

## Research Paper

## The Effect of a Selected Corrective Program on Upper Crossed Syndrome in Men With Depression

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**Article info:****Received:** 30 Nov 2022**Accepted:** 14 Jan 2023**Available Online:** 01 Jul 2022**Keywords:**Corrective exercises,  
Spine alignment,  
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crossed syndrome**ABSTRACT**

**Purpose:** Most studies have examined the effect of aerobic exercises on improving depression and performance. However, due to the importance of the relationship between corrective exercise and spine alignment, especially in depressed men, this study aimed to investigate the effect of a selected corrective program on the upper crossed syndrome in men with depression.

**Methods:** The present study was a randomized controlled trial conducted in Shahrekord City, Iran. To perform this research, 30 depressed people with the upper crossed syndrome were purposefully selected and divided into experimental and control groups. The Beck depression inventory was used to measure their depression. The amount of forward head and shoulder angles were determined by the photogrammetry method, and a flexible ruler was used to measure the dorsal curvature of the spine. After evaluating the variables in the pre-test, the experimental group received the selected corrective exercise program for 8 weeks, 3 days a week. During this period, the control group did not do any exercises. Finally, after executing the selected protocol, the mentioned variables were measured again in the post-test. In inferential statistics, an analysis of covariance was used to compare inter-group differences.

**Results:** After performing corrective exercises, the results showed a significant difference between the groups ( $P < 0.05$ ). The change in the corrective exercises group was significantly greater in the angles of kyphosis ( $P = 0.001$ ), forward head ( $P = 0.001$ ), forward shoulder ( $P = 0.001$ ), and level of depression ( $P = 0.001$ ) than those in the control group.

**Conclusion:** The results revealed that 8 weeks of selected corrective exercises positively affect depression. According to the results, 8 weeks of corrective exercises can significantly reduce the angle of the head forward, round shoulder, and hyperkyphosis in depressed men with the upper crossed syndrome. So, these corrective exercises can be recommended to specialists as a treatment.

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## Highlights

- This article investigated the effect of corrective exercise on depression.
- Upper crossed syndrome was investigated in men with depression.
- Corrective exercises improved posture alignment in depressed men.

## Plain Language Summary

Mental illnesses and depression can somehow affect the body condition; a person suffering from depression feels weak and incapable due to mental disorders and low self-esteem. In a study, it was found that more than 60% of patients with body abnormalities have experienced a period of major depressive disorder in their life; about 35% had anxiety disorders, and 25% had mental disorders. In other words, an ugly body has bad effects on people's minds and they can make a person stay at home. Therefore, improving physical condition is necessary to correct mental illnesses. In this regard, the researchers of this study try to improve the problems related to depression and physical condition by using sports exercises. The difference between these exercises and other exercises is that in this type of exercises, we have used correction exercises, games, and exercises at the same time. And naturally, they can leave more beneficial effects. In this sense, the present study can open a new window on the effect of selected corrective exercises on the upper crossed syndrome in people suffering from depression. Therefore, the present study aims to investigate the effect of a selected corrective program course on upper crossed syndrome in people with depression.

### 1. Introduction

**M**ental and mood diseases range from anxiety, depression, and mild stress to schizophrenia and madness. The most common mood disease is major depressive disorder [1]. Mild symptoms of depression are considered a normal response in dealing with many social pressures in life, especially losing loved ones or important things. In the world, about 121 million people suffer from depressive disorder, and about 10% of people have experienced at least one period of depression during one year of their lives [2]. However, the prevalence of depressive disorders varies widely in different countries and ranges from 6% or less over the lifetime (Japan, China, Bulgaria, and Romania) to about 20% (Brazil, New Zealand, United States) [3, 4]. Mental illnesses and depression can somehow affect the body condition; a person suffering from depression feels weak and powerless due to low self-esteem [5]. A study found that more than 60% of patients with body abnormalities have experienced a period of major depressive disorder, about 35% had anxiety disorders, and 25% had mental disorders [6]. Canales et al. compared the effect of mild and severe depression on spinal alignment. They reported that people with severe depression had increased anterior tilt of the head, hyperkyphosis of the thoracic spine, and improved scapula abduction posture compared to the other group [7]. Janda

named this phenomenon an upper crossed syndrome. The upper crossed syndrome is a pattern of contrast between weakness and stiffness of the muscles of the cervical and thoracic spine. As a result, mainly the posterior-superior and anterior phasic muscles of the cervical region are shortened. In contrast, the anterior deep tonic muscles of the cervical spine and the inferior posterior of the shoulder girdle are stretched [8]. This muscle imbalance pattern causes dysfunction in the atlas-occipital joints and cervical and dorsal articular processes [9]. All these cases show the importance of prevention and correction of this misalignment. Various training methods and protocols have been implemented to correct upper crossed syndrome; these include common corrective exercises, comprehensive corrective exercises, and national academy of sports medicine exercises (NASM) [10, 11]. Corrective games and postural correction exercises are among the new methods of corrective exercises that researchers have considered in correcting deformities [12, 13, 14]. Postural correction training is related to eliminating these wrong patterns in daily life and training to adopt correct postures and increase people's awareness regarding body states in different body positions [14]. With the increasing role of games and primarily corrective games, postural correction training, and physical exercises on the correction and improvement of people's performance, it is expected that this study will take an essential step toward the progress and health of people suffering from depression. In this regard, what

can be understood by studying the previous research is that each of these research studies had a different framework. Thus, the effect of corrective exercises and games and postural correction training on upper limb abnormalities in other societies have been investigated. For example, Arshadi et al. showed in a study that corrective games improved the curvature of the upper crossed syndrome [13]. In another study, Signes et al. investigated the effect of a postural training course on improving symptoms related to lumbago among 10 to 11 years old children. These researchers reported that increasing knowledge about the wrong movement pattern and correcting it during daily activities improves and reduces symptoms related to lumbago [14].

On the other hand, based on the researcher's investigation, no study was found to deal with the simultaneous role of corrective exercises, corrective games, and postural correction training (which the researcher mentioned as selected corrective exercises) on the upper crossed syndrome in people with depression. In this sense, the present study can open a new window on the effect of selected corrective exercises on the upper crossed syndrome in people suffering from depression. Therefore, the present study aims to investigate the impact of a selected corrective program course on the upper crossed syndrome in people with depression.

## 2. Materials and Methods

### Study participants

Based on the study objectives, the present study is applied and quasi-experimental. Before the protocol implementation, the steps of obtaining the code of ethics were followed in the research and approved by the Ethics Committee (Code: (R1) SSRI.REC-2106-1042). To select the subjects, the researcher referred to the mental and health centers of Shahrekord Hajar Hospital, and the necessary arrangements with the officials were made. The statistical population of the current study consisted of men with an age range of 18 to 40 years with depression disorder, of whom 30 men were selected by convenience sampling based on the inclusion and exclusion criteria and assigned in the exercise (n=15) and control (n=15) groups. G\*Power software was used to check the size of the statistical sample. In this regard, the list of 290 patients with depression problems was numbered first. Then, based on the numbers in the software, the subjects of this study were selected. Even numbers were assigned to the experimental group, and odd numbers to the control group. Finally, the numbers were written, and the sample size reached 15 people in each group. Also,

informed consent was obtained from the subjects included in the study. The inclusion criteria include having a forward shoulder deformity of more than 52 degrees, a forward head deformity of more than 46 degrees, a kyphosis angle of more than 42 degrees [15], scoring 17-29 in the Beck questionnaire [16], male gender, and not taking antidepressants while doing exercises, age range 18 to 40 years, no cardiovascular and respiratory diseases, no history of surgery in the upper and lower limbs, no history of lasting injuries such as degenerative changes in the joints of the body, and absence of upper and lower limbs injuries in the previous years [15].

### Study procedures

In this research, the Beck depression inventory (1961) was used to measure the depression level of the subjects [16]. This questionnaire has 21 questions, each with four options (0-1-2-3). The subjects answer the questions by circling the number that best matches their feelings on that week. Fifteen questionnaire statements are related to psychological symptoms, and six others are related to physical symptoms. The total score of depression is calculated by summing the scores obtained from all statements, and its range varies between 0 and 63. In this questionnaire, a score between 0 and 9 is a sign of no depression, a score between 10 and 16 is a sign of mild depression, a score between 17 and 29 is a sign of moderate depression, and scores more than 30 indicate severe depression. The reliability and validity of this questionnaire were investigated in 1979, 1985, and 1986 [16]. According to the scoring of this questionnaire, a score between 17-29 is considered to identify men with moderate depression, and scores below 10 are considered to identify non-depressed men [16]. The head and shoulder forward angles were measured using the photogrammetry method. To measure the forward head and shoulder angles using this method, the first three anatomical signs of the tragus of the ear and the right acromion protrusion, as well as the spinous processes of the C7 vertebra, should be identified and marked with a landmark. A prominent landmark was used to mark the spinous processes of the C7 vertebra. Then, the subject was asked to stand in the designated place next to the wall (at a distance of 23 cm) with his left arm facing the wall. Then, a photographic tripod, on which the digital camera was also placed, was located at a distance of 265 cm from the wall, and its height was adjusted at the level of the subject's right shoulder. The subject was asked to bend forward three times and raise his hands above his head three times, and then stand comfortably and naturally and look at an imaginary point on the opposite wall (eyes along the horizon). After a 5 second pause, the examiner took a photo from the profile view. Finally, the mentioned

photo was transferred to the computer, and using AutoCAD software, the angle of the line connecting the tragus and C7 with the perpendicular line (forward head angle) and the angle C7 connecting line and the acromion appendage with the perpendicular line (forward shoulder angle) was measured [17]. A flexible ruler was used to measure the back curvature of the spine. For this purpose, the subject was told to bend his head and neck forward to expose the seventh cervical vertebra. Therefore, the spinous processes of the C7 vertebra are determined. After that, the examiner placed the index finger on the 12th rib, and the T12 vertebra was marked with the thumb. A flexible ruler is placed on the midline of the examinee's spine, between two specific points, and after applying appropriate pressure on it, the examiner places the ruler on a piece of paper and copies the spine's arch on paper by dragging the pen along the flexible ruler. the mentioned points were connected, and the kyphosis angle was calculated using the trigonometric Equation 1:

$$1. \theta = 4[\text{Arctan}(2H/L)] \text{ [17].}$$

After reviewing the results of the evaluations in the pre-test, the experimental group simultaneously performed corrective combined exercises, corrective games, and postural correction for 8 weeks. After completing the selected corrective exercises, the mentioned variables were measured again in the post-test.

**Selected corrective exercises**

Selected corrective exercises taken from specialized texts and previous research and under the supervision of researchers were designed to improve upper crossed syndrome. The implementation of the corrective exercises protocol was as follows: the subjects did corrective exercises for eight weeks, three days a week, along with corrective games and posture correction training. Each session starts with a 10 minute warm-up, including smooth running and kinetic movements. The exercises were performed from simple to complex, and finally, the training program was completed with a 10 minute cool-down. In addition, in the implementation process, the number of exercises (repetition and duration) gradually in-

**Table 1.** Corrective exercises

Row	Type of Movement	Modus Operandi	Set and Repetitions
1	Strengthening the cervical flexors and back extensors in the prone position	Placing the forehead on the ground and rolling toward the head back; At the same time and in this situation, cross-hour training is done using the Thera band	Two sets of 10 (1 <sup>st</sup> & 2 <sup>nd</sup> week) Three sets of 10 (3 <sup>rd</sup> & 4 <sup>th</sup> week) Three sets of 15 (5 <sup>th</sup> & 6 <sup>th</sup> week) Three sets of 20 (7 <sup>th</sup> & 8 <sup>th</sup> week)
2	Strengthening the intrinsic cervical muscles in the quadruped position	Aligning the stretch of the thoracic spine with the ground, Also, aligning the head and cervical vertebrae and the back and lumbar vertebrae, In this case, the subject is asked to turn his head down and then back so that he feels that an imaginary bar passes through the middle of his neck and turns his neck backward around that bar.	Two sets of 10 (1 <sup>st</sup> & 2 <sup>nd</sup> week) Three sets of 10 (3 <sup>rd</sup> & 4 <sup>th</sup> week) Three sets of 15 (5 <sup>th</sup> & 6 <sup>th</sup> week) Three sets of 20 (7 <sup>th</sup> & 8 <sup>th</sup> week)
3	Strengthening the intrinsic cervical flexors in the supine position	Correcting the alignment of the lumbar and chest area by contracting the abdominal muscles, also supporting the arms with a pillow, and placing the knees in a 90-degree flexion position, A rolled towel is used under the patient's head. Meanwhile, The person is asked to turn the head and chin towards the anterior cervical spine, The subject should feel a downward stretch on the back of the neck and use the deep and posterior intrinsic flexor muscles of the neck.	Two sets of 10 (1 <sup>st</sup> & 2 <sup>nd</sup> week) Three sets of 10 (3 <sup>rd</sup> & 4 <sup>th</sup> week) Three sets of 15 (5 <sup>th</sup> & 6 <sup>th</sup> week) Three sets of 20 (7 <sup>th</sup> & 8 <sup>th</sup> week)
4	Exercise sitting with back to the wall and doing shoulder flexion with the resistance of the band	In the position of elbow flexion and placing the palms in front of him, the subject flexes and externally rotates the shoulder up to 90 degrees. Then the person is asked to perform shoulder flexion by raising the hands toward the ceiling with the band's resistance, One should keep the lumbar vertebra against the wall.	Two sets of 10 (1 <sup>st</sup> & 2 <sup>nd</sup> week) Three sets of 10 (3 <sup>rd</sup> & 4 <sup>th</sup> week) Three sets of 15 (5 <sup>th</sup> & 6 <sup>th</sup> week) Three sets of 20 (7 <sup>th</sup> & 8 <sup>th</sup> week)
5	Abduction and external rotation of the shoulder in the sitting position with the back to the wall	The subject places the arms facing the wall and performs abduction and bilateral external rotation of the shoulder without compensatory extension in the vertebrae of the thoracic, lumbar, and cervical regions. The person slides their arms up against the resistance of the Thera band on the wall while rolling forward.	Two sets of 10 (1 <sup>st</sup> & 2 <sup>nd</sup> week) Three sets of 10 (3 <sup>rd</sup> & 4 <sup>th</sup> week) Three sets of 15 (5 <sup>th</sup> & 6 <sup>th</sup> week) Three sets of 20 (7 <sup>th</sup> & 8 <sup>th</sup> week)
6	Slide on the wall	Placing in front of the wall and while the shoulders are in a flexion state, the person puts his ulnar part on the wall. In this position, the person is asked to maintain the correct position of the scapula and keep his chin down towards the front of the neck. In this position, the person is asked to slide their arms upwards on the wall while the resistance of the Thera band is applied.	Two sets of 10 (1 <sup>st</sup> & 2 <sup>nd</sup> week) Three sets of 10 (3 <sup>rd</sup> & 4 <sup>th</sup> week) Three sets of 15 (5 <sup>th</sup> & 6 <sup>th</sup> week) Three sets of 20 (7 <sup>th</sup> & 8 <sup>th</sup> week)

**Table 2.** Description of corrective games

Game Title	Goal	Variety and Progress of the Game
Snake crawling forward-tent on the ball	Stretching the Latissimus dorsi, pectoralis major, and minor muscles	Two rounds of play
Carrying a book with the head	Stretching of the pectoralis major and minor muscles and shoulder internal rotators.	The 1 <sup>st</sup> and 2 <sup>nd</sup> weeks: walking-the size of the game path is 12 meters. The 2 <sup>nd</sup> and 3 <sup>rd</sup> weeks: crossing two obstacles-the length of the game path is 16 meters. Launch face-the size of the game path is 18 meters. The 7 <sup>th</sup> and 8 <sup>th</sup> week: Movement in the form of launch-the length of the game path is 16 meters.
Passing the ball under the bridge	Stretching of the pectoralis major and minor, shoulder internal rotators (subscapularis), and anterior deltoid.	The 1 <sup>st</sup> to 4 <sup>th</sup> weeks: the size of the game path is 12 meters-two rounds of the game. The 5 <sup>th</sup> to the 8 <sup>th</sup> weeks: the length of the game path is 18 meters-two rounds of the game.
Ant-carrying luggage	Strengthening deep flexor muscles of the neck (isometric neck retraction).	The 1 <sup>st</sup> and 2 <sup>nd</sup> weeks: yellow elastic-walking-two rounds of the game. The 2 <sup>nd</sup> and 3 <sup>rd</sup> weeks: yellow elastic-crossing two obstacles-two rounds of the game. The 4 <sup>th</sup> and 5 <sup>th</sup> weeks: yellow elastic-traveling three barriers-two rounds of the game. The 7 <sup>th</sup> and 8 <sup>th</sup> weeks: red flexible-crossing three barriers-Two rounds of the game.
Catapult-central	Strengthening the parallelogram muscles, middle and lower trapezius strings, external shoulder rotator, and spine straightener muscles.	The 1 <sup>st</sup> to 4 <sup>th</sup> weeks: yellow elastic-ball size 45-elbows in flexion. The 5 <sup>th</sup> to 8 <sup>th</sup> week: yellow flexible-bigger ball size-elbows open
Cable car-crossing the river	Strengthening the rhomboid muscles, middle and lower trapezius strings	1 <sup>st</sup> and 2 <sup>nd</sup> weeks: silver stretch-length of the path 6 meters. 3 <sup>rd</sup> and 4 <sup>th</sup> week: silver stretch - length of the path 7 meters. 5 <sup>th</sup> and 6 <sup>th</sup> week: silver stretch-length of the path 8 meters seventh and 8 <sup>th</sup> week: silver stretch-length of the path 8 meters

PHYSICAL TREATMENTS

creased during the 8 weeks of the exercise program, according to Table 1, and the individual characteristics of each subject. The rest between each set is 45 second, and the rest between exercises is 1 minute and 30 second [18, 19, 20] (Table 1).

**Corrective games**

Corrective games in the current research were designed using valid corrective exercises in a previous study [21]. The program of corrective games was based on the simultaneous correction of all three abnormalities related to the upper crossed syndrome, which included activation of weak muscles and inhibition of hyperactive muscles involved in upper crossed syndrome and was appropriate to the physical and mental characteristics of people with depression (Table 2).

**Posture correction training**

The correct posture of the head, neck, and shoulder and the correct standing and sitting posture were taught according to the deformity associated with the upper crossed syndrome. At first, the necessary instructions were given to the participants during a session, and then they were taught the correct postural position through

speech and manual guidance of the therapist [14, 22, 23, 24] (Table 3).

**Statistical analysis**

Finally, in the inferential statistics section, the analysis of the covariance test was used to compare the differences between groups, was used to compare the differences within groups. Data were analyzed using SPSS software, version 23. Also, hypothesis testing was done at a significance level of 95% with alpha less than or equal to 0.05.

**3. Results**

The Shapiro-Wilk and Levene’s tests were used to check the normal distribution of data and homogeneity of variance between groups (P>0.05). The results of the covariance analysis showed that the implementation of the program of selected corrective exercises had a significant effect on the forward head angle, kyphosis, and also the forward shoulder angle (P≤0.05) (Table 4, 5 and 6).



**Table 3.** Posture correction training

Row	Type of Movement	Modus Operandi	Repetition
1	Correction of shoulder position	The subject is placed in a standing position, the gluteal muscles are in a contraction state, the arms are turned outwards, and the shoulders are turned backward (the thumb is pointing back); in this state, respiration is performed with the shoulders bending backward, and exhalation was performed with the shoulders moving downwards and forwards.	Six times a day for 8 weeks
2	Correction of head position	Taking the head back after correcting shoulder posture (this exercise is done without moving the nose up or down and without opening the mouth).	Six times a day for 8 weeks
3	Correction of the standing position	To correct the bent posture (inclination of the shoulders and head towards the front, full adaptation of the center of mass of the body and the center of the surface of the heels), the act of standing up and standing straight was performed. By placing the person in this position, Full adaptation of the center of mass of the body and the front of the foot was made, and the natural arches of the back and neck were preserved.	Six times a day for 8 weeks
4	Correction of the sitting position	rotating the pelvis forward (sitting on the ischial tuberosity of the pelvis while maintaining the lumbar arch), moving the chest forward and upward (slight external displacement without excessive thoracolumbar extension), and bending the head slightly forward (preventing Extension of the upper cervical vertebrae)	Six times a day for 8 weeks

PHYSICAL TREATMENTS

### 4. Discussion

The findings indicated the effectiveness of selected corrective exercises in improving forward head angle, forward shoulder, and kyphosis in people suffering from depression with upper crossed syndrome. Studies have shown that disorders in the three dimensions of physiological, motion, and psycho-social functioning may cause an excessive increase in the neck and back arches towards the front and scoliosis [7]. Therefore, by considering the chain reaction of the body, the researcher chose functional corrective exercises, posture correction training, and corrective games used in the current research in a

way that three abnormalities related to the upper crossed syndrome affected simultaneously and relying on correct movement patterns, which seems to be the main reasons for the positive findings of the research. The results of this research are consistent with the findings of Cho et al. [25], Nitayarak et al. [26], Zalani et al. [27], and Bae et al. [27]. Cho et al. used scapular stabilizing exercises and deep cervical flexor muscle strengthening to correct the upper crossed syndrome. The results showed that these exercises simultaneously improve the head forward, shoulder forward, and kyphosis abnormalities [25]. In the current research, rolling the head backward in a prone, supine, on quadruped position state and flexion of

**Table 4.** Demographic information of research variables

Index	Group	Mean±SD	t	P
Age (y)	Control	26.26±3.43	0.438	0.665
	Training	174.73±3.23		
Height (m)	Control	174.00±2.13	1.669	0.100
	Training	177.93±2.08		
Weight (kg)	Control	74.60±4.45	0.435	0.667
	Training	75.33±4.75		

PHYSICAL TREATMENTS

**Table 5.** Intergroup changes of depression variable in the experimental and control groups before and after the intervention

Variables	Source of Changes	Degree of Freedom	Degree of Freedom	Average of Squares	F	P	η2
Depression	Test	32.825	1	32.825	75.425	0.000	0.652
	The main effect of groups	112.685	1	112.685	298.94	0.001	0.899
	Residual error	10.169	27	0.398			

PHYSICAL TREATMENTS

**Table 6.** Intergroup changes of posture variables in the experimental and control groups before and after the intervention

Variables	Source of Changes	Degree of Freedom	Degree of Freedom	Average of Squares	F	P	$\eta^2$
Kyphosis posture	Test	3.831	1	3.831	8.499	0.000	0.239
	The main effect of groups	62.624	1	62.624	138.94	0.001	0.837
	Residual error	12.169	27	0.451			
Forward head posture	Test	37.213	1	37.213	87.727	0.000	0.765
	The main effect of groups	138.697	1	138.697	326.963	0.001	0.924
	Residual error	11.453	27	0.424			
Forward shoulder posture	Test	16.156	1	16.156	4.549	0.042	0.142
	The main effect of groups	109.456	1	109.456	31.189	0.000	0.536
	Residual error	94.75	27	3.50			

PHYSICAL TREATMENTS

the neck area in a sitting position with back to the wall (1, 2, 3, and 4 exercises) in the group of functional exercises and scapular retraction activity with Thera band, due to increasing the call of the intra-articular muscles of the neck area to create posterior rotation instead of posterior displacement, while strengthening the deep flexors of the neck and stretching the upper extensor muscles of the neck, leading to the strengthening of the scapula adductor muscles and finally stimulating the mechanical receptors and muscle afferents of the cervical spine and dorsal spine, which provide important deep sense information for position control and improvement of the upper crossed syndrome [28].

Also, teaching posture correction and sitting exercises with back to the wall with shoulder flexion and sliding on the wall (exercises 5 and 6) were performed in the present study to correct the upper crossed syndrome by creating and focusing more on strengthening the scapular adductors along with strengthening the intra-articular muscles of the cervical region, leading to neuromuscular adaptation and increased elasticity of muscles. In addition, the above exercises challenged the muscles around the spine. They strengthened the deep sensation receptors of these muscles, which had a significant effect on controlling the stability of the body posture of the spine. Therefore, it can be said that the weakened muscles in the neck and back area have improved, which has led to the improvement of the muscle imbalance and ultimately led to maintaining the spine's alignment.

The results of the present study on the effect of corrective games on the upper crossed syndrome are in agreement with the findings of Feng et al. [12], Weon et al. (2016) [29], and Yen et al. [30]. Feng et al. investigated corrective games on the rate of kyphosis in young people. The results of their research showed that the strength of the extensor and adductor muscles of the scapula had increased significantly [12]. Yen et al. reported that the rate of the upper crossed syndrome significantly decreased after a corrective game protocol [30]. The difference between the games designed in the present research and the previous research was the design of games with a comprehensive corrective approach based on the body motion chain for the abnormalities of the upper quadrant of the body in people with depression. In the modified catapult game, the subjects externally rotated the shoulders with the retraction of the Thera band to keep the ball on the chest; maintaining this position required the isometric contraction of the rotator cuff, lower middle trapezius, and rhomboid muscles, which were simultaneously activated. The simultaneous contraction of muscles is important in improving joint stability control and maintaining posture stability [31]. In the game of passing the ball over a bridge, the subjects, by a bridge on the back over the hands turned outwards, simultaneously stretch the external rotator muscles of the shoulder, pectoralis major and minor. This movement was accompanied by bringing the shoulders and the extension of the thoracic spine and by maintaining and preserving the alignment of the head and neck in a natural position and at the same level as the shoulders, which also resulted in the strengthening of the deep muscles of the spine, which

in correcting of the forward shoulder, forward head and kyphosis were effective [32]. Also, the results showed that the daily correction of posture, along with corrective exercises and corrective games, improved the forward head, kyphosis, and forward shoulder angles. The results of the present research are in line with the studies of Signes et al. [14], Dupuis et al. [22], and Abadiyan et al. [33]. Among the possible reasons, we can mention the presentation of positive feedback. Teaching and pointing out the correct posture teaches the person to adopt the correct body position, and as a result, the person gets used to it as a new position over time. The existence of a new customary place by the correct posture leads to improving muscle imbalances and maintaining the proper tension length relationship [14]. According to the results of the present study, the correctional program can be used for people suffering from mental problems with upper crossed syndrome, and its findings can be used during injury. The limitations of the present study included not controlling nutrition, stress, and daily activities outside of our physical exercises and, on the other hand, not measuring the motivation of subjects with depression to enter the research. In addition to these issues, correcting the abnormality of the high cross syndrome in men suffering from depression could significantly improve their depression. This factor had a special place in this study.

## 5. Conclusion

The results revealed that 8 weeks of selected corrective exercises positively affected depression. According to the results, 8 weeks of corrective exercises can be significantly effective in reducing the angle of the head forward, round shoulder, and hyperkyphosis on the upper crossed syndrome in men with depression, and it can be recommended to specialists as a treatment.

## Ethical Considerations

### Compliance with ethical guidelines

All ethical principles were observed in this research. first, several meetings were held with the subjects, and they were informed about the steps of the study. All their information was kept confidential. They were also allowed to leave the study at any time. After explaining the research process, they signed the consent form (Code: (R1) SSRI.REC-2106-1042).

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## Authors' contributions

Conceptualization, methodology, investigation, visualization: Taleb Fadaei Dehcheshmeh; Data curation, formal analysis and writing: Taleb Fadaei Dehcheshmeh and Ali Shamsi Majelan; Review and editing: Hassan Daneshmandi and Ali Shamsi Majelan.

## Conflict of interest

The authors declared no conflict of interest.

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