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Research Article

The effect of yoga exercises on body posture, fatigue intensity, pain and trunk kinematics of girls with erectile dysfunction

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Yoga, scapular kinematics, erectile dysfunction, pain, fatigue

Abstract

Background: The aim of this study was to investigate the effect of one cycle of regular yoga exercises on body posture, fatigue severity, pain and trunk kinematics in girls with erectile dysfunction.

Materials and Methods: The present study was an applied study that was performed by quasi-experimental method with pretest-posttest with a control group. The statistical population of this study included all girls aged 25-35 years living in Rasht with erectile dysfunction that 24 people were selected as a sample based on G-Power software based on entry and exit criteria in a targeted and accessible manner. An equal number (12 experimental and 12 control) were divided. The experimental group underwent Iangar yoga for 3 weeks each week for eight weeks, and the control group performed only their daily activities. Then, in order to measure the pre-test and post-test of the head-forward variables, dorsal kyphosis, lumbar lordosis from a flexible ruler, to measure fatigue severity from the MFIS fatigue questionnaire, for back pain from the visual pain intensity scale (vas) and to measure upper rotation Shoulder and shoulder protection by Diota (1990) method and the total shoulder protection on the dominant and non-dominant side was considered as the distance between the two shoulders. Data were analyzed using paired t-test at the significance level of P≥0.05.

Results: The results of paired t-test showed a significant effect of eight weeks of yoga exercises on head forward reduction, dorsal kyphosis, lumbar lordosis, fatigue severity, low back pain, upper scapular rotation, scapular protrusion and distance between two scapulae (p≤ 0.001).

Conclusion: According to the research findings, it can be concluded that yoga exercises in girls with dorsal kyphosis and cervical and lumbar lordosis in order to strengthen the stabilizing muscles of the spine as well as strengthening the scapular retractor muscles and stretching the anterior chest muscles while reducing the kyphosis angle. Cervical and lumbar lordosis improves the position of the scapula and consequently increases the range of motion of the upper limb.

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1. Introduction

The spine and its arches seem to be very important for having a favorable physical condition. Natural curves in the spine reduce pressure and abnormalities on the body (1). Among the arches of the spine, cervical lordosis is the highest curvature of the spine. One of the most common defective postures is the cervical spine (2). The appearance of this defective posture increases the effect of gravitational forces on the head, excessive extension of the head on the neck at the Atlantoaxial joint, bending of the neck on the thorax and retraction of the mandible and the use of deep neck flexors (3). On the other hand, by changing the position of the head forward, the effect of gravity on the head increased, which in the long run leads to degenerative changes in the joints of the cervical spine and intervertebral disc damage (4). In addition to these effects, there are other local effects following the forward break, which include increased pressure on the blood vessels and decreased blood flow from the vertebrae to the brain and brainstem, and decreased respiratory capacity. Abnormalities in one part of the spine usually affect other parts and affect not only physiologically but also psychologically and socially (5). The spread of urbanization and the industrialization of societies and the use of machines instead of muscular force have led to a reduction in natural human movements. Due to poor mobility and reduced mobility and physical activity, the range of motion of joints and different parts of the body is reduced and over time, the person is faced with a decrease in flexibility and muscle weakness and a decrease in muscle strength and endurance. The pain occurs in different parts of the body. In this regard, the arches of the spine play an essential role in absorbing the pressures applied to it and strengthening the spine and maintaining the height and protection of the spinal cord. Spinal curvatures have a high ductility and change during different ages and according to the type of activity of a person's life (3). To have a good physical condition, special attention should be paid to the spine. One of the most important parts of this column is the lumbar arch, which is of special importance due to its unique position. Any increase or decrease in the amount of its angle affects the balance of the body and leads to various anomalies (6). Yoga has been considered as a spiritual philosophy throughout history, but it has also been used as a treatment and clinical intervention, and its use has increased in the last three decades. in scientific sources, more than 800 articles have been recorded on the benefits and positive effects of yoga. These effects in clinically controlled trials in many diseases such as carpal tunnel syndrome, multiple sclerosis, asthma, pulmonary tuberculosis, hypertension, osteoarthritis and pain Chronic lumbar, the effects of improving patients have been seen. (7)

Although many studies have been done on the effects of yoga on patients' recovery, few studies have looked at these effects in people with upper extremity disorders. For this reason, the researchers of the present project decided to measure the effect of a period of regular yoga exercises on posture, fatigue intensity, pain and body kinematics of girls with erectile dysfunction.

2. Materials and Methods

Subjects

The present study was a quasi-experimental study and was performed as a pretest-posttest. The statistical population of the study consisted of 25–35-year-old girls with upper limb abnormalities in Rasht city. 24 people were selected based on the inclusion criteria and were randomly divided into two experimental groups (12 people) and control (12 people). In this regard, women referring to the Young Stars Club of Rasht city were screened with a checkerboard and samples were determined. Poor volunteers, knowing how to conduct the research, read and signed the consent form. Then demographic information including age, height, weight and body mass index were recorded. A goniometer was used to measure the head-forward angle and a flexible ruler was used to measure the angles of kyphosis and lumbar lordosis. To determine the head-forward angle, the angle between the intersection of the vertical line drawn along the 7C thorny appendage and the line connecting the larynx to the 7C thorny appendage was measured. The larger the angle, the greater the intensity of the head forward (8).

A goniometer was used to measure the head-forward angle, and a flexible ruler was used to measure the angles of kyphosis and lumbar lordosis. The gourd connects to the 7C thorn appendage, measured. The larger the angle, the greater the intensity of the head forward (8).

To measure the angles of kyphosis and lordosis, the 1T and 12T vertebrae (to measure thoracic kyphosis) and 1L and 2S to measure lumbar lordosis were magically marked by touching the shock appendages manually. To determine the 7C nut shock appendage, the examiner stood behind the subject and asked him to bend his head. In this case, two protrusions were visible at the lower end of the cervical region, which is actually, the thorny appendage of the 6C and 7C vertebrae. While touching these two protrusions, the subject was asked to slowly bend his head backwards (extension) To win. In such a situation, one of the protrusions (6C) disappeared from the tester's hand and only one palpable protrusion remained, which was the thoracic appendage of the 7C nut. After identifying and marking the shock appendage of the 7C vertebra, it was easily marked with a landmark as the starting point of the curvature of the thoracic spine by moving the finger downwards and in the direction of the spine, respectively. To determine the shock surges of the 12T and 1L spines, the examiner stood behind the subject and asked him to bend slightly forward from the waist and place his weight on the table while placing his hands on the table. Move on his hands (to relieve the contraction of the extensor muscles of the spine and the muscles around the ribs). In such a situation, to reach the 12T vertebral appendage, the lower edge of the last gear on either side of the trunk was touched by the researcher's thumb, and then the researcher continued to touch the last gear simultaneously up and in with both fingers, to some extent. Which was not possible due to the presence of muscle mass. In this position, the line between the two fingertips was marked by the landmark as the location of the 12T vertebral shock appendage or the end of the curvature of the thoracic spine. Then, by touching and counting downwards, the first shock appendage was marked as a 1L vertebral shock appendage and the beginning of the lumbar spine curvature was marked by a landmark. The line between the upper posterior iliac spines was used to determine the location of the 2S spine appendage (end of the lumbar spine curvature).

The researcher marked these sections and then magically connected them and marked its midpoint with a landmark. Then, to measure lumbar lordosis, the subject was placed in a standing position and a flexible ruler was placed on the lumbar vertebrae and the angle related to kyphosis and lumbar lordosis was recorded. The shape obtained by the ruler was carefully drawn on paper and the amount of back and lumbar arch curvature was calculated using the formula Θ = 4 Arc tan (2H / L). (3)

The MFIS fatigue questionnaire will be used to assess the severity of fatigue. This questionnaire consists of 21 questions and each question has 5 options from 0 to 4, which is finally obtained from the sum of the scores of the questions, the test score which is from 0 to 84. A score of 84 indicates the highest level of fatigue and a score of zero indicates no fatigue (9, 10). Visual Pain Intensity Scale (VAS) will be used to assess pain. This scale is in the form of a horizontal bar with a length of 100 mm or 10 cm, one end of which is zero and the other end is 10, which is the most severe pain possible. This scale is one of the most reliable visual grading systems for pain (11, 12). The study used Diota (1990) method to measure the amount of upper scrotal protrusion and rotation. The subject was asked to stand completely naturally and relaxed so that the legs were shoulder-width apart and the weight was evenly distributed between them, with the head facing completely. Then, through the superficial anatomy, the lower angle, the root of the scapula, the posterior-external part of the last appendage of the scapula were magically marked. Then, using an anthropometric meter, the distance between the spine appendage of the dorsal vertebra is aligned with the root of the scapula to the posterior-outer part of the lateral appendage (BAE) and the distance from the scapular root to the posterior-external part of the dorsal appendix (AE). Its dorsal dorsal CD) and the distance between the spine appendage of the dorsal vertebra with the scapular root to the spine of the dorsal vertebra with the lower scapula (BC) were measured in millimeters. Based on the formulas (TanΘ = BC / CD) scapular rotation, AE / AE = scapular protrusion) the amount of scapular protrusion and rotation in both dominant and non-dominant parts of the two groups was calculated (10). Also, the total shoulder scraping on the dominant and non-dominant sides was considered as the distance between the two shoulders. After completing the pre-test evaluations of an Iyengar Yoga Exercise Program (Table 2) with the main aspects of proper body alignment and sequencing using accessories such as blocks, belts and chairs, for 8 weeks each week. 3 sessions were held. All exercise sessions began with the Tadasana Mountains, followed by positions focused on stretching the spine and improving flexibility, balance, muscle strength, and endurance (13). Descriptive and inferential statistics were used to statistically analyze the data. Descriptive statistics were used to calculate central indicators, dispersion of quantitative scales, drawing graphs, and tables. In order to evaluate the hypotheses, after examining the normality of the data by Kolmogorov-Smirnov test, paired t-test was used. All calculations were performed by SPSS software version 21 at the significant level of 05/0 ≥P.

3. Results

1. Descriptive findings

The distribution of subjects in this study according to age, weight and height and body mass index (BMI) is shown in Table (1)

Table (1): Description of demographic characteristics of groups

		control group				Experimental group			
	Variable	**Average**	**Standard deviation**	**The least**	**the most**	**Average**	**Standard deviation**	**The least**	**the most**
1	Age	25.62	3.461	27	32	27.12	٢٧٠,٣	26	34
2	Height	168.87	8.842	162	170	170.37	9.410	164	168.5
3	Weight	78.87	6.619	64	87	77.75	7.421	62	83
4	BMI	21.8	1.208	25.1	29.8	20.8	2.019	26.7	30.1

Table (2): Test results describing research variables in research gr

	Variable	**Column Head**		**control group**	**Experimental group**
1	Head angle forward	Pre-test		39.9±14.63	38.10±2.1
		Post-test		39.8±61.23	49.7±43.45
2	Rear kyphosis angle	Pre-test		49.4±13.70	50.4±40.25
		Post-test		49.4±24.90	41.5±20.37
3	Lumbar lordosis	Pre-test		49.14±8.92	49.19±67.68
		Post-test		49.14±7.92	42.06±3.659
4	Fatigue intensity	Pre-test		55.4±72.52	56.5±68.54
		Post-test		55.4±11.66	49.4±25.26
5	Low back pain	Pre-test		71.18±2.5	75.20±7.2
		Post-test		72.19±7.9	25.16±7.9
6	Upper shoulder rotation	Pre-test		46.4±17.31	38.10±2.1
		Post-test		47.4±05.28	49.7±43.45
7	Distance between two shoulders	Pre-test		14.1±10.12	50.4±40.25
		Post-test		14.0±10.84	41.5±20.37
8	Shoulder protection	Pre-test		3.2±1.06	49.19±67.68
		Post-test		3.2±12.1	42.06±3.659

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Based on the information collected and processed by statistical software, it can be seen in Table 2 that due to eight weeks of yoga practice, head-forward angle, dorsal kyphosis, lumbar lordosis, fatigue severity, back pain, distance between two shoulders, Scapular protrusion decreased and the rate of upper scapular rotation increased in the experimental group.

The Kolmogorov-Smirnov test was performed to determine whether the data were normal or not, and the data were normal. In order to investigate the effect of eight weeks of yoga exercises on the forward angle of girls with erectile dysfunction in this study, using the dependent t-test (paired), the difference between the mean pre-test and post-test of the experimental group and the control group was investigated. Next, the difference between the mean scores of the post-test of the control group and the experimental group is compared using the independent t-test, the results of which are shown in the tables:

Table (3): Evaluation of dependent t-test (paired t-test)

	Pairs or pairs		Couple difference						
		Average	Standard deviation	Average Standard deviation	Assurance distance ۹۵%		Dependent t statistics	Degrees of freedom	Significance level
					Bottom line	upper bound			
Head-forward angle test	Control group pre-test scores	-۲۵۱/۰	۷۷۵/۰	۲۷۴/۰	-۸۹۹/۰	-۸۹۹/۰	۹۱۷/۰	۷	۳۹۰/۰
	Control group post-test scores								
	Experimental group pre-test scores	-۵۸۶/۶	۰۳۰/۶	۱۳۲/۲	-۶۲۸/۱۱	-۶۲۸/۱۱	۰۸۹/۳	۷	۰۱۸/۰
	Experimental group post-test scores								
Lumbar lordosis test	Control group pre-test scores	-۱۳۳/۰	۱۸۶/۰	۰۶۵/۰	-۲۸۹/۰	۰۲۲/۰	-۰۳۰/۲	۷	۰۸۲/۰
	Control group post-test scores								
	Experimental group pre-test scores	-۶۵۱/۰	۳۱۴/۰	۱۱۱/۰	-۹۱۴/۰	۳۸۸/۰	-۸۵۵/۵	۷	.۰۰۰
	Experimental group post-test scores								
Fatigue severity test	Control group pre-test scores	-۴۲۵/۰	۲۳۹/۰	۰۲۹/۰	-۱۷۰/۰	۲۴۰/۰	-۲۴۱/۴	۷	۰۷۹/۰
	Control group post-test scores								
	Experimental group pre-test scores	-۹۸۰/۰	۴۲۸/۰	۱۴۶/۰	-۳۸۷/۰	-۴۷۶/۰	-۴۵۹/۳	۷	۰۰۲/۰
	Experimental group post-test scores								
Back pain test	Control group pre-test scores	-۲۴۱/۰	۱۸۶/۰	۰۶۵/۰	-۳۰۸/۰	۰۲۲/۰	-۱۰۸/۳	۷	۰۶۲/۰
	Control group post-test scores								
	Experimental group pre-test scores	-۶۵۱/۰	۳۱۴/۰	۱۵۶/۰	-۹۱۴/۰	-۳۹۰/۰	-۵۸۸/۴	۷	۰۰۱/۰
	Experimental group post-test scores								
Upper rotation of the scapula	Control group pre-test scores	-۱۱۳/۰	۲۸۱/۰	۱۱۹/۰	-۲۸۵/۰	۳۰۶/۰	-۴۳۴/۰	۷	۵۳۶/۰
	Control group post-test scores								
	Experimental group pre-test scores	۲۲۲/۳	۱۶۴/۲	۷۸۱/۰	۸۹۳/۲	۰۲۵/۶	۶۰۱/۴	۷	۰۰۰/۰
	Experimental group post-test scores								
The distance between the two shoulders	Control group pre-test scores	-۲۵۳/۰	۲۷۳/۰	۲۱۹/۰	-۲۷۱/۰	۳۱۰/۰	-۲۲۴/۰	۷	۶۱۶/۰
	Control group post-test scores								
	Experimental group pre-test scores	۴۱۲/۳	۱۵۳/۲	۷۸۱/۰	۸۹۳/۲	۲۳۸/۵	۵۲۱/۵	۷	۰۰۰/۰
	Experimental group post-test scores								
Shoulder protection	Control group pre-test scores	-۳۱۰/۰	۴۰۸/۰	۲۴۴/۰	-۴۰۱/۰	۳۲۵/۰	-۳۸۴/۰	۷	۷۲۰/۰
	Control group post-test scores								
	Experimental group pre-test scores	۵۵۱/۳	۱۵۳/۲	۷۸۹/۰	۳۰۲/۲	۲۲۶/۳	۳۶۹/۴	۷	۰۰۱/۰
	Experimental group post-test scores								

Table (4): Independent t test results

	Post-test (Variable)	group	Average	Dispute Average	Degrees of freedom	Test statistics t	Significance level
1	Headangle forward	control group	۶۱/۳۹	-۸۲/۹	۱۴	۲۱۱/۴	۰۰۱/۰
		Experimental group	۴۳/۴۹				
2	Back angle angle	control group	۲۴/۴۹	۰۴/۸	۱۴	۸۶۶/۷	۰۰۰/۰
		Experimental group	۲۰/۴۱				
3	Lumbar lordosis	control group	۷/۴۹	۴/۷	۱۴	۷۰۱/۵	۰۰۰/۰
		Experimental group	۳/۴۲				
4	Intensity of fatigue	control group	۱۱/۵۵	۸۶/۵	۱۴	۳۰۲/۶	۰۰۰/۰
		Experimental group	۲۵/۴۹				
5	backache	control group	۷/۷۲	۴۷	۱۴	۱۱۱/۵	۰۰۰/۰
		Experimental group	۷/۲۵				
6	Upper rotation of the scapula	control group	۰۵/۴۷	-۵۶/۷	۱۴	۲۲۹/۴	۰۰۰/۰
		Experimental group	۶۱/۵۴				
7	The distance between the two shoulders	control group	۱۰/۱۴	٦٧,١	١٤	٠١٩,٧	٠٠٠,٠
		Experimental group	۴۳/۱۲				
8	Shoulder protection	control group	۱۲/۳	٠٤,١	١٤	٦٠٩,٣	٠٠٠,٠
		Experimental group	۰۸/۲				

4. Discussion

The results of this part of the study showed that eight weeks of yoga exercises have a significant effect on the head-forward angle of girls with erectile dysfunction (P 0 0.001).

This part of the results is consistent with Qiyasi Nejad et al. (2016), Lee (2016) and Ishaqi (2015). In a study, Ghiyasi Nejad examined the effect of 8 weeks of yoga exercises on the head-forward angle and deep sense of the neck in girls aged 17-15 years and reported positive results (14). In his study, Lee examined the effect of 10 weeks of Pilates exercises on neck range of motion, muscle pain and muscle fatigue in women aged 20-39 with a forward head position. Exercises were held 3 days a week for 50 minutes each session and reported positive results in all variables (15). Ishaqi (2015) examined the effect of yoga on balance and forward posture among blind male students. In this study, it was proved that yoga affects the overall balance of students and also leads to a significant reduction in head-forward posture (16). Green et al. And Hamill et al. Believe that lordosis is caused by anterior pelvic tilt with weak abdominal muscles. There are several factors involved in the formation of low back pain that can be corrected by adopting regular yoga exercises. Improper alignment of the pelvis with the spine, which leads to shortening of the flexor muscles of the thigh and the contraction of the muscles of the abdomen and back of the thigh, causes a permanent tension in the short muscles, followed by excessive and constant stretching of the opposite muscles. These conditions cause abnormalities and poor mobility in people with the disease. (17). It seems that in people with lumbar lordosis, which is accompanied by an increase in anterior pelvic tilt, the muscles of the anterior part of the abdomen as well as the posterior thigh area are stretched, and in contrast, the flexor and

lumbar spine muscles in the lumbar region are reduced in length. By strengthening weakened muscle groups and stretching shortened muscle groups, the amount of abnormality in patients can be reduced (17).

Since no study was found that examined the effect of yoga exercises on healthy individuals with erectile dysfunction, as in a previous study, we compared the report with a study of patients. The results of this part of our research are consistent with the results of Stroe et al. (2020), Tofighi et al. (2012) and Pazkian et al. (2012) and inconsistent with the results of Aghababa and Kashi (2015).

In his study, Stroe practiced yoga for eight weeks with 173 cancer patients suffering from mild to severe fatigue. Stroe reported that yoga effectively reduces fatigue and depressive symptoms in patients with various types of cancer (18). In his study, Tawfiqi examined the effect of 12 weeks, 3 sessions per week for 45 to 60 minutes of progressive resistance training on balance, fatigue and disability in 12 MS patients and reported positive results in reducing fatigue and increasing balance, but disability scores changed. Did not have (19). Pazokian et al. Investigated the effect of aerobic stretching exercises on fatigue in patients with multiple sclerosis. Exercises were performed for 6 weeks (18 sessions) and immediately after the sessions, the severity of fatigue was measured by FSS scale and the results showed that aerobic exercise with stretching is very effective in reducing fatigue (20). In his research, Aghababa examined the effect of yoga exercises on women with MS. Exercises were held for eight weeks and 3 sessions per week. The results showed that yoga activity has no significant effect on total fatigue and physical, cognitive and psychological subscales of people with MS. Possible reasons for this discrepancy include differences in the samples and exercise program used (21).

In general, it seems that the exercises used in this study for participants with erectile dysfunction who had a decrease in muscle strength due to scapular positioning disorder through the mechanism of correction of the relationship between length and tension of muscles acting on positioning and The stability of the scapula has reduced the muscle tension in the scapula and arm complex and has also played a role in increasing the strength of the shoulder joint muscles by improving the ability to transfer energy along the motor chain (22). On the other hand, the exercises used may have effects such as improving the position and increasing the stability of the scapula due to increasing the activity of the stabilizing muscles, as well as strengthening and improving the call of the trunk muscles to return the natural force pair in the scapular muscle complex. Improvement of scapular kinematics has been effective (23). Physical position is the relative alignment of different parts of the body with each other. A person who is in good physical condition balances the direction of his body in such a way that the pressures on different parts of his body are minimized. But a person who is in poor physical condition, due to high pressure on certain parts of the body, the direction of his body is out of balance (24-28).

In this regard, Kibler states that dorsal kyphosis or cervical lordosis causes the scapula to move too far away (29). In justifying the findings of the present study, it can be said that the direction of the spine affects the normal position of the scapula and both of these affect the function of the shoulder girdle. The basis for this relationship between spine alignment, scapular position, and shoulder girdle function is related to at least two factors:

1) Scapulohumeral rhythm: During arm movements, the scapula should provide a stable base for glenohumeral joint movements while moving relative to the position of the arm during range of motion.

2) Existence of multiple muscle connections between the spine, scapula, clavicle and arm: The direction of these bony parts may change directly through the muscle connections between them. The direction of the bones affects the length of the muscles and thus can affect the ability of the muscle to produce tension.

Conclusion

In general, according to the findings of the present study and the theoretical use of background literature, it can be concluded that yoga exercises in girls with kyphosis and cervical and lumbar lordosis to strengthen the stabilizing muscles of the spine and strengthen the retractor muscles of the shoulder and muscle tension. Anterior chest while reducing the angle of kyphosis and cervical and lumbar lordosis improves the position of the scapula and consequently increases the range of motion of the upper limb.

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Compliance with ethical standards

Conflict of interest None declared.

Ethical approval the research was conducted with regard to the ethical principles.

Informed consent Informed consent was obtained from all participants.

Author contributions

Conceptualization: A.D., H.Y.E., Sh.R.; Methodology: A.D., H.Y.E., Sh.R.; Software: A.D., H.Y.E., Sh.R.; Validation: A.D., H.Y.E., Sh.R.; Formal analysis: A.D., H.Y.E., Sh.R.; Investigation: A.D., H.Y.E., Sh.R.; Resources: A.D., H.Y.E., Sh.R.; Data curation: A.D., H.Y.E., Sh.R.; Writing - original draft: A.D., H.Y.E., Sh.R.; Writing - review & editing: A.D., H.Y.E., Sh.R.; Visualization: A.D., H.Y.E., Sh.R.; Supervision: A.D., H.Y.E., Sh.R.; Project administration: A.D., H.Y.E., Sh.R.; Funding acquisition: A.D., H.Y.E., Sh.R.

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