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The effect of rehabilitative exercises in correcting spinal curvature and head fall forward for high school students aged 16 years

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Abstract

The purpose of this paper is to identify the effect of rehabilitative exercises in correcting the curvature of the spine and the head falling forward among 16-year-old female high school students. The researchers used the experimental method to suit the nature of the research, and the researchers used a one-group design with two pre- and post-tests. The research community consisted of 16-year-old female high school students. The researchers intentionally selected members of the research community from Wasit High School, who numbered (20) students. After obtaining the approval of the students' parents and the administration of the concerned school, a medical examination was conducted by looking and by standing with their backs against the wall. The result of these examinations was the presence of a group of (5) female students with kyphosis. One of the most important results reached by the researcher is that: There are positive effects of rehabilitative exercises, and these exercises reduce the degree of curvature of the spine for members of the research sample at the age of 16 years in the X-ray test (XRay) or through the Ferguson angle, and there are statistically significant differences between the pre- and post-tests in measuring the degree of the spinal curvature angle and the forward bend of the head. and this achieves one of the sustainable development goals of the United Nations in Iraq which is (Quality Education)

Keywords

rehabilitation exercises , Correcting the curvature of the spine , head falling forward

Introduction:

A healthy figure is considered one of the important and even necessary demands that have become urgent in light of our daily life, and in which many forms of luxury have developed until it has become a feature of the modern era, as humans have become lavish in using modern technologies for the purpose of comfort, so the result of this is not practicing sports activities, even if only during the day. In its simplest form, the individual becomes vulnerable to injury as well as many posture deviations. A healthy posture enhances the functional capabilities of the body's vital systems and reduces the rates of physical stress on the muscles, joints, and ligaments of some diseases associated with the body's muscular, nervous, and skeletal systems, which result from defects and deviations in posture. This reflects negatively on the body's

mechanics and its good performance of its daily tasks, in addition to its psychological, social, and economic effects on the body. The individual. It is noted that during this stage female student are vulnerable to postural deformities, especially those related to the spine. The increase in the prevalence of postural deviations among high school students is due to the lack of postural awareness among individuals and thus among their children, the deficiency of school curricula in this area, as well as the small amount of hours allocated for practicing sports within the school. The lack of sports teachers in the high school stage, as well as the spread of computers and teenagers sitting for hours in incorrect postures are all factors that have contributed to the exacerbation of the problem. In addition to this is the state of the school environment, such as overcrowding in the classrooms, lack of

ventilation and lighting, and the presence of unhealthy chairs and tables that are not suitable for the size of the students, which forces him to take Improper sessions. What made matters worse was the heavy wallet that the student was forced to carry several times and over long distances. All of these factors led to the emergence of some stature deviations in early stages of life, which can be considered a serious phenomenon that must be treated. Postural deformity occurs when we follow wrong habits, do not pay attention to public health and nutrition, or are exposed to injuries and diseases. Hence the importance of research in using rehabilitative exercises to correct curvature of the spine and head fall in front of high school students at the age of 16 years. Thus, the need arose to prepare rehabilitative exercises to repair what modern life has spoiled in the era of computers and communications, as it unleashed the work of the mind and restricted the movement of the body within the walls of the mind. Rehabilitation is considered the most effective means of improving posture, and at the same time it guarantees the safety and security of the individual while practicing it.

Research problem:

As for the research problem, through the experience of the researchers and their observation of female students in the field application in sports injuries and their rehabilitation, they prepared the following question: Does the use of rehabilitative exercises contribute to restoring the correction of curvature of the spine and falling head forward in female high school students at the age of 16 years? With regard to the objectives of the research, it is to prepare Rehabilitation exercises to correct spinal curvature and head fall for 16-year-old female high school students

Research objective:

Table .1 shows the research community, its selected sample, and the percentage

Research community	Sample research		Sample exploratory experiment	
	Number	Percentage	Number	Percentage
20	5	25	3	15

Field research procedures:

Determine the study variables and their tests
Measuring the degree of curvature of the spine or the Ferguson angle using X-ray: (Lomans Charles. Young. Cavl. Hareh) (2)

- Identify the effect of rehabilitative exercises in correcting the curvature of the spine and the head falling forward among 16-year-old female high school students.
- Identify the effect of rehabilitative exercises in correcting the curvature of the spine and the head falling forward between the pre- and post-tests for the sample. Experimental for female students.

Research hypotheses:

- There are statistically significant differences between the pre- and post-tests in the study variables among the research sample in the study variables

Research fields:

- Human field: high school students aged 16 years
- Time field: (13/1/2021) to (17/4/2022)
- Spatial field: Wasit high School for Girls - Physical Therapy and Injury Rehabilitation Center in Najaf

Research Methodology:

Research Methodology:

The researchers used the experimental method to suit the nature of the research, and the researchers used a one-group design with two pre- and post-tests

Community and sample research:

The research community consisted of 16-year-old female high school students. The researchers intentionally selected members of the research community from Wasit High School, who numbered (20) students. After obtaining the approval of the students' parents and the administration of the concerned school, a medical examination was conducted by looking and by standing with their backs against the wall. The result of these examinations was the presence of a group of (5) female students with kyphosis.

take the x-ray images. The first image was from the front (in front of the chest) and the second from the side, where A person with curvature of the spine needs a special position when taking the x-ray film, in order to prevent pressure on the apex of the curvature, which leads to a difference in the angle of the curvature. This is done using the following two methods:

The patient stands with his back adjacent to the X-ray machine, his arms hanging down, and his head adjacent to the device to take a picture of the spine from the front to observe the skewed position while standing from the front.

The patient stands sideways so that one side of the body is adjacent to the device, with the arms bent over the head, which reduces pressure on the spine and keeps it in its natural position. This method is considered the most accurate in determining the amount of curvature of the spine.

After the radiographs were taken, the doctor and the researcher placed the radiographs on the illuminated board for each student to determine the degree of convexity or the Ferguson angle by measuring with a ruler and protractor.

The purpose of testing the kyphosis angle (the curvature of the spine in the dorsal region) using an The Ferguson method consists of three stages, which are as follows:

We identify the vertebra on the radiograph in which the convexity is most severe, between the vertebra (7, 6, and 5), then mark a high point in it after measuring the anteroposterior diameter, and then we identify three vertebrae above and three vertebrae below the vertebra with the greatest convexity, or identify the upper and lower vertebrae. Which is without deviation within the natural curve of the spine.

You mark the high point at the top of the top paragraph of the three paragraphs above the particular paragraph or the paragraph directly above it, and the high point at the bottom of the bottom paragraph.

We draw a line from the midpoint of the curved high vertebra in which the convexity is severe to the upper midpoint, and then we draw a line from the high midpoint or to the lower midpoint. The angle of convexity is measured along the lower line and the upper line using a protractor and a ruler. This angle is called the Ferguson angle.

The two intersecting vertical lines from the upper surface of the upper vertebra and the surface of the lower line of the lower vertebra are two lines to measure the curves in the spine and they are called the Ferguson lines or the Ferguson angle.



Figure (1)
Ferguson method

Measuring torso flexibility from a standing position on a wooden box: (Ferguson) (3)

This test uses a wooden box with a graduated ruler installed at the bottom. This test aims to measure

the flexibility of the posterior muscles (back). The tested student takes a standing position on top of the wooden box with the legs extended at full length. Then he bends the torso downward,

extends the arms downward, and records the minimum distance traveled by the high finger of the hand. Each student is given two attempts. The best attempt is recorded, and the distance is calculated to the nearest (cm) during which the student can remain in this position for three seconds.

Exploratory experience:

A reconnaissance experiment was conducted with the ancillary work team on 1/15/2021 on female students with injuries outside the research sample, and the goal of the exploratory experiment is to familiarize the ancillary work team with how to use tools and devices, while knowing the obstacles that would require caution in implementing the main experiment. Overcoming them, researchers benefited from the observations, negatives and positives.

Pre-tests:

Pre-tests were conducted at the Physical Therapy and Trauma Rehabilitation Center to determine the degree of curvature of the spine using the Ferguson angle, and the physical test was conducted at Wasit High School for Girls on (17/1/2021).

Main experience:

The researchers conducted the main research experiment on the research sample. The following procedures were carried out:

Using qualifying exercises after reviewing some scientific references, various sources, researchers' readings, their continuous informing, and their interviews with specialized professors, as (70) exercises were prepared that are consistent with scientific ideas and experts' opinions.

The qualifying exercises were presented to the experts and specialists, and after informing the experts, they agreed on choosing (12) exercises

The rehabilitation units were formed based on the exercises, as (4-6) exercises were chosen in each rehabilitation unit, and the number of rehabilitation units was formed (24) at a rate of (3) units per week and according to the times for the

Table .2 Results of measuring the variable degree of convexity or the Ferguson angle using X-rays

Tests	Variable s	Pre-test		Post-test		Arithmeti c mean of difference	Standard deviation of differences	T value Calculated	Level sig	Type sig
		Arithmeti c mean	Standar d deviatio n	Arithmeti c mean	Standar d deviatio n					
Freguso	Degree	20.850	2.207	11.050	1.877	9.800	1.240	35.353	0.00	Sig

selected exercises with repetition and rest. The time of the rehabilitation units ranged between (15-50) minutes.

The rehabilitation units were divided into three stages for the purpose of completing the research work, which are as follows:

- First stage: This stage was characterized by the performance of simple exercises, which consisted of static and moving exercises characterized by their simple performance, the purpose of which was to relieve pressure.
- Second stage: This stage was characterized by the use of a higher intensity, as the affected student performed a different set of rehabilitative exercises (flexion and extension in different directions), with the specified intensity. These exercises were from different positions (standing, long sitting, prone, lying down), as this stage continued. For four weeks, each week has three rehabilitation units. This phase included a gradual increase in the intensity and difficulty of the exercises, some resistance exercises without weights,
- Third stage: This is the last stage of the rehabilitation period. Tools such as (medicine balls, rubber balls, and iron devices) were used. This stage consisted of four weeks, at three units per week. This stage was characterized by an increase in the intensity of the exercises in order to prepare the students to practice life studies normally.

Post-tests:

The post-tests were conducted on (14/3/2021), the tests were conducted in the same place where the pre-tests were held, and the researchers were keen to provide the same conditions.

Statistical methods: The search data was processed through the Statistical Package for the Social Sciences (SPSS).

Results:

Presentation the results of the t-test in the results of the pre- and post-tests of the research group

n angle									0	
Torso flexibility	Cm	12.900	0.852	18.050	0.759	5.150	0.489	47.064	0.000	Sig

Discussion:

It is clear from Table (2) that there are significant differences between the pre- and post-tests to measure the Ferguson angle for the research sample at the age of 16 years. Influential differences in the results of the pre- and post-tests are in favor of the post-test for the 16-year-olds that make up the research sample, as a clear improvement appeared in the Ferguson angle or degree of convexity.

The researchers attribute this development in the results of the test to measure the degree of convexity (Ferguson angle) in the post-test among members of the research sample to the rehabilitative exercises and show that the prepared exercises were characterized by smoothness in terms of performance and with a gradual range of motion and at various angles, and this thing helped in obtaining these results for the research sample. The researchers attribute this improvement to the rehabilitative exercises prepared and based on scientific foundations, as these exercises contributed to correcting the curvature of the spine for the members of the research sample by emphasizing targeting the affected areas of the spine, which the researchers find to have an important role in the movement of the injured students to practice various life activities.

The researchers also believe that the reason for this is to increase the lack of convexity in the sample members, as well as to strengthen the dorsal muscles because of applying the vocabulary of the rehabilitation units. "The strength of the back muscles means part of the general or complete physical fitness, which provides the individual with interrelated and interrelated fitness, such as health, psychological, and social fitness." It is also the reason for this. This development is the subjection of the sample members to rehabilitative exercises, in addition to other factors, including the development of the strength and flexibility of the research sample members as a result of their application of strength and flexibility exercises, such as weight-

bearing exercises, by strengthening and stretching the abdominal and thoracic muscles and others. (Samia Khalil) believes that therapeutic exercises she is Specific movements for various disease cases, their purpose is preventive and therapeutic, in order to return the body to normal condition. Natural and rehabilitative methods and the use of the basic principles of sensory-motor work that operate in the Effect on muscle and nerve tone by choosing appropriate movements and positions (1) Exercises that improve strength and muscle tone work at the same time. Partially corrects postural deviations and distortions when strength training exercises. Focus on flexibility exercises in the muscles, and this is consistent with the opinion of (Thulin J) "Developing special strength and flexibility exercises works to modify and straighten the muscles." No deviations and distortions." (5)

The researchers believe that this improvement in the deviation of the spine and the fall of the head forward is due to the rehabilitative exercises that were applied to the female students, which contained 3 elements of the B Hathi and this agrees with - (Nelson N. and Jenson) (4) These muscles with their focused exercises, which are specific to this part The deformed person and its associated muscular components, tendons, ligaments and bones. Rehabilitation exercises for the dorsal muscles were also targeted, which It plays a large and important role through its relaxation in the occurrence of deviation, so it is necessary to work on developing muscle strength. Why?

The mechanism of neuromuscular coordination to increase the ability to return the spine to its normal position before for injury

Conclusions:

- There are positive effects of rehabilitative exercises, and these exercises reduce the degree of curvature of the spine for members of the research sample at the age of 16 years in the X-ray test (XRay) or through the Ferguson angle.

- There are statistically significant differences between the pre- and post-tests in measuring the degree of the spinal curvature angle and the forward bend of the head. .

Recommendations:

Based on the results of this study, the researchers recommend the following:

- It is necessary to rely on rehabilitative exercises, and these exercises reduce the degree of kyphosis of the spine for members of the research sample at the age of 16 years for all schools in the governorate, in order to reduce the prevalence of kyphosis of the spine and the head falling forward.
- They recommended the necessity of conducting complementary studies that include other variables and educational stages.

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اثر تمارينات تاهيلية في تقويم انحناء العمود الفقري وسقوط الرأس اماماً لدى لطالبات المرحلة الإعدادية بعمر 16 سنة

سجاد كفاح صالح 1 ، رحاب نبيل عبد العظيم 2 ، اسماء حازم محمد 3 ، ضرغام عبد الكاظم حسن 4
1, 2, 3 & 4 جامعة الكوفة / كلية التربية البدنية و علوم الرياضة

يعتبر القوام السليم أحد المطالب الهامة بل والضرورية التي أصبحت ملحة في ظل حياتنا اليومية والتي طرأ عليها العديد من أشكال الرفاهية حتى أصبحت هي سمة العصر الحديث، حيث أصبح الإنسان مسرفاً في استخدام التقنيات الحديثة وذلك بهدف الراحة، فكان نتاج ذلك عدم ممارسة الأنشطة الرياضية ولو في أبسط صورها فأصبح الفرد عرضة للإصابة وكذا العديد من الانحرافات القوامية وتكمن أهميه البحث في اعداد تمارينات تاهيلية في تقويم انحناء العمود الفقري وسقوط الرأس لطالبات المرحلة الإعدادية بعمر 16 سنة وبالتالي ظهرت الحاجة لإعداد التمارينات التاهيلية لإصلاح ما أفسدته الحياة الحديثة في عصر الكمبيوتر والإتصالات حيث أطلقت العنان لعمل العقل وقيدت حركة الجسد داخل أسوار العقل فالتمارين التاهيلية تعتبر أكثر الوسائل فعالية في تحسين القوام، وهي في نفس الوقت تضمن أمن وسلامة الفرد أثناء ممارستها وتتمثل مشكلة البحث من خلال خبرة الباحثين ومشاهدتهم للطالبات في التطبيق الميداني في الإصابات الرياضية وتاهيلها واعدا السؤال الاتي؟ هل أن استخدام التمارينات التاهيلية تساهم في استعادة تقويم انحناء العمود الفقري وسقوط الرأس اماماً لدى لطالبات المرحلة الإعدادية بعمر 16 سنة؟. وهدف البحث الى اعداد تمارينات تاهيلية في تقويم انحناء العمود الفقري وسقوط الرأس اماماً لدى طالبات المرحلة الإعدادية بعمر 16 سنة. وأيضا التعرف على تأثير التمارينات التاهيلية في تقويم انحناء العمود الفقري وسقوط الرأس اماماً لدى طالبات المرحلة الإعدادية بعمر 16 سنة. و استخدام الباحثون المنهج التجريبي لملائمته طبيعة البحث بتصميم المجموعة الواحدة ذات الاختبارين القبلي - البعدي تكون مجتمع البحث من طالبات المرحلة الإعدادية بعمر 16 سنة، حيث قام الباحثون باختيار عمدي لأفراد مجتمع البحث من اعدادية واسط والبالغ عددهم (20) طالبة وبعد اخذ موافقة أولياء أمور الطالبات وإدارة المدرسة المعنية تم إجراء الفحص الطبي من خلال النظر ومن خلال الوقوف والظهر ملاصق للحائط وكانت حصيلة هذه لفحوصات وجود مجموعة مكونة من (5) طالبات مصابات بالتحدب وتضمن البحث مجموعة من الإختبارات ومنها إ قياس درجة التحدب للعمود الفقري او زاوية فركسون عن طريق الأشعة السينية **Xray** لتقويم تحذب العمود الفقري وسقوط الراس اماماً وأخيراً ولغرض إستخراج النتائج تم إستخدام الوسائل الإحصائية المناسبة (الحقيقية الإحصائية **SPSS** ولقد توصل الباحثون الى عدة استنتاجات منها هناك تأثيرات إيجابية للتمارين التاهيلية وهذه التمارينات تقلل من درجة تحذب العمود الفقري لافراد عينة البحث بعمر 16 سنة في اختبار الأشعة السينية **XRay** أو عن طريق زاوية فركسون من خلال النتائج التي خرجت بها هذه الدراسة يوصي الباحثون بضرورة الاعتماد على التمارينات التاهيلية وهذه التمارينات تقلل من درجة تحذب العمود الفقري لافراد عينة البحث بعمر 16 سنة للجميع مدارس المحافظة وذلك للحد من نسبة انتشار حدوث تحذب العمود الفقري وسقوط الراس اماماً وهذا ما يحقق احد اهداف التنمية المستدامة للامم المتحدة في العراق (التعليم الجيد)

تمارين تاهيلية ، تقويم انحناء العمود الفقري ، سقوط الرأس اماماً

الكلمات المفتاحية