

A comparative study on the effect of the motor system on the mind and throat systems on the efficiency of the vestibular system

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Abstract

The research objectives to:

1. Recognizing the size of the effect of the motor system of the mind and throat systems with the efficiency of the vestibular system
2. Identifying the efficiency of the vestibular apparatus of the research sample.

The researchers used the descriptive approach in the survey method, which means comparing the phenomena with each other to reveal the factors and conditions. To achieve the objectives of the research, the researchers chose the research sample at random, which are students of the College of Physical Education and Sports Sciences / University of Basra, the second stage for the academic year 2020-2021, and the total number of students was (175) students, and (10) students were selected for the research sample, and the percentage reached (5.71%) And homogeneity between groups was achieved in the variables (height, weight and age) and the appropriate physical measurements were determined for each student. This section also contained the exploratory experiment, the vestibular system efficiency test, the main experiment and statistical means.

The researchers concluded the following:

- The motor chain on the throat system hurts the functional efficiency of the vestibular system.
- The motor chain on the pull-up device hurts the functional efficiency of the vestibular system.
- The kinematic chain on the throat apparatus has a larger effect on the functional efficiency of the vestibular apparatus than on the barbell apparatus.

The researchers recommended the following:

- The necessity of giving balance exercises in the educational unit to help the student maintain his balance while performing skills on gymnastics equipment.
- Conducting other studies and research, including developing balance and functional efficiency, and knowing its effect on improving some of the skills that are interspersed with rotations around the different body axes and on different sports activities at different ages.

Keywords: Motor, mind and vestibular system.

Introduction

Artistic gymnastics is one of the colours of sports activity that is characterized by a unique quality of competition between players in the form of a kinetic chain characterized by compatibility and harmony while maintaining the balance of the body. The vestibular system is one of the highly sensitive receptors related to the position of the body and changes in its conditions that are related to the balance of the body during stability and movement. Studies and research conducted in this regard are going on. The level of functional efficiency of the balance lowering device can be improved under the influence of training by using special exercises that help to raise the dynamic stability rate of the vestibular analyzer in the lowering balance device for different movements while reducing the impact of unwanted actions.¹

Difficult and complex rotations and jumps of different types of scales that work to maintain balance After performing the kinetic chain and from the foregoing, the importance of the research lies in shedding light on the efficiency of the vestibular system in maintaining the balance of the human in general and the athlete in particular during his performance of the various kinetic skills that require maintaining the balance and stability of the centre of gravity of the body.

Research problem

One movement is one of the most important functions of human organs. The movement that a person performs, such as walking and running, depends on the extent of the individual's control over his nervous and muscular systems, for him to maintain the position of the body without losing its balance. The effectiveness of the body's balance increases by increasing the sensitivity of sensory sources. An important component of motor performance, whether it is normal movements or sports movements, and to obtain high degrees in the gymnastics game requires the player to perform a kinetic chain characterized by lightness, agility and aesthetic performance while maintaining the balance and stability of the body, and from the above, the researchers formulated the research problem with the following question:

Is there an effect of the volume of the motor system performed on the mind and throat systems with the efficiency of the vestibular system?

Research Objectives

1. Recognizing the size of the effect of the motor system of the mind and throat systems with the efficiency of the vestibular system
2. Identifying the efficiency of the vestibular apparatus of the research sample.

Hypothesis

- There are significant differences in the effect size of the motor sentence performed on the mind and throat systems with the efficiency of the vestibular apparatus.

Research fields

- The human field: second stage students in the College of Physical Education and the Sports Sciences / University of Basra for the academic year 2020-2021.
- Time range: for the period from 8/12/2020 to 5/4/2021.
- Spatial field: the closed gymnastics hall in the College of Physical Education and the Sports Sciences / University of Basra.

Research methodology and field procedures

Research Methodology

To reach scientific and objective facts, it is necessary to choose the appropriate approach to the research, so the researchers used the descriptive approach in the survey method to suit the nature of the problem to be solved.

Research sample population

The research sample is one of the basic things that require the researcher to pay attention to because the sample is many individuals or things that are tested according to a certain rule or method from the statistical community that represents this community.²

So, to achieve the objectives of the research, the researchers chose the research sample randomly, and they are students of the College of Physical Education and Sports Sciences, University of Basra, the second stage for the academic year 2020-2021, and the total number of students was (175) students. Percentage (5.71%) of the original population. For the main experiment to be of high accuracy, the researchers resorted to using the skew coefficient to find out the homogeneity of the sample for each of the heights, weight and age after extracting the mean and standard deviation. The probability of a normal distribution for these variables. As shown in Table (1).

Table (1). Shows the means, standard deviations, and skew modulus values for height, weight, and age

S	Variables	Units	Mean	SD	Skewness
1	length	Cm	1.70	0.33	0.841
2	weight	Kg	70	2.54	0.611
3	Age	Year	22	0.788	0.407

Research tools

Research tools (the means or method by which the researcher can solve a problem, whatever the tools are, are data and equipment).³

Means of collecting information

- Arabic references and sources.
- The Internet, the international information network.
- personal interviews
- Scientific observation.

Devices and tools

- DELL laptop.
- Throat devise.
- Pull up device.
- Medical scale.
- Gymnastics Rugs.
- Stationary.
- Tape measure.
- Stopwatch.
- Flat platform.

Measurements and tests used in research

Selected Body Measurements ⁴

Measurement of total height: the height of a person is measured erect and without shoes, and the height is recorded to the nearest 0.1 cm because a person is taller in the morning immediately after waking up, and this length contrasts to about one cm with the passage of the day due to the pressure on the cartilages in the dorsal chain for a body.

- Weight measurement: The person is at his lightest state (less weight) in the early morning after emptying the bladder, provided that the weight is slightly affected by the meals and fluids consumed during the day, and the weight is measured while the person wears only light underwear without shoes, and the weight is recorded, i.e. the nearest 100 cm.
- Age measurement: The age of each student from the sample was recorded by calculating the birth.

The tests used in the research

Vestibular system aptitude test ⁴

- Test name: Yarostek test
- Purpose of the test: To measure the efficiency of the vestibular system
- Performance specifications: The test is performed from standing, where the laboratory works to make successive rotations of the head in one direction only, where the laboratory rotates the head in one direction at a rate of one complete revolution every second.
- Calculation of scores: time is calculated from the beginning to the moment of loss of balance.

Experimental experience

The exploratory experiment is one of the basic conditions in scientific research, as it is a preliminary experimental study carried out by the researcher on a small sample before

carrying out his research to choose the research methods. Through this premise, the researchers conducted the reconnaissance experiment on Wednesday, 10/2/2021, at exactly⁵ am In the gymnastics hall for students, the researchers conducted the exploratory experiment on (5) students from outside the research sample. The purpose of the experiment was:

1. Ensuring the understanding of the work team and their adequacy in anthropometric measurements and recording the results.
2. Knowing the time required to carry out physical measurements.
3. Knowing the obstacles that may appear and the convergence of errors and interference in the work.

Main experiment

After all the preparations, the researchers conducted the tests on Monday, February 15, 2021, at (11:30) am, after giving an appropriate warm-up period. It included testing the efficiency of the vestibular apparatus before and after performing the pull-up and throat apparatus.

Statistical means ⁶

The researchers recorded the data of the analysis process and then unloaded it into tables and entered it into the calculator to conduct statistical analyzes to process the data and get the results. The statistical data were processed by using ready-made programs (SPSS).

Results

Display the results of a T-test of samples related to the efficiency of the vestibular apparatus on the throat apparatus

Table (2). Shows the descriptive statistics, the calculated and significant (T) value, the statistical significance and the effect size for the efficiency of the vestibular apparatus on the throat apparatus

The efficiency of the vestibular apparatus before stress		The efficiency of the vestibular apparatus after exertion		Mean Diff.	SD Diff.	(T) Value	Significant	Statistical significance	Impact size
Mean	SD	Mean	SD						
46.500	8.154	28.200	6.214	1.83	5.35	10.80	0.00	Sig.	2.242

Through Table (2), it is clear to us that the mean value of the efficiency of the vestibular apparatus on the throat apparatus before the performance was (46,500) and with a standard deviation of (8.154), and the mean value of the efficiency of the vestibular apparatus on the throat apparatus after performance reached (28.200) and with a standard deviation of (6.214) it reached The mean value of the differences is (1.83) and the standard deviation value of the differences is (5.35). The value of (computed) T is (10.80) and the effect size is (2.242).

Table (3). Shows the descriptive statistics, the calculated and significant (T) value, the statistical significance and the effect size for the efficiency of the vestibular apparatus on the pull-up apparatus

The efficiency of the vestibular apparatus before stress		The efficiency of the vestibular apparatus after exertion		Mean Diff.	SD Diff.	(T) Value	Significant	Statistical significance	Impact size
Mean	SD	Mean	SD						
37.600	5.146	28.900	2.183	8.700	3.683	7.469	0.00	Sig.	1.840

Through Table (2), it is clear to us that the mean value of the efficiency of the vestibular apparatus on the pull-up device before performance amounted to (37.600) and with a standard deviation of (5.146), and the mean of the efficiency of the vestibular apparatus on the pull-up device after performance reached (28.900) and with a standard deviation of (2.183) and it reached The mean value of the differences is (8.700) and the standard deviation value of the differences is (3.683). The value of the (computed T) is (7.469) and the effect size is (1.840).

Discussions

From the above, the size of the effect of the efficiency of the vestibular system on the throat system is greater than on the horizontal system, and this explains the extent to which the gymnast needs the efficiency of the vestibular system, which is one of the important factors that achieve balance, and that the synergy between the muscular and nervous systems plays a major role in maintaining the balance of the body, and he attributes The researchers' reason that the vestibular system is a highly sensitive receptor that is related to determining the position of the body and changes in its positions that are related to the balance of the body instability and movement, If we turn the head right or left at any moment, the fluid in the inner ear moves and continues to move after The stability of the head position, and this continuous fluid affects the movement and gives the individual a feeling that the head is still moving despite the actual movement has stopped. This effect generates the so-called false sense of movement, which sometimes results in difficulty in balancing after performing the movements.

We also note the great importance that the vestibular system plays and the extent of its safety in sports activities that are characterized by complex technical sports skills, and the extent of the ability that the athlete must have to feel the place and time as well as the movements of the conditions of his body in the vacuum and the ocean and maintain the balance of the body, the vestibular system is injured, the athlete notices a state of volatility or oscillation in the eyeballs, which is a rapid involuntary oscillation, as well as an inability to maintain balance.⁷

The researchers also see that the training age and the nature of sports activity play a major role in improving the level of functional efficiency of the vestibular system and thus improving the nervous processes and control of the nervous system on the emergence of many motor reactions, especially voluntary when the vestibular system is excited, the

vestibular system improves when training is regular, as its stability increases, which leads to the concentration of excitation in certain parts of the central nervous system, and thus the involuntary reactions decrease .⁸

The researchers also see that the close connection between the different sensory receptors in the body is of great importance by transmitting sensory nerve signals to the cerebral cortex, where this information is processed and converted into nerve signals that can maintain the balance of the body. The athlete was able to perceive the physical world surrounding him, which is represented by the sense of sight, hearing, and the organs of the motor sense.

These receptors play an important role when the athlete performs all sporting activities, and the efficiency of the technical performance of the various motor skills depends on the efficiency of these sensory receptors, especially when performing body movements in the air. Or harmonic movements, and descending movements, so these processes are improved by training.⁹

The importance of visual information in maintaining balance. After the destruction of his vestibular apparatus, and even after losing most of the proprioception information from his body, a person can use his visual mechanisms to maintain his balance as he displaces even linear movement or The simple rotation of the body immediately the visual image on the retina and this information is transmitted to the centres of equilibrium and some of the damaged people have their vestibular systems completely in balance almost as long as their eyes are open and as long as they make their movements slowly, but when someone moves quickly or when he closes his eyes, he loses his balance in the head.¹⁰

The throat device is one of the semi-fixed gymnastics devices, which has characteristics that differ greatly from the rest of the devices, including the freedom of movement of the device, so it becomes necessary for the player to technique movements with the freedom of movement of the throat, and the player must perform the motor skills with accuracy and high compatibility while maintaining the balance of the body, The nature of the movements performed on the throat device are movements of a pendulum nature in which the player's centre of gravity moves up and down close to the vertical line, and therefore the difficulty of controlling and adjusting the characteristics and performance requirements on the throat device made the student face difficulty in maintaining and adjusting his balance, which made the size of the effect larger.

Conclusions

1. The motor chain on the throat system hurts the functional efficiency of the vestibular system.
2. The motor chain on the pull-up device hurts the functional efficiency of the vestibular system.
3. The kinematic chain on the throat apparatus has a larger effect on the functional efficiency of the vestibular apparatus than on the barbell apparatus.

Recommendations

1. The necessity of giving balance exercises in the educational unit to help the student maintain his balance while performing skills on gymnastics equipment.
2. Conducting other studies and research, including developing balance and functional efficiency, and knowing its effect on improving some of the skills that are interspersed with rotations around the different body axes and on different sports activities at different ages.

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