5s 5s	70 s 56 sec 56 sec 56 sec 70 s 56 sec 56 sec 25 min	Exercise (1) leads the injured for 10 seconds and repeat 7 times Exercise (2) Lead the injured for 8 seconds and repeat 7 times Exercise (4) Lead the injured for 8 seconds and repeat 7 times Exercise (5) leads the injured for 8 seconds and repeat 7 times Exercise (6) Lead the injured for 10 seconds and repeat 7 times Exercise (7) leads the injured for 8 seconds and repeats 7 times Exercise (8) leads the injured for 8 seconds and repeats 7 times Fixed wheel exercise	Third
25 min		25 min	Electrical stimulation session using the Beditech device for 25 minutes	Fourth