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A rehabilitation program to straighten the neck vertebrae and some incorrect head and neck movements for blind players in various sports activities

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ABSTRACT:
Blindness is one of the common disabilities in society and it is of degrees. There are those who suffer from total blindness, and some of them suffer from partial blindness, with degrees that differ according to the degree of their vision. They classified as being congenital blind, or the disability is urgent, i.e. after birth, specifically after the age of five years. The study will focus on a group of completely blind athletes who have a group of abnormal movements in the neck of the head, as well as some distortions in the straightening of the head due to the loss of vision, and thus the appearance of some incorrect movements. The reason is that the blind does not have the same dynamic skill as the sighted person, which is represented by seeing the shape and movements of the body and then self-correcting them, as we notice a decrease in the level of their life experiences they have compared to the life experiences of ordinary people. The results of scientists' studies and research indicated that the blind have less experience than the sighted. Therefore, this research focused on study the impact of a rehabilitation program that includes a set of exercises and movements using means of correcting head and neck movements of the blind to be similar to the natural movements of the non-blind, and to ensure their integration into society. As well as to avoid permanent distortions in the neck vertebrae and the ligaments and tendons of these vertebrae, which causes future problems in the motor and nervous system of the blind person.

I. INTRODUCTION

The research included exercises to rehabilitate the neck vertebrae and the associated muscles, ligaments and tendons through a set of exercises that work to return the injured person to the normal position represented by the performance of various movements within the normal functional range. The rehabilitation program took period of (60) days for a group of blind players who play various sports games for the disabled and who perform a set of incorrect movements represented by raising the head up, tilting the head to the side, back and exaggerated bending of the neck to one side and getting used to these movements permanently. The problem of the research is the absence or lack of rehabilitation programs for correcting the movements of the blind, which lead to permanent injuries or distortions in the neck vertebrae and the accompanying multiple health problems, in addition to improve the external appearance of body movements. The research aims to identify the effectiveness of prepared rehabilitative exercises in the rehabilitation of the neck vertebrae and associated muscles, ligaments and tendons, the researcher assumes that rehabilitative exercises have a positive effect on straightening the movements of the head and neck in a relatively short time. Pre and post -tests conducted for the research sample to demonstrate the effectiveness of the rehabilitation program, where the test for

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measuring the range of motion of the head in the four directions was approved using the genometer device, in addition to the medical diagnosis. After conducting the post-tests and showing the statistical results, the researcher concluded that the prepared program and the prepared rehabilitative exercises had a positive impact on the rehabilitation of the neck vertebrae and the associated muscles, ligaments and tendons. The researcher recommends the adoption of this program in the rehabilitation of blind athletes and non-athletes who suffer from involuntary movements in the head and neck due to blindness, and who are unable to straighten the shape of body movements correctly due to disability.

The number of the sample was (10) blind athletes who practice different sports. The pre and post research tests and the rehabilitation program conducted in the Baquba Sports Forum for the period from 1/3/ to 2/5/ 2023.

The most important spinal injuries summarized as follows: (Abbas Hussein Obaid, 2013, p. 116)

1- Lateral scoliosis (kyphosis, Lumbar concavity).
2- Osteoarthritis of the vertebrae.
3- Erosion of the vertebrae.
4- Herniated disc
5- Lumbar nerve entrapment
6- All kinds of fractures and bruises

II. RESEARCH METHODOLOGY AND FIELD PROCEDURES

2.1 Research Methodology

The researcher used the experimental approach with one group design (pre and post -test) for its suitability to the research problem.

2.2 the research sample

The research sample included a group of blind players who play various sports games for the disabled and who perform a set of incorrect movements represented by raising the head up, tilting the head to the side, back, and exaggerated bending of the neck to one side continuously. The number of the sample at the beginning of the program was (10) blind players, and their ages ranged between (17-24) years, males and females.

Table I: it shows the homogeneity of the research sample in some of the indicators and variables used in the research by knowing the torsion coefficient within the normal distribution.

Torsion coefficien	**standard deviation**	**Median**	**Mean**	**Measruing unit**		**Variables**
	±S	**M**	**M**			
1,66	0,9	19,5	20	***Year***		**Age**
1,05	1.7	5,4	6	**Year**		**Training age**
0.88	1,7	62.5	63	**Kg**		**Weight**
0,78	0,96	17	17,25	**Degree**	**bend down**	**range of motion**
0,66	1,12	16	16,1		**bend up**	
1,80	0,83	17	17,9		**Bend to the right**	
	0,96	19	19,07		**Bend to the left**	

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1,45	1,55	32	32,20		**Right turn**	
1,77	1,27	26,5	27,3		**left turn**	
0,32	0,92	3	3.4	**Kg**	**front**	**Neck muscle strength**
0,34	0,88	3,75	4		**background**	
1,89	1,11	2,6	2,14		**Bend to the right**	
0,73	1,22	2,7	3		**Bend to the left**	
0,91	0,98	2	2,20		**Right turn**	
0,76	0,78	1	1,5		**left turn**	
1,64	0,91	5	5,25	**Degree**		**Degree of pain**

It appears that all the values of the torsion coefficient were between (0.32) and (1.89), and these values are within the range of the curve of (±3), which indicates the homogeneity of the sample in these variables and indicators.

2.3 search tools

1- Flexometer device for measuring the range of motion of the neck
2- Dynamometer device for measuring the strength of the neck muscles.
3- Pain scale Scales Analogues visual (VAS) to measure the degree of pain.
4- Medical scale for measuring weight (kilograms)
5- Scaled ruler for measuring length (centimeters)
6- Data registration form
7- Medicine balls of different weights and sizes
8- Sponge and plastic neck braces
9- Various rubber bands and ropes

2.4 Research tests:

1- Measuring the range of motion of the neck with a flexometer: In the sitting or lying position, with the head in the middle of the body, while maintaining the stability of the shoulders, the flexometer is installed on the middle of the head of the injured person with a belt from the lateral side. The injured person bends the head in all directions according to the measurement and to the maximum extent possible with stability, and the degree is recorded. (12:81).

2- Measuring the strength of the neck muscles with a dynamometer: It measures the muscular strength of the neck muscles and determines the ability of the muscles to resist the external force applied to them.

3- Measuring the degree of pain, Scales Analogues visual (VAS) to measure the degree of pain: It is a simple and effective scale that is widely used in motor rehabilitation programs. It is graded from (0 to 10) horizontal or vertical degrees, respectively, starting from zero to 10 degrees, which expresses the largest scale of the degree of pain. (according to 5:42).

- **1- Pre-tests:** Pre_ measurements were taken on 1/3/2023 on the research sample of (10) players with a torn wrist joint. All data were recorded by the work team from measuring weight, grip strength, and measuring the range of motion of the wrist joint, in addition to recording the chronological age and training age for all members of the sample.
- **2- Rehabilitation programme:** it began on Wednesday 1/3/2023, and ends on Tuesday 1/5/2023 (Appendix 1).
- **3- Post-tests**: Post_ measurements were conducted on the research sample after completing the rehabilitation

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program on Thursday 2/5/2023 in the Sub-Committee for the Disabled in Baquba, and all data were recorded for statistical processing.

- **4- Statistical means**: The following statistical methods were used:

- Mean (The student, Al-Samarrai 1987, pg. 40):

$$M = \frac{\sum x}{n}$$

- standard deviation (Yassin and Al-Obeidi 1996, p. 156):

$$SD = \sqrt{\frac{\sum x^2 - \frac{\sum x^2}{n}}{n-1}}$$

- T-TEST for one sample (Ayed Karim Al-Kinani 2009, p. 146):

$$T = \frac{M\ F}{\frac{SD\ F}{\sqrt{n}}}$$

III. RESEARCH RESULTS, ANALYSIS AND DISCUSSION

3.1 The results of testing the range of motion of the neck, the strength of the neck muscles, and the degree of pain, and their analysis and discussion

Table II:

It shows the arithmetic mean, standard deviations, the difference of the arithmetic mean and its standard deviation, the value of (t) calculated, the significance of the differences to measure the range of motion of the neck, the strength of the neck muscles and the degree of pain in the results of the pre and post measurements of the research sample.

Significance of differences	T tabular value	T value calculated	difference standard deviations	mean difference	Post-test		Pre-test		Measruing unit	Variables	
					SD	M	SD	M			
Significant	2,26	31,9	11,9	33,9	1,24	60,5	0,78	17,25	**Degree**	**bend down**	**Neck range of motion**
Significant	2,26	66,4	2.31	48,5	2,06	64,6	0,94	16,1		**bend up**	
Significant	2,26	15	1,1	51,1	1,88	69	1,19	17,9		**Bend to the right**	
Significant	2,26	44,7	3,16	44,7	1,65	64,4	0,92	19,07		**Bend to the left**	
Significant	2,26	12,94	8,71	35,6	2,20	67.9	1.02	32,20		**Right turn**	
Significant	2,26	53,4	3	50,2	2.07	80	0.93	27,3		**left turn**	

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Significant	2,26	16,06	1,05	5,3	1,98	9	1,20	3.4	**Kg**	**front**	**Neck muscle strength**
Significant	2,26	26,6	0,69	5,6	1,91	10,3	0,60	4		**background**	
Significant	2,26	12,12	1,05	4	2.11	7,1	0,17	2,14		**Bend to the right**	
Significant	2,26	15	0,66	3	1,88	6,3	1,1	3		**Bend to the left**	
Significant	2,26	20,9	0,69	4,4	1.40	6,1	0,14	2,20		**Right turn**	
Significant	2,26	11,5	1,16	4,15	1,74	6	0,97	1,5		**left turn**	
Significant	2,26	16,1	0,70	4,02	0,9	0,5	1.2	5,25	**Degree**		**Degree of pain**

Through table No. (2), the results of the neck motor range test (bottom) appeared, where the arithmetic mean was (17.25) with a standard deviation (0.78) for the pre-test, while the arithmetic mean value for the post-test was (60.5) with a standard deviation (1, 24). And after using the (t) test for the differences between the pre and post tests,, the calculated (t) value reached (31.9), which is greater than the tabular value of (2.26) at the significance level (0.05) and the degree of freedom (5). And this confirms there are high significant differences between the pre and post tests, in favor of the post test.

It also shows the results of measuring the motor range of the neck (top), where the arithmetic mean was (16.1) with a standard deviation (0.94) for the pre-test, while the arithmetic mean for the post-test was (64.6) with a standard deviation (2.06) and after using (T) test for differences between the pre and post tests. The calculated value of (T) was (66.4), which is greater than the tabular value of (2.26) at the significance level (0.05) and the degree of freedom (5). And this confirms the existence of significant differences between the two tests. pre and post test and in favor of the post test.

It also shows the results of measuring the range of movement of the neck joint (bending to the right), where the arithmetic mean was (17,9) with a standard deviation (1,19) for the pre-test, while the arithmetic mean for the post-test was (69) with a standard deviation (1,88). And after using (T) test for differences between the pre and post tests, the calculated value of (T) was (15), which is greater than the tabular value of (2.26) at the significance level (0.05) and the degree of freedom (5). And this confirms the existence of significant differences between the two tests. pre and post test.

The results of measuring the range of movement of the neck (bending to the left) indicate that the arithmetic mean was (19,07) with a standard deviation (0,92) for the pre-test, while the arithmetic mean for the post-test was (64,4) with a standard deviation (1,65). And after using (T) test for differences between the pre and post tests, the calculated value of (T) was (44,7), which is greater than the tabular value of (2.26) at the significance level (0.05) and the degree of freedom (5). And this confirms the existence of significant differences between the two tests. pre and post test.

The table also shows the results of measuring the range of movement of the neck (rotation to the right), where the arithmetic mean was (32,20) with a standard deviation (1,02) for the pre-test, while the arithmetic mean for the post-test was (67,9) with a standard deviation (2,20). And after using (T) test for differences between the pre and post tests, the

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calculated value of (T) was (12,94), which is greater than the tabular value of (2.26) at the significance level (0.05) and the degree of freedom (5). And this confirms the existence of significant differences between the two tests. pre and post test.

It also shows the results of measuring the range of motion of the neck (left rotation), where the arithmetic mean was (27,3) with a standard deviation (0,93) for the pre-test, while the arithmetic mean for the post-test was (80) with a standard deviation (2,07). And after using (T) test for differences between the pre and post tests, the calculated value of (T) was (53,4), which is greater than the tabular value of (2.26) at the significance level (0.05) and the degree of freedom (5). And this confirms the existence of significant differences between the two tests. pre and post test.

It also shows the results of measuring the strength of the (front) neck muscles, where the arithmetic mean was (3,4) with a standard deviation (1,20) for the pre-test, while the arithmetic mean for the post-test was (9) with a standard deviation (1,98). And after using (T) test for differences between the pre and post tests, the calculated value of (T) was (16,06), which is greater than the tabular value of (2.26) at the significance level (0.05) and the degree of freedom (5). And this confirms the existence of significant differences between the two tests. pre and post test.

It also shows the results of measuring the strength of the neck muscles (back), where the arithmetic mean was (4) with a standard deviation (0,60) for the pre-test, while the arithmetic mean for the post-test was (10,3) with a standard deviation (1,91). And after using (T) test for differences between the pre and post tests, the calculated value of (T) was (26,6), which is greater than the tabular value of (2.26) at the significance level (0.05) and the degree of freedom (5). And this confirms the existence of significant differences between the two tests. pre and post test.

It also shows the results of measuring the strength of the neck muscles (bending to the right), where the arithmetic mean was (2,14) with a standard deviation (0,17) for the pre-test, while the arithmetic mean for the post-test was (7,1) with a standard deviation (2,11). And after using (T) test for differences between the pre and post tests, the calculated value of (T) was (12,12), which is greater than the tabular value of (2.26) at the significance level (0.05) and the degree of freedom (5). And this confirms the existence of significant differences between the two tests. pre and post test.

It also shows the results of measuring the strength of the neck muscles (bending to the left), where the arithmetic mean was (3) with a standard deviation (1,1) for the pre-test, while the arithmetic mean for the post-test was (6,3) with a standard deviation (1,88). And after using (T) test for differences between the pre and post tests, the calculated value of (T) was (15), which is greater than the tabular value of (2.26) at the significance level (0.05) and the degree of freedom (5). And this confirms the existence of significant differences between the two tests. pre and post test.

It also shows the results of measuring the strength of the neck muscles (rotation to the right), where the arithmetic mean was (2,20) with a standard deviation (0,14) for the pre-test, while the arithmetic mean for the post-test was (6,1) with a standard deviation (1,40). And after using (T) test for differences between the pre and post tests, the calculated value of (T) was (20,9), which is greater than the tabular value of (2.26) at the significance level (0.05) and the degree of freedom (5). And this confirms the existence of significant differences between the two tests. pre and post test.

It also shows the results of measuring the strength of the neck muscles (rotation to the left), where the arithmetic mean was (1,5) with a standard deviation (0,97) for the pre-test, while the arithmetic mean for the post-test was (6) with a standard deviation (1,74). And after using (T) test for differences between the pre and post tests, the calculated value of (T) was (11,5), which is greater than the tabular value of (2.26) at the significance level (0.05) and the degree of freedom (5). And this confirms the existence of significant differences between the two tests. pre and post test.

It also shows the pain score test results, where the arithmetic mean was (5,25) with a standard deviation (1,2) for the pre-test, while the arithmetic mean for the post-test was (0,5) with a standard deviation (0,9). And after using (T) test for differences between the pre and post tests, the calculated value of (T) was (16,1), which is greater than the tabular value of (2.26) at the significance level (0.05) and the degree of freedom (5). And this confirms the existence of significant differences between the two tests. pre and post test.

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Through the results of the pre and post tests and measurements, and the significant differences in favor of the post tests for the research sample, the effect of the rehabilitation program prepared by the researcher appears clearly.

The program contributed significantly to straighten the neck movements. And this was through the balance in the strength of the working muscles of the neck, which led to the return of the normal range of motion of the head and the final disappearance of pain, which appeared when performing some movements, which are considered within the normal range of movement of the head and neck.

The researcher attributes this development in the work of the neck muscles to the exercises and means that were used in the rehabilitation program. The researcher diversified these exercises to include all the muscles working on the neck vertebrae, in addition to working to increase the flexibility and strength of the articular ligaments of the neck vertebrae, as well as the working muscle tendons and their balance.

The remarkable improvement in the position of the muscles working on the neck as a result of applying the paragraphs of the rehabilitation program helped to improve the psychological status of the blind, “The functional state of all body systems is affected by the psychological state of the individual” (Samiaa Khalil, 2010).

Performing exercises, engaging muscle groups equally and correctly for the muscles working on the head and neck during the implementation of the rehabilitation program had a role in increasing the range of motion of the head and neck. Thus, an improvement in the movement and form of movement of the sample individuals during the performance of the exercises.

Performing the rehabilitation exercises gradually had a clear effect in increasing strength and flexibility and restoring the normal range of movement of the head and neck, as well as improving the shape of head movements and eliminating some incorrect movements because of continuous evaluation during the Performance of the rehabilitation program.

Both (Ahmed Al-Samarrai and Bastawisi Ahmed 1984, p. 234) indicate that "sustainable motor development can be obtained through organized and targeted exercises."

Ahmed Salama (2010, p. 117) confirms that the vertebrae of the neck region are among the most complex vertebrae in the spine from an anatomical point of view, due to the presence of a large number of nerves and muscles in close proximity. Therefore, the neck region is considered one of the most vulnerable areas to injuries. In addition to the huge number of movements performed by the neck for athletes and non-athletes, and wrong practices, whether at work, sitting incorrectly, or practicing any activity incorrectly, all of these reasons lead to an increase in the percentage of injuries in the neck vertebrae.

(Dalton 2010) confirmed that most cases of deformities in the spine were due to wrong habits, whether in standing, sitting, the nature of work, or sitting in a wrong position, which generates an imbalance in strength on both sides of the body, which in turn leads to a mechanical imbalance of the spine.

What helped accelerate the improvement in the work of the neck muscles is a program of rehabilitative exercises that contributed to stimulating the blood circulation of the neck vertebrae and the work of the muscles on them, which helped to improve the health condition of the neck area.

Where “the remnants of injuries and ruptures of muscle fibers are considered one of the factors that impede the speed of recovery”. (Abu Al-Ela Ahmed, 1997, p. 248).

Therapeutic exercises aim to gain strength for the working muscles, which have the main role in preserving the integrity of the ligaments when the joint performs various movements and multiple resistances (Mohamed Ibrahim Shehata: 1997).

One of the goals of the rehabilitation exercises is to return the injured part to normal by restoring strength to the muscles working on the joints and increasing the flexibility of the ligaments. (Mervat Al-Sayed Youssef, 1998, p. 41).

1. Short goals, including:

- Maintain and improve flexibility.
- Return or increase strength.
- Pain control.

2. Long-term goals, including:

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• Restore the physiological level of the injured person by practicing proper motor performance.

IV. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Through the results of the research, the researcher reached the following conclusions:

1- The prepared rehabilitation program has a positive effect on the rehabilitation of the neck vertebrae and the muscles working on them, through the results of the pre- and post-tests.

2- The rehabilitation program exercises consisted of strength and flexibility exercises in developing the mobility of the head and neck, improving motor skills, and coordinating the shape and balance of movements among the sample members.

Recommendations: The researcher recommends several recommendations, including:

1- The importance of using the rehabilitative program prepared to rehabilitate the work of the neck muscles and neck vertebrae, improve the range of motion, balance the strength of the neck muscles, and the form of movements for the blind.

2- The importance of continuous correction of the blind for the purpose of performing the movements correctly to avoid the occurrence of motor distortions in the future.

3- The need to use modern devices and means that help the blind to develop their motor skills.

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REHABILITATION PROGRAMME

The first week: (5 days a week) unit time (120 minutes), rest between exercises (20) seconds.

1) Walk 50 meters back and forth using a spongy neck brace to correct the head position while walking (repeat 3 times).
2) From a standing position, bend the head to the right for 10 seconds (repeat 5 times).
3) Repeat the same previous exercise on the left side.
4) Bend the head forward for 10 seconds (repeat 5 times).
5) Repeat the same previous exercise backwards.
6) From a standing position, bend the body forward from the hip joint, so that the head is close to the knees, with the hands behind the neck for 5 seconds (repeat 3 times).
7) Rotate the head to the right and then to the left 10 times (repeat 5 times).
8) Bending the body forward (prostration position) with the arms fully extended forward and the head attached to the ground on the right side for 5 seconds, repeat (5 times).
9) Repeat the same previous exercise with the head positioned to the left.
10) From a lying position on the back, put a towel or a small pillow under the head and start moving the head

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back by pushing the hand from the chin area for 30 seconds, repeat (5 times).

The second week: (5 days a week) unit time (120 minutes), rest between exercises (20) seconds.

1) Walk 100 m back and forth using a spongy neck brace to correct the head position while walking (repeat 3 times).
2) From a standing position, bend the head to the right for 10 seconds (repeat 10 times).
3) Repeat the same previous exercise on the left side.
4) Bend the head forward for 10 seconds (repeat 10 times).
5) Repeat the same previous exercise backwards.
6) From a standing position, bend the body forward from the hip joint, so that the head is close to the knees, with the hands behind the neck for 5 seconds (repeat 5 times).
7) Rotate the head to the right and then to the left 10 times (repeat 10 times).
8) Bending the body forward (prostration position) with the arms fully extended forward and the head attached to the ground on the right side for 5 seconds, repeat (10 times).
9) Repeat the same previous exercise with the head positioned to the left.
10) From a lying position on the back, put a towel or a small pillow under the head and start moving the head back and forth by pushing the hand from the chin area for one minute, repeat (10 times).

The third week: (5 days a week) a unit of time (120 minutes), rest between exercises (15) seconds.

1) Walking 120m around a playground (20*40m) back and forth, wearing a spongy neck brace to correct head position while walking (repeat 5 times).
2) From a standing position, bend the head to the right for 5 seconds, fixing a rubber band on the head and on the other side against the wall to increase the resistance (repeat 5 times).
3) Repeat the same previous exercise on the left side.
4) Bending the head forward for 5 seconds, while fixing a rubber band on the head and on the other hand on the wall to increase the resistance (repeat 5 times).
5) Repeat the same previous exercise backwards.
6) From a standing position, bend the body forward from the hip joint, so that the head is close to the knees, with the hands behind the neck for 10 seconds (repeat 5 times).
7) Rotate the head right then left 5 times while fixing a rubber band on the head and the other side on the wall to increase the resistance (repeat 5 times).
8) Bending the body forward (prostration position) with the arms fully extended forward and the head attached to the ground on the right side for 10 seconds, repeat (10 times).
9) Repeat the same previous exercise with the head positioned to the left.
10) From a lying position on the back, put a towel or a small pillow under the head and start moving the head back and forth by pushing the hand from the chin area for 90 seconds, repeat (10 times).

The fourth week: (5 days a week) a unit of time (120 minutes), rest between exercises (10) seconds.

1) Slow running 120 meters around the playground (20 * 40 meters) back and forth, wearing a spongy neck brace to correct head position while walking (repeat 3 times).
2) From a standing position, bend the head to the right for 10 seconds, fixing a rubber band on the head and on the other side against the wall to increase the resistance (repeat 3 times).
3) Repeat the same previous exercise on the left side.
4) Bending the head forward for 10 seconds, while fixing a rubber band on the head and on the other hand on the wall to increase the resistance (repeat 3 times).
5) Repeat the same previous exercise backwards.
6) From a standing position, bend the body forward from the hip joint, so that the head is close to the knees, with the hands behind the neck for 20 seconds (repeat 3 times).
7) Rotate the head right then left 10 times while fixing a rubber band on the head and the other side on the wall to increase the resistance (repeat 3 times).
8) Bending the body forward (prostration position) with the arms fully extended forward and the head attached

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to the ground on the right side for 20 seconds, repeat (5 times).
9) Repeat the same previous exercise with the head positioned to the left.
10) From a lying position on the back, put a towel or a small pillow under the head and start moving the head back and forth by pushing the hand from the chin area for 2 minutes, repeat (5 times).

Fifth week: (5 days a week) unit of time (120 minutes), rest between exercises (7) seconds.

1) Slow running 120 meters around the playground (20 * 40 meters) back and forth, wearing a spongy neck brace to correct head position while walking (repeat 5 times).
2) From a standing position, bend the head to the right for 10 seconds, fixing a rubber band on the head and on the other side against the wall to increase the resistance (repeat 5 times).
3) Repeat the same previous exercise on the left side.
4) Bending the head forward for 10 seconds, while fixing a rubber band on the head and on the other hand on the wall to increase the resistance (repeat 5 times).
5) Repeat the same previous exercise backwards.
6) From a standing position, bend the body forward from the hip joint, so that the head is close to the knees, with the hands behind the neck for 20 seconds (repeat 5 times).
7) Rotate the head right then left 10 times while fixing a rubber band on the head and the other side on the wall to increase the resistance (repeat 5 times).
8) Bending the body forward (prostration position) with the arms fully extended forward and the head attached to the ground on the right side for 20 seconds, repeat (10 times).
9) Repeat the same previous exercise with the head positioned to the left.
10) From a lying position on the back, put a towel or a small pillow under the head and start moving the head back and forth by pushing the hand from the chin area for 2 minutes, repeat (10 times).

Sixth week: (5 days a week) unit time (120 minutes), rest between exercises (15) seconds.

1) Run 120 meters around the playground (20 * 40 meters) back and forth, wearing a spongy neck brace to correct head position while walking (repeat 3 times).
2) From a standing position, bend the head to the right for 15 seconds, fixing a rubber band on the head and on the other side against the wall to increase the resistance (repeat 3 times).
3) Repeat the same previous exercise on the left side.
4) Bending the head forward for 15 seconds, while fixing a rubber band on the head and on the other hand on the wall to increase the resistance (repeat 3 times).
5) Repeat the same previous exercise backwards.
6) From a standing position, bend the body forward from the hip joint, so that the head is close to the knees, with the hands behind the neck for 20 seconds (repeat 10 times).
7) Rotate the head right then left 15 times while fixing a rubber band on the head and the other side on the wall to increase the resistance (repeat 3 times).
8) Bending the body forward (prostration position) with the arms fully extended forward and the head attached to the ground on the right side for 20 seconds, repeat (15 times).
9) Repeat the same previous exercise with the head positioned to the left.
10) From a lying position on the back, put a towel or a small pillow under the head and start moving the head back and forth by pushing the hand from the chin area for 2 minutes, repeat (15 times).

Week 7 and 8: (5 days a week), unit time (120 minutes), rest between exercises (20) seconds.

1) Fast running 120 meters around the playground (20 * 40 meters) back and forth, wearing a spongy neck brace to correct head position while walking (repeat 5 times).
2) From a standing position, bend the head to the right for 15 seconds, fixing a rubber band on the head and on the other side against the wall to increase the resistance (repeat 5 times).
3) Repeat the same previous exercise on the left side.
4) Bending the head forward for 15 seconds, while fixing a rubber band on the head and on the other hand on the wall to increase the resistance (repeat 5 times).

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5) Repeat the same previous exercise backwards.
6) From a standing position, bend the body forward from the hip joint, so that the head is close to the knees, with the hands behind the neck for 20 seconds (repeat 15 times).
7) Rotate the head right then left 15 times while fixing a rubber band on the head and the other side on the wall to increase the resistance (repeat 5 times).
8) Bending the body forward (prostration position) with the arms fully extended forward and the head attached to the ground on the right side for 20 seconds, repeat (20 times).
9) Repeat the same previous exercise with the head positioned to the left.
10) From a lying position on the back, put a towel or a small pillow under the head and start moving the head back and forth by pushing the hand from the chin area for 2 minutes, repeat (20 times).