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Department of Bio, Health and Sports Sciences

Rehabilitation program using the chiropractic and its effect on the posture and mobility of the neck of the mobile phone

Thesis Introduction

(Within the requirements for scientific research of the PhD degree)

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Introduction:

The negative effects of misuse of modern devices such as smartphones and tablets have increased in recent times as a result of constant access to the daily media and playing board games (The Games), so the tablet has become a tool used in many stages of the educational stages of students from children and adolescents and a basic means Used to follow educational curricula and complete final exams on it, In addition to their increasing practice of individual and group activities in which they use these devices, which resulted in neck pain and damage caused by the long period of bending looking down and bending the head forward, which naturally affected the curvature of the spine, especially the cervical and upper trapezius muscles working on it.

(30: 4) , (23: 16) , (11: 11)

The study conducted by the American surgeon Kenneth Hans raj on the forces that affect the spine when looking at smartphones for a long time has shown that the head of an adult who weighs between four to five kg affects the spine and neck with a force of about 13 kg When the head is tilted forward at an angle of about 15 degrees, indicating that the greater the degree of curvature, the greater the burden on the vertebrae and the greater the angle of inclination on the neck approximately 60 degrees, and thus affects the neck and back with a force of 27 kg, equivalent to the weight of a seven-year-old child .

(11: 5) , (21: 6 , 13)

The German doctor (Ofrian) also confirmed that the more this situation is repeated and the longer it lasts, the shoulders relaxed forward, the neck muscles were relaxed, the chest muscles contracted, and the pressure on the spine increased, causing muscle tension in the neck muscles and headaches. For children and adolescents, this is due to the excessive use of mobile phones and tablets, and thus they have become They are most at risk and suffer from neck mobile symptoms, because their spine is very

flexible and improper positions are not tolerated because of this, especially for long periods. **(25: 12) , (12: 3) , (21: 49)**

And the spine is the essence of the human body and it is one of the most important and effective parts as a main and central axis that depends on it in movement and posture, which is done through articulated connections between the vertebrae.

(6: 18) (4: 61)

And this term Neck Mobile has become used to describe one of the health problems, and medical science uses it to describe neck pain and the damage attached to it. **(9:1)**

The most recent studies carried out by Haavick H1, Niazi IK2, Holt K2, Murphy B3: 2017 showed that 79% of those aged 13-18 years who have smartphones use them for two to four hours per day and in the long term cause pain. The neck and its arthritis, especially when carried with one hand, which results in spasms of the shoulder muscles due to nerve radiculopathy in the neck as a result of stability in one position, whether in the hand or the head, which causes arm pain and numbness in the hand.

(23: 2) , (24: 65) , (15: 3)

Among the therapeutic methods that have achieved great progress without the patient being exposed to Chiropractic surgery, which is the use of hands in controlling the mechanical relationships between the organs of the body and treating the movement disability caused by diseases of the spine, neck and pelvis and straightening it.**(14: 11)**

As confirmed by Keating JC. Frank M., the basis of this science is to study the mechanical relationships between the various bones of the body and between nerves, muscles and blood vessels. **(19: 27), (13: 9)**

Chiropractic is a common scientific technique used by the specialist as a first step of treatment to adjust and straighten the spine to improve movement, avoid acute pain, restore the normal function of the spine and adapt by moving the joint to its normal

position with the help of a group of movement and static exercises that the patient performs under the supervision of the specialist. **(27: 2)**

And Chiropractic as a medical treatment method concerned with the relationship between bones, nerves, muscles and blood vessels from a physiological, pathological and chemical point of view. **(28: 3)**

The first to start using hands to reduce body pain were the Pharaohs (the ancient Egyptians), followed by the Chinese, then the Greeks, followed by the Arabs who excelled in this science and took steps for it by dissecting the body.

Then a new light bulb was emitted in the field of Chiropractic by the American Doctor (Daniel David Palmer) in the United States in (1895AD), and while he was exposed to one of the Greek patients, he asked him for a word by hand in the Greek language and he told him that it means (chiropracticus), so Dr. Palmer gave this science the name Chiropractic, and since that time this science has spread and is now being taught in universities in the United States of America, Canada, Europe, Japan and Australia on a large scale. **(5: 3)**

The goal of this science (Chiropractic) is to obtain the optimal physiological activity of the body by correcting any abnormal relationship between the different parts of the body by making the body more ready to use its own capabilities to perform its functions in a proper manner, and for this it is mainly concerned with the integrity of the nervous system that dominates in the end All body functions and any normal excitement of the nervous system, whether external or internal, makes the body work in an inappropriate way, which exposes it to diseases and pain.

Herein lies the benefits of Chiropractic in removing these nerve effects, making the body more resistant to disease. **(13:5)**

Research problem:

And based on the researcher's experience during his work in the field of physical and movement rehabilitation, he noticed that there are problems among a group of middle school and high school students who suffer from loose shoulders forward, diastasis in the neck muscles, contraction in the chest muscles, and a continuous increase in pressure on the spine, which causes muscle tension in the muscles Neck with headache, pain in the shoulder and arm, and numbness in the palm. (24: 65)

This was accompanied by the excessive use of tablets and mobile phones, which prompted the researcher to work, design and build a rehabilitation and chiropractic program to improve the motor and functional efficiency of the muscles and vertebrae working on the neck.

Importance and need for research:

The research is considered a new addition in the field of injuries and rehabilitation. Through the researcher's readings in references, research and specialized scientific journals, the scarcity of standardized programs in the field of rehabilitation and prevention of negative symptoms of the use of modern technology and its various means becomes evident. One of the problems is the impact of their use of smartphones and mobile devices such as tablets and mobile phones, and for long periods of time, resulting in curvature of the spine and neck pain, which affects the biomechanical, physical and morphological aspects of them. (16: 2) , (29: 9),(24: 57)

Scientific importance of research:

- 1- Providing a scientific basis for rehabilitation programs for Neck Mobile symptoms.
- 2- Laying down foundations to improve the motor and functional efficiency of muscles and vertebrae working on the neck.

3- Knowing the methods of prevention from falling into negative problems and symptoms due to the use of modern technology and its various means.

Applied importance of research:

Provide a standardized and chiropractic program that can be used by children and adolescents in improving the motor and functional efficiency of the vertebrae and muscles working on the cervical region of the spine.

The aims of the present research:

The study aims to design and build a physical and chiropractic program to improve the anatomical and kinesthetic competence of the mobile phone neck for children and adolescents from 12-17 years old by improving both: -

- 1- Muscle strength working on the cervical region.
- 2- The motor range of the cervical region.
- 3- Reducing pain.

Study hypotheses:

The physical program and the Chiropractic positively affect:

- 1- Muscle strength working on the cervical region.
- 2- The motor range of the cervical region.
- 3- Orthotic integrity and moderation of the cervical region.
- 4- The degree of pain.

Scientific terms:

(Neck Mobile)

The relationship between mobile phone use and pain in the cervical region and the damages attached to it.

A description of the recurrent injury from fatigue and pain in the neck area resulting from excessive monitoring of hand-held devices for a long period of time.

(23: 15) (21: 1), (1: 74)

Foreign Studies:

1- Study: Ken Hansraj, Ken Hans Raj (2017)

Study title: Bad smartphone use may directly affect the spine and neck

Curriculum: The research followed the experimental curriculum on students of Columbia University in New York, consisting of (16) students divided into two groups (experimental - control).

The goal: the wrong way to carry the smartphone makes us tilt the head down, causing injury to the neck and lower back

Results: It was proved that the more the head tilted forward, it puts pressure on the spine and neck muscles, and this pressure may eventually lead to pain, which in the worst conditions requires surgical intervention.

2- Study: Dhopte et al., Dhopte et all (2017)

Study title: A knowledge translation intervention test for improvement and chiropractic care for adults with neck pain disorders.

Curriculum: The research followed the experimental approach whereby the University of San Francisco conducted a test for its students, and this test was very simple.

Students who were sitting in a healthy position (the head position is correct with the cervical spine straight) were tested with their counterparts who were sitting in the position of slouching (the position of the head and the cervical spine is not Correct) they are tilted head forward with the curvature of the spine, and the test showed that the second category has stronger feelings of depression and decreased energy compared to their counterparts

Objective: The study concluded that after the age of (25) every hour that a student spends in a slouching position, his (expected physiological) life will be reduced by (22) minutes, and that sitting in the wrong position for long period's doubles the injury.

Results: Sitting slouch with the head tilted forward and sitting in a way that the legs are placed on top of each other increases the risk of spinal and neck pain.

3- Study: Douglas et al., Douglas et all (2017)

Study title: The effect of half-sitting position on the neck and head, and the movement of muscles during tablet reading.

Objective: The study concluded that after the age of (25) every hour that a student spends in a slouching position, his (expected physiological) life will be reduced by (22) minutes, and that sitting in the wrong position for long period's doubles the injury.

Results: Sitting slouch with the head tilted forward and sitting in a way that the legs are placed on top of each other increases the risk of spinal and neck pain.

3- Study: Douglas et al., Douglas et all (2017)

Study title: The effect of half-sitting position on the neck and head, and the movement of muscles during tablet reading.

Approach: The research followed the experimental method on three groups of (36) individuals, and each group differs from the other in the age stage and consists of (12) adolescents, (12) young people and (12) elderly, provided that they are all users

Tablet device

Objective: To detect the effect of staying in the wrong position for long periods while examining e-mail, reading news, conducting conversations or surfing the Internet is

what causes neck and spine pain due to the lack of motor activity of the muscles working on it

Findings: The study proved that adolescents and young adults are more likely to suffer from neck pain due to their sitting wrongly and hunched for hours and long periods and with constant repetition without taking breaks and without physical exercise

4- Study: Hinckley et al., (2017)

Study title: The effect of mobile phone development on four-year-olds and its interference as young drivers - a randomized trial control study system.

Curriculum: The research followed the random approach on a group of 50 students divided into groups

Objective: To uncover the different causes that cause headaches in children due to the use of mobile phones

Results: headache and vascular headache caused by high blood pressure and from tension that leads to tightening of the muscles of the face and neck.

5- Study: Inet Jacob, Int J ccup saf Ergon (2017)

Study title: Symptoms that result from using mobile phones and internet devices and cause pain and aches and anesthesia (numbness) in the wrist and fingers of the hand

Syllabus: istabiyani

Objective: To determine the possible relationship between the symptoms that appear on the wrist and fingers of the hand, including aches, pains, and numbness after using computers and mobile phones

Results: It showed that most users of mobile phones and computers, especially for long periods of time, feel pain in the wrist and numbness in the fingers.

Results:

It was demonstrated that there is a significant effect of radiation on the right hemisphere of the brain, as there is photographic memory among adolescents who put the phone on their right ear when making calls for long periods.

Extent of benefit from related studies:

Although it dealt with the problem of the study from many aspects, the researcher could benefit from it in terms of the quality of the necessary measurements and the types of therapeutic exercises for the development of physical and movement capabilities and therapeutic means such as chiropractic that can be used in this study, but the method of treating the problem and the method of implementation is unique to this study in terms of using a method A combination of movement and static exercises with flexibility, stretching, and Chiropractic.

Cervical spine anatomy and neck pain

Telephone Neck Associated Diseases:

Associate Diseases with neck mobile

Associated symptoms with neck mobile

Associated muscles with neck mobile

Muscles working on the neck and rehabilitation

– The Basic and Auxiliary Muscles: Basic Muscles and Muscles Support

– Designing the physical and locomotors program by means of a questionnaire

Choosing appropriate tests for the nature and sample of the research

Determine the duration of the program implementation

Determine the number of units, their time, intensity, number of repetitions, and intervals of rest

Identify and improve the problems and difficulties faced by previous researchers

– Learn about the most appropriate methods for conducting appropriate statistical transactions that are commensurate with the objectives and hypotheses of the research

Assisting the researcher in interpreting the results

Research Methodology:

The experimental approach was used for its suitability to the nature of the study, and the experimental design for one experimental group was used.

The following took into account in the selection of the research sample:

Children and adolescents should be users of modern devices (tablets - smart mobile phones) for long periods of time.

There are no obstacles preventing students from implementing the rehabilitation program.

- That the students have the desire to implement the rehabilitation program.

That they do not have congenital anomalies in the spine (cervical and dorsal region)

They should not have injuries or have been exposed to chronic injuries in the cervical region or the back and shoulders.

Table No. (1)

**Statistical description of the basic measurements of the research sample of
children and adolescents (N = 8)**

| Measurements | | Min. | Max. | Mean | Std. Deviation | Skewness | Kurtosis |
|---------------------|------------------------|-------------|-------------|---------------|---------------------------|-----------------|-----------------|
| 1 | Age (years) | 12 | 17 | 14.75 | 1.669 | 0.461 | 0.596 |
| 2 | Height (cm) | 149 | 166 | 158.00 | 5.952 | 0.168 | 1.145 |
| 3 | Weight (kg) | 51 | 68 | 59.63 | 5.951 | 0.168 | 1.195 |

Table No. (1) shows the arithmetic mean and the standard deviation in the basic measurements, and the torsion coefficients came close to zero, and the coefficients of

sputtering are limited to (± 3), which indicates the moderation of values and homogeneity of the research sample members of children and adolescents before applying the basic study.

The research sample:

The sample was chosen by a purposive sample of male children and adolescents who use modern devices such as (tablets - smart mobile phones) and its consistency was (8) individuals, where the proposed rehabilitation program was applied to them, and the sample ages ranged between (12: 17) years an exploratory experiment on (2) from outside the sample.

Time domain:

The research study was conducted during the period from (4/15/2020) to (7/14/2020).

Spatial domain: stadiums and the gymnasium at Smouha Sports Club

Devices and tools used in the research:

It is classified as follows:

Tools and devices used to implement the measurements and the rehabilitation program

- Joint range of motion scale (goniometer) to measure the range of motion in the cervical region.

Muscle strength scale (dynamometer) to measure the strength of the muscles working on the spine

The Length and the Weight Measurement

Pain score scale

- Calibrated medical scale (weight) - Stop watch - A cm tape measure - Leather straps of different sizes for fixation - Different weight resistors (sandbags) - Sponge mattresses - Elastic bands

Different sizes and resistors - Wooden boxes of different heights (10: 15: 20 cm)

The search tools have been identified as follows:

Measurements used:

As basic measurements: length to the nearest centimeter - weight to the nearest half a kilogram - age

Kinematic measurements:

Measuring the range of motion of the joints in the following areas:

- The cervical region - the lumbar region - the shoulder joint - the wrist joint

The following muscle strength measurements:

♣ Holding the muscles working on the torso

♣ extensor muscles working on the torso

♣ rotary for the cervical region

Holding the neck of the muscles working on the cervical region

Extensor of the lumbar region to the muscles working on the lumbar region Measure the degree of pain

Physical and Chiropractic program components:

By referring to previous references and studies and to the researcher's experience with physical and rehabilitative exercises, a group of exercises with graded difficulty were selected to develop the physical, motor and functional characteristics of the muscle groups and joints in the spine to reduce the negative repercussions of the neck mobile in the cervical region, shoulders, arm and hand in order to improve the various

physical characteristics of the injured Safely and without any pressure or any damage to the aforementioned muscle and articular areas.

And it was presented to a group of experts and specialists to ascertain the components and methods of implementing the physical and chiropractic program and its suitability to achieve the goal of the research.

The physical and chiropractic program included three phases that lasted for three months, and each phase was of approximately 30 days.

The following was taken into account when designing the proposed physical and biopsy program:

- Presenting the program to professors and experts in traumatology and chiropractic in the Faculties of Physical Education and Medicine to benefit from their scientific views.
- Permanent knowledge of new scientific research on chiropractic and the treatment methods used to benefit from it.

The researcher has taken training courses in the United States of America to know the methods of Chiropractic treatment and to train on them for use in the research.

And based on the opinions of expert professors from physical education, alternative and natural medicine, and rehabilitation, and on the theoretical analysis of references and scientific research, the following means and methods of treatment were reached:

1- Rehabilitation Exercises

The rehabilitation program contained a group of exercises, which totaled (76) exercises, and they were divided into three stages as follows:

The first phase included (22) exercises, the second phase included (20) exercises, and the third phase included (34) exercises that are the basis of the components of the physical and psychoactive program, and aims to provide children and adolescents

with the elements of physical fitness and therapy with Chiropractic in order to return them to a normal state.

The physical program includes a set of exercises that are intended to:

Therapeutic exercises

Physical exercises consisting of:

1- Stretching and stretching exercises for the muscles

2- Flexibility exercises for joints

3- Resistance exercises (for the shoulders - neck - for the upper and lower back muscles)

The main objectives of the proposed physical and Chiropractic program for telephone neck treatment:

- Flexibility development of the cervical and lumbar region, the shoulders and the joints of the upper and lower extremities

Strengthening the muscles working on the spine and shoulders

- Expanding the space between the vertebrae of the spine and moderating it with Chiropractic to reduce pressure

- Improving the angles of the spine as an indicator of the improvement of postural deviation in the cervical region

- Reducing the degree of pain from the aggravation of injury to advanced degrees

Stages of the rehabilitation program:

The first phase: from (28:30) days and it contained (22) exercises and aims to: -

Maintain muscle tone

Encouraging the injured to move

Controlling negative symptoms with chiropractic treatment

Teaching injured students the correct posture

The procedures followed at this stage:

Musculoskeletal static and motor work of the muscles working on the shoulders,
upper and lower spine and chiropractic therapy

The second stage: from (25:28) days and contained (20) exercises and aims to:

Development of the motor range of the spine and shoulder joint

Muscle strength development

Reducing pain

The procedures followed at this stage:

Musculoskeletal action

- Attention to flexibility exercises and elongations

Pay attention to strength training

The third phase: from (30:32) days and contained (34) exercises and aimed at:

- Attempting to reach by force to the normal limit or as close as possible

- Trying to reach the dynamic range and the functional range to the normal range or as close as possible to that

- Get moving and sitting to the normal position whenever possible

- Examination with chiropractic of patients to check on the normal condition of the spine, especially the cervical region.

Procedures for this stage:

Flexibility exercises

Stretching exercises

Strength training

Musculoskeletal and functional work

Basic study:

As of 4/15/2020, the basic study was carried out and the program was implemented with the first case of the sample for students suffering from negative symptoms of the neck mobile phone))

The sample consisted of (8) cases of students. The physical program interpretation was applied to them, and pre-measurements were made for each case before the start of the program. Dimensional measurements were also made after completing the three stages of the physical and biopsychological program.

Display results:

Presentation and discussion of the significance of the differences between the pre-measurement and the post-measurement in the muscle strength variables

Table (2)

The arithmetic mean, standard deviation, improvement percentage, and "t" value computed between the pre and post measurement in muscle strength measurements and the degree of pain perception (n = 8)

| Measurements | | Pre Measurement | | Post measurement | | difference between measurements | | T test | Ratio Improvement% |
|---------------------------------------|-------|-----------------|------|------------------|------|---------------------------------|------|---------|--------------------|
| | | M | SD | M | SD | M | SD | | |
| Torso flexor strength | | 31.5 | 2.45 | 44.5 | 3.63 | 13 | 1.41 | 26.00** | 41.27 |
| Torso extensor muscle strength | | 20.25 | 2.12 | 31.75 | 3.41 | 11.5 | 1.41 | 23.00** | 56.79 |
| Muscular strength Rotator cervical | right | 4.13 | 1.13 | 11.75 | 2.12 | 7.63 | 1.19 | 18.16** | 184.85 |
| | Left | 4.88 | 1.13 | 12.38 | 2 | 7.5 | 1.07 | 19.84** | 153.85 |
| Neck flexing force | | 8.38 | 1.06 | 21 | 2.39 | 12.63 | 1.41 | 25.36** | 150.75 |
| Neck extensor muscle | | 5.13 | 0.83 | 17.75 | 3.49 | 12.63 | 3.07 | 11.64** | 246.34 |
| The degree of pain perception | | 8 | 0.76 | 2.25 | 0.71 | -5.75 | 0.71 | 23.00** | 71.88 |

* Tabular "T" morale is at the level of 0.05 = 2.365, ** at the level of 0.01 = 3.499

It is evident from Table (2) that there are significant differences in the value of "T" computed between the pre and post measurement in muscle strength measurements, where the rate of improvement ranged between (41.27%: 246.34%) and the degree of pain perception by 71.88% in favor of the post-measurement

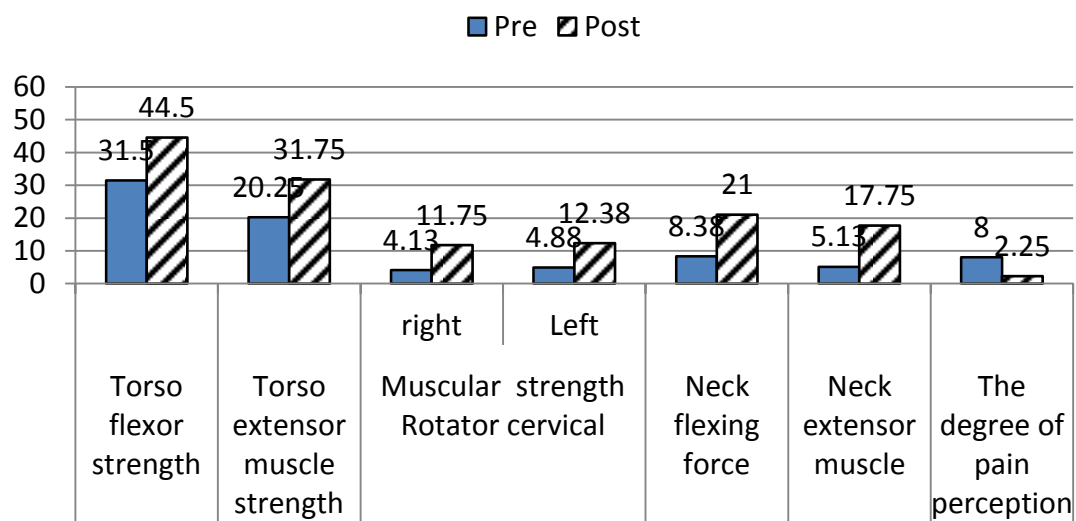


Figure (1)

The arithmetic mean between pre and post measurements in muscle strength measurements and the degree of pain perception for children and adolescents

Presentation and discussion of the results between the pre-measurement and the post-measurement in the variables of the kinematic range

Table (3)

The arithmetic mean, standard deviation, improvement percentage, and "t" value computed between pre and post measurement in measurements of the kinematic range of the cervical region (n = 8)

| Measurements | Pre Measurement | | Post measurement | | difference between measurements | | T test | Ratio Improvement% |
|---------------|-----------------|------|------------------|------|---------------------------------|------|---------|--------------------|
| | M | SD | M | SD | M | SD | | |
| Receipt | 27.88 | 3.4 | 42.25 | 2.12 | 14.38 | 1.3 | 31.22** | 51.57 |
| Simplify | 34.38 | 5.63 | 48.75 | 3.92 | 14.38 | 1.85 | 22.02** | 41.82 |
| Right slope | 27.63 | 5.21 | 39 | 1.31 | 11.38 | 3.96 | 8.12** | 41.18 |
| Left tilt | 27.5 | 4.96 | 39.13 | 1.25 | 11.63 | 3.96 | 8.30** | 42.27 |
| Right turn | 43.63 | 3.46 | 69.88 | 1.64 | 26.25 | 2.05 | 36.17** | 60.17 |
| Left rotation | 44.5 | 4.6 | 69.5 | 2.07 | 25 | 2.78 | 25.46** | 56.18 |

* Tabular "T" morale is at the level of 0.05 = 2.365, ** at the level of 0.01 =

3.499

Table (3) shows that there are significant differences in the value of "T" computed between the pre and post measurement in measurements of the kinematic range of the cervical region, where the improvement rate ranged between (41.18%: 60.17%) in favor of the post-measurement in favor of the post-measurement

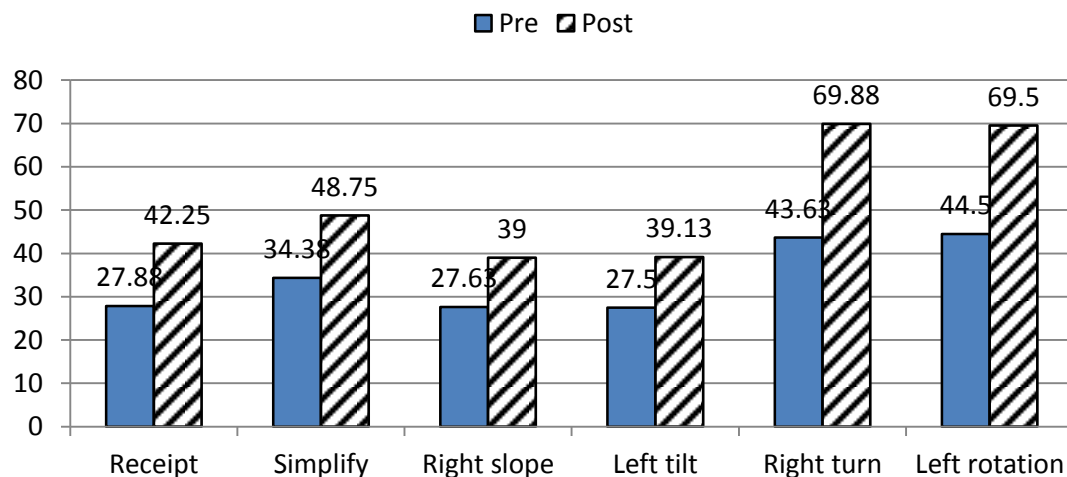


Figure (2)

The arithmetic mean between the pre and post measurement in the kinematic range measurements for the cervical region of children and adolescents

Discussing and interpreting results:

And through the survey study of the foreign and Arab scientific references and research that have been viewed in the field of this research and from the reality of personal contacts with workers in the fields of sports injuries, therapeutic exercises, rehabilitation and sports medicine, the scarcity of physical and chiropractic programs for the neck mobile became evident.

Therefore, there is a need to develop a physical and chiropractic program to improve the motor efficiency and muscle strength of cases affected by the mobile cervix, increase the range of motion and improve the angles of the cervical spine to reduce pain and achieve the best possible health condition.

Discuss the results of muscle strength and degree of pain sensation:

Tables (1) and the graph (1) showed improvement in muscle strength measurements, and the effect of the rehabilitation program was high in improving muscle strength, lack of feeling and feeling of pain, and increasing the mobility of the neck of the mobile phone.

The improvement in the muscular strength of the working muscles on the neck is due to the use of physical and chiropractic exercises, as the content of the program of physical exercises led to an increase in muscle strength, which had an excessive lengthening as a result of its use.

These results are consistent with what was indicated by (Douglas Gagger and others) as well as Dr. Ken Hansraj) that improving the range of motion of the cervical region and improving the muscular strength of the muscles working on it and the treatment with chiropractic works on the integration and coordination between the muscles and ligaments of the back and cartilage and the return of biomechanics. Mobility and correct load distribution in the body.

(Doing Salmon et al.) and (Kim Hye et al.) Indicate that the nature of the rehabilitative training programs and their containment exercises that work to strengthen the muscles working on the cervical spine area and lead to increased muscle strength and maintenance of its stability and lack of pain due to the excessive use of portable devices, and here It is evident that the first hypothesis is correct and fulfilled, that the proposed program included exercises for that part, which led to the improvement of muscle strength working on it and not feeling pain.

Discuss the results of the range of motion of the cervical region:

Tables (2) and graph (2) in the measurements of the kinematic range (of the cervical region) showed that there are statistically significant differences between the pre-measurement and the post-measurement in favor of the post-measurement of the experimental group, which led to an improvement in the motor range of the cervical region (grip and extension - tilt to the right and left - turn right And the left) and this is due to the proposed rehabilitation program, which included a set of exercises that were carefully selected to improve the efficiency of the motor range of the cervical region Due to its great importance in relieving the load on the spine because it is the most mobile area of the spine and also carries the head with its vital organs and represents a weight on the spine, so it is necessary to work on the presence of exercises to strengthen this area to reduce the negative effects and relieve pain on the area of the column Cervical spine.

First: Conclusions:

In light of the objectives and hypotheses of the research and within the limits of the research sample, and based on statistical treatments and after presenting and interpreting the results, the following conclusions were made:

1- The physical and psychoactive program has positive effects on students with neck mobile symptoms.

2- The proposed program has achieved an improvement in:

Muscle strength of the muscles operating on the cervical spine

The range of motion of the cervical spine region

Degree of pain

Recommendations:

In light of the research objectives, hypotheses and conclusions, the researcher

recommends the following:

- Paying attention to the strength of the muscles working on the neck area and its range of motion to reduce the pressure on the spine (the cervical region) and help support the weight of the head by practicing a physical program that can benefit users of mobile devices

- Place the phone at eye level as possible, do not bend the head or look down and keep it completely straight in line with the shoulders and spine, and set a timer or alarm to remember to have periods of rest every 20 to 30 minutes throughout the period of use

- Chiropractic therapy spares the users of modern mobile devices from the negative effects of neck pain and helps to recover from the injury that occurs as a result of its frequent use with the application of the physical program

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First: Arabic references

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