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Influence of Postural Stability Training Versus Neck Stabilization Exersices on Balance in Patients with Forward Head Posture

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Abstract

Background: Research has confirmed that adopting a forward head position (FHP) can cause a displacement of the body's center of gravity, causing the upper body to lean backward. This can create a significant ergonomic hazard, increasing the likelihood of sustaining injuries. Due to compensatory upper body drift, both hips usually tilt forward. As a result, FHP can not only lead to neck pain but also create back pain and disrupt balance.

Aim of Study: Thepurpose of study was to find out the impact of biodex postural stability training versus stabilization head and neck exercise balance in individuals with forward head posture.

Material and Methods: This study involved 60 young adults with severe forward head posture (<46 cranio-vertebral angle).

Subjects were divided into 3 groups (A,B and C):

- Group A were given conventional treatment plus postural stability training using biodex balance system for six weeks, day after day.
- Group B were given conventional treatment plus neck stabilization exercise for six weeks, day after day.
- Group C were given conventional treatment plus combination between postural stability training and neck stabilization exercise.

Results: Comparison between the three groups reveled the findings of these study revealed that the superiority of group A on group B in both APS, MLS, and, while, there was superiority of group B on group A in CVA. In addition, there were superiority of group C on group A in OS, MLS, CVA, and ROF.

Further more, there was superiority of group C on group B in all variables except CVA.

Conclusions: According to the extent and results of the study, it was determined that stability exercise in addition to conventional treatment were more effective in improving biodex measurement, CVA measurements, OS, MLS, APS, and ROF.

Key Words: *Mechanicalneck pain – Exercise – Posture stability – Biodex – CVA.*

Introduction

FORWARD head posture (FHP) is the most prevalent deviation from optimal head posture. It is defined by the head protruding forward in the sagittal plane, positioning it in front of the trunk *[1]*.

The absence of the cervical curve is seen as a notable contributing factor in specific disorders, such as mechanical cervical dysfunction *[2]*.

Individuals suffering neck dysfunction often exhibit FHP in comparison to individuals of the same age without neck dysfunction *[3]*.

Asymmetric posture is a persistent source of stress and the main cause of most harmful stimuli that might potentially reduce 70-90% of chronic dysfunction *[4]*.

Prolonged FHP can lead to musculoskeletal disorders like 'upper crossed syndrome', characterized by decreased lordosis of the lower cervical spine and increased kyphosis of the upper thoracic vertebrae. This condition is often accompanied by severe neck pain and impaired balance *[5]*.

It results in the misalignment of the vertebrae, leading to atypical stress as well as strain on the spinal cord *[6]*.

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Neuronal as well as vascular components are subjected to negative mechanical tension by the FHP [7].

Research has confirmed that a FHP can cause a displacement of the center of gravity, causing the upper body to lean backwards and producing a potential ergonomic hazard that may lead to injury. As a counter balance to upper body drift, both hips usually lean forward. This forward tilt of the hips, known as FHP, can not only contribute to neck pain but also lead to back pain in addition disrupt equilibrium [8].

The influence of FHP on static balance control is more pronounced than its effect on dynamic balance control. Thus, engaging in static balancing training can assist patients in overcoming issues related to FHP. Additional research is required to validate the positive impacts of static balancing training in individuals with FHP [9].

Furthermore, it is widely acknowledged that the consistent maintenance of muscle contraction and the resulting fatigue from muscle weakening contribute to chronic dysfunction within the cervical region [10].

When the head is in a forward posture, it can create up to thirty pounds of excessive force on the cervical spine. This force pulls the entire spine out of alignment. Additionally, the loss of the natural curvature of the spine (known as physiological lordosis) can cause pain due to muscle imbalances. In cases of kyphotic deformities, where the spine curves forward excessively, the anterior parts of the spine can become overloaded and cause pain [11].

This results in the contraction of the posterior cervical as well as suboccipital muscles, elongation and reduced strength of the anterior neck muscles, weakened scapula retractor muscles, and heightened tension on the ligaments. The imbalances resulting from this position reduce muscle efficiency, necessitating additional muscular effort to maintain a stable position of the head and neck [12].

There are quite many methods to evaluate such atypical forward head posture, but the observational method along with visual assessment to analyze the posture by using anatomical landmark suggested by Kendal is most frequently used in the clinic [13,14].

A smaller cranio-vertebral angle (CVA) indicate a greater FHP, A CVA 52-58 degree indicate non forward head posture , 46-50 indicate slight forward head posture, less than 46 indicate moderate to severe forward head posture [15,16].

Design:

Experimental research design. A two-factorial pre and post randomized study design.

Ethical approval:

The study received approval from the Institutional Ethics Committee of the Faculty of Physical Therapy, Cairo University, Egypt (P.T.REC/012/004706).

Material and Methods

The participants were chosen from the outpatient clinics of orthopedics at the Faculty of Physical Therapy, Modern University for Technology and Information. (Between October 2023 to May 2024)

Patients were referred from a neurologist or an orthopedistwith forward neck posture. Their age ranged from 18 to 35 years. Patients were divided equally (n=20) into three groups (A, B and C).

- Group (A): Were given conventional treatment plus postural stability training viabiodex balance system for six weeks, day after day.
- Group (B): Were given conventional treatment plus neck stabilization exercise for six weeks, day after day.
- Group (C): Were given conventional treatment plus combination between postural stability training and neck stabilization exercise.

Patients were required to meet the specified inclusion criteria in order to be eligible for participation in this study.

60 young adults was selected with severe forward head posture (<46 cranio-vertebral angle) [16].

Inclusion criteria:

1- Asymptomatic and symptomatic participants.

2- Age ranging from 18 : 35.

3- Both genders.

Patients were excluded if:

Headache, migraine or vertebra-basilar insufficiency (VBI):

1- Fixed or mobile spinal deformity.

2- Temporomandibular joint dysfunction (TMJ) or untreated visual or auditory impairment.

3- History surgery of the upper quadrant of the body.

Evaluation procedure:

First, anthropometrics measurements including height, weight and body mass index was taken.

Participants were assessed using the following instrumentations:

1- *Measurement of CVA:*

The CVA was measured by taking a lateral view plain X-ray while sitting or standing (while loading).

We made markings on the tragus of the ear along with the spinous processes of the 7th cervical verte-

bra. Determine the head's forward angle by measuring the angle formed between a line from the tragus of the ear to the 7th cervical vertebra and a horizontal line *[17]*.

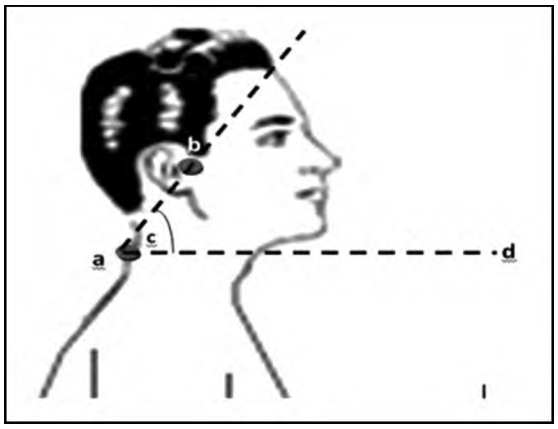

Fig. (1): Measurement of cranio-vertebral angle. a, C7 spinous process; b, Tragus; c, cranio-vertebral angle; d, horizontal line *[17]*.

2- *Biodex Balance System TM Sd – Static and Dynamic Balance Testing and Training. (With 2.02 software):*

The Biodex Balance System (SD, 115 VAC) was utilized to conduct balance evaluations. This technique has been previously utilized in the evaluation as well as training of dynamic balance. The device is a multi-axial instrument that accurately evaluates and documents an individual's capacity to stabilize a joint that is impacted by a dynamic load. The platform is circular and may rotate freely in all directions, including the mediolateral as well as anteroposterior axes. To maximize stimulation of the ankle joint's mechanoreceptors, BBS permits a platform tilt of up to 20 degrees for the feet. Poor balance is indicated by a high score. Following the manufacturer's directions, the Fall Risk Test was conducted *[18]*.

Treatment procedures:

1- *Conventional treatment included: Postural correction exercise:*

Strengthening of deep cervical flexor muscles:

- Every patient was directed to assume a seated position with their arms in a relaxed state by their sides. A gentle touch was applied to the region above the lip and beneath the nose, and the patient was instructed to tuck their head in.
- The proper execution of tucking the chin inward and aligning the spine was verbally reinforced.
- The patient was instructed to flex their neck, aligning their ears with the tip of their shoulders, while in a seated position.
- The exercise was completed for 3 sets consisting of 12 repetitions, with each repeat being held for 6 seconds.

Strengthening of the scapular retractor muscles:

- The patient was seated on a chair lacking back support, prior to engaging in tactile as well as proprioceptive training.
- The patient was instructed to retract the scapula by gently resisting the movement of its inferior angle and asking them to pinch them together. We instructed the patient to visualize "gripping a quarter firmly between the scapulae".
- Every patient was advised to refrain from elevating the scapulae or extending the shoulders.
- The patient assumed a standing position with his hands grasped together behind his lower back, resulting in scapular adduction. Direct him to bring his scapula closer to the midline of his body and maintain this position with both arms dropped for a duration of six seconds. This exercise was executed for three sets, each consisting of 12 repetitions, with a 6-second hold for each repeat.

Stretching exercises:

Stretching of suboccipital muscles:

- The exercise was carried out while in a seated position. Locate the spinous process of the 2nd cervical vertebra and hold it using the therapist's thumb. Instructed the patient to gradually nodding their head, doing a gentle tipping movement on the upper part of the spine.
- The exercise was performed three times, with each repetition lasting thirty seconds.

Stretching of the Pectoralis major muscle:

This exercise was carried out in a seated position with the hands positioned behind the head, while the shoulders were raised and rotated outward at a 90-degree angle. Perform passive stretching by the therapist upon reaching the maximum ROM. This exercise should be repeated three times, with each repetition lasting 30 seconds [19].

2- *Postural Stability training (PST):*

Postural Stability Training mode is intended to emphasize particular movement patterns or techniques by positioning targets at various locations on the screen grid or maintaining balance inside a defined ring or boundary.

By employing the target approach, the patient's score is determined by adding up the number of times the patient is able to touch the targets through leaning and adjusting their postural stance throughout the session. The sway envelope refers to the space in which an individual can shift their COG while remaining inside their base of support. The approximate vertical sway of the object is 8 degrees to one side as well as 8 degrees to the other, resulting in a total swing of 16 degrees. Additionally, there is an 8-degree forward sway as well as a 4-de-

gree backward movement, resulting in a total sway of 12 degrees.

During the boundary selection process, the patient engaged in exercises to maintain balance within the specified boundary. The Target as well as Ring/Boundary approaches are mutually exclusive, meaning that only one approach was chosen at any one moment.

During the training session, the movement of the patient's on-screen pointer is recorded by a tracing feature, which tracks the path of the cursor on the grid. This functionality can be employed to show a patient's placement during the course of the procedure. The time increments or decrements according to the provided value.

Each patient engaged in postural stability training using the BIODEX BALANCE SYSTEM for 12 minutes during each session, three times a week.

Neck stabilizing exercise (NSE):

A neck stabilization exercise was conducted with the individual maintaining a chin-in posture while utilizing a sling. Patients engaged in isometric exercises targeting all sides of the neck. The exercises were performed for a duration of 10 seconds, repeated 10 times, and completed in three sets. The duration of the holding time was progressively extended. Additionally, the patient incorporated the use of a gymnastic ball in a standing posture. They pressed the ball against the wall while laying their forehead on the ball, aiming to maintain a steady pressure for 20 seconds. This exercise was performed in 3 sets per session, with a gradual increase over time [20].

Statistical analysis:

An unpaired *t*-test was performed to compare the ages among the groups. A chi-squared test was used to compare the distribution of sex among groups. The Shapiro-Wilk test was conducted to assess the normal distribution of the data. A Levene's test was performed to assess the homogeneity of variances among the groups. MANOVA was performed to examine the impact of treatment on patients. The significance limit for all statistical tests was established at $p<0.05$. The statistical analysis was performed using the SPSS software package, specifically version 25 for Windows, developed by IBM SPSS in Chicago, IL, USA.

Fig. (2): Neck stabilizing exercise using resistance elastic band and gymnastic ball.

Results

General demographic data:

There was insignificant difference among the three groups in Mean age as well as BMI ($p<0.05$). As well, there was In significant difference in the distribution of sex among groups ($p<0.05$).

Multiple analysis of variance (MANOVA) showed that there were substantial differences groups, measurements, as well as intercept (Table 1).

The within-group results: There were significant differences in overall stability index (OS), Antero-posterior stability index (APS), MLS, CVA and ROF between pre- as well as post-test in group A (traditional treatment group) (p=0.000, 0.000, 0.007, 0.001, and 0.000 respectively). Concerning group B (neck stabilizing exercise), there were significant changes of all variables except APS (p= 0.000, 0.000, 0.08, 0.000, and 0.009 respectively). For group C (Biodex postural stability exercise), there were substantial differences across all variables except APS as well as MLS (p=0.000, 0.77, 0.39, 0.000, and 0.000 respectively).

The in-between group results:

There were insignificant differences in the pretest of OS, APS, MLS, CVA, and ROF between groups (p=0.89, 0.370, 0.731, 0.838, & 0.935), while there were substantial differences in the post-test (p=0.000 for all variables) (Table 2 and Figs. 2,3).

Table (1): Multiple analysis of variance (MANOVA) for groups and measurements.

Tests of Between-Subjects Effects						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	72560.41	1	72560.41	138326.78	0.000*	0.99
Groups	98.22	2	49.11	93.62	0.000*	0.62
Measurements	49.42	1	49.42	94.22	0.000*	0.45
Groups * measurements	82.47	2	41.23	78.61	0.000*	0.58

Table (2): Within and In-between comparisons.

Variable	Measurement	Traditional group	Exercise group	BFB training group	In-between group comparison
OS	Pre-test	2.66±0.31	2.69±0.18	2.69±0.16	0.89
	Post-test	1.8±0.19	1.88±0.43	1.88±0.43	0.000*
	Within-group comparison	0.000*	0.000*	0.000*	
MLS	Pre-test	1.96±0.27	2.09±0.33	2.03±0.29	0.370
	Post-test	2.42±0.33	2.53±0.16	2.01±0.23	0.000*
	Within-group comparison	0.000*	0.000*	0.77	
APS	Pre-test	1.47±0.22	1.76±0.37	1.31±0.15	0.731
	Post-test	1.71±0.31	1.94±0.28	1.35±0.17	0.000*
	Within-group comparison	0.007*	0.08	0.39	
CVA	Pre-test	44±1.45	44.2±1.28	43.95±1.47	0.838
	Post-test	45.95±1.85	52.95±1.76	46.35±1.57	0.000*
	Within-group comparison	0.001*	0.000*	0.000*	
ROF	Pre-test	2.96±0.22	2.93±0.26	2.93±0.26	0.935
	Post-test	2.52±0.24	2.72±0.23	2.31±0.21	0.000*
	Within-group comparison	0.000*	0.009*	0.000*	

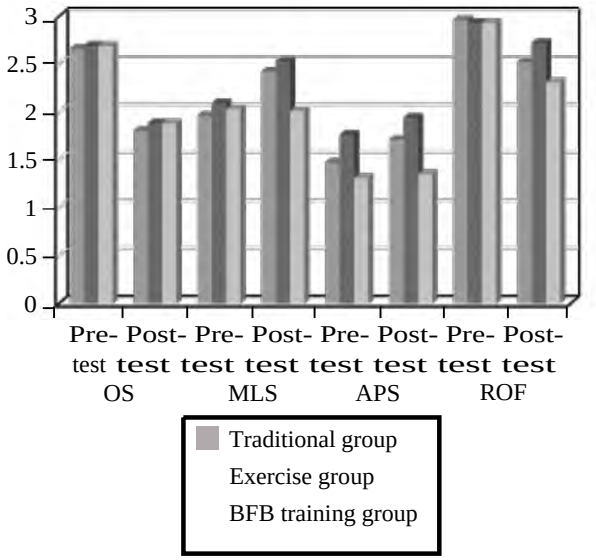

Fig. (3): OS, MLS, APS, and ROF.

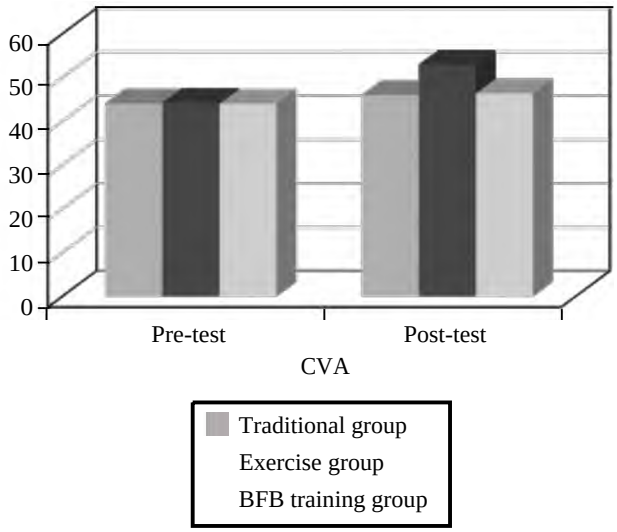

Fig. (4): CVA.

Multiple Comparisons (Least Significance Difference):

Post-hoc test revealed the superiority of group A on group B in both APS, MLS, and ROF (p=0.001, 0.006, and 0.009 respectively), while, there was superiority of group B on group A in CVA (p=0.000). In addition, there were superiority of group C on group Ain OS, MLS, CVA, and ROF (p=0.000 for all variables). Furthermore, there were superiority of group C on group B in all variables except CVA (p=0.000 or all variables) (Table 3).

Table (3): Multiple Comparisons (LSD).

Dependent Variable	(I) Groups	(J) Groups	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
OS	Traditional	Exercise	–0.105	0.08	0.186	–.2619	0.05
		Study	0.415*	0.08	0.000*	.2581	0.57
	Exercise	Study	0.52*	0.08	0.000*	.3631	0.68
APS	Traditional	Exercise	–0.29*	0.08	0.001*	–.4566	–0.12
		Study	0.16	0.08	0.059	–.0066	0.33
	Exercise	Study	0.45*	0.08	0.000*	.2834	0.62
MLS	Traditional	Exercise	–0.26*	0.08	0.006*	–.3995	–0.07
		Study	0.36*	0.08	0.000*	.1905	0.52
	Exercise	Study	0.59*	0.08	0.000*	.4255	0.75
CVA	Traditional	Exercise	–7*	0.55	0.000*	-8.0950	–5.91
		Study	-0.4	0.55	0.467	–1.4950	0.69
	Exercise	Study	6.6*	0.55	0.000*	5.5050	7.69
ROF	Traditional	Exercise	–0.19*	0.07	0.009*	–.3385	–0.05
		Study	0.22*	0.07	0.004*	.0715	0.36
	Exercise	Study	0.41*	0.07	0.000*	.2665	0.55

Discussion

We investigate the effectiveness of investigate the effect of biodex postural stability training versus stabilization head and neck exercise balance in individuals with FHP measuring biodex, neck disability index, CVA.

As many studies try to investigate the effect of biodex on the stability and relations between cranio-cervical angle in cases of forward neck and lumbar vertebrae pain and injuries and the subsequent effect of exercising one region of spine on the other spinal regions, another underlying mechanism that can illustrate the results is that Pain is associated with alterations in muscle recruitment patterns. The intense muscle tension and increased muscle tone lead to a reduction in muscle length and the development of excessive muscle imbalances. Consequently, this results in heightened discomfort and pain, which can impact the entire spine rather than just the specific injured location [21].

Kiana et al., work discovered that the integration of manual therapy as well as stabilization exercise yielded notable results in lowering pain in the neck in addition improving function as well as posture in patients. However, the group that received both treatment interventions experienced greater improvement in function as well as pain in contrast to Group 2, which only received stabilization exercise. This suggests that MT can be utilized as an additional method to the stabilizing intervention for treating neck pain. The author proposed that further investigations are necessary to validate the findings of this study [21].

Previous studies also did find a clear influence of strengthening and stretching exercise training program such as Ruivo work found that experimental group that followed a stretch and strength training programs demonstrated substantial improvements in the cervical as well as shoulder angles after the 3 2-week intervention. No statistically substantial changes were noted in the three postural angles within the intervention group following the 16-week detraining phase.

He determined that the exercise intervention effectively reduced forward head as well as protracted shoulder among adolescents. The detraining period was inadequate to diminish the overall training effects. His study provides evidence for the effectiveness of posture training as well as rehabilitation in Physical Education classes for both the prevention and management of upper quadrant musculoskeletal pain [22].

Juchul study conducted a comparison between the combination of upper thoracic spine mobilization as well as mobility exercise, in addition the combination of upper cervical mobilization as well as stability exercise. The treatment duration was 4 weeks, with follow-up evaluations conducted at four and six weeks after the initial examination.

Outcome measures including the cranio-vertebral angle (CVA), cervical range of motion, numeric pain rating scale (NPRS), pressure pain threshold, neck disability index (NDI), as well as global rating of change (GRC) were collected. The data were analyzed using a two-way repeated-measures analysis of variance, specifically examining the interaction between group × times.

The findings indicated at the 6-week follow-up, participants in the thoracic group showed substantial improvements ($p<.05$) in CVA, cervical extension, NPRS, as well as NDI in contrast to those in the cervical group. Furthermore, out of the 15 participants in the thoracic group, 11 of them (68.8%) had a GRC score of +4 or higher at the 4-week follow-up. In comparison, out of the 16 participants in the cervical group, only 8 of them (50%) had a GRC score of +4 or higher.

Contrary to our work, the combination of mobilizing and exercising the upper thoracic spine showed superior short-term results in various aspects such as standing position, cervical extension, NPRS, NDI, as well as GRC in contrast to mobilizing as well as stabilizing the upper cervical spine among individuals with FHP *[23]*.

Recommendation:

Further investigation is required to establish a treatment-based classification system for individuals suffering from neck pain. By enhancing our capacity to identify subgroups of patients suffering from neck pain, we can improve our clinical decision making as well as treatment effectiveness. This will be achieved by matching these patients with an intervention that is likely to be beneficial for them.

Additional research should incorporate stability training exercises to assess the enhancement of activities of daily living as well as functionality among individuals with forward neck posture. Further research should investigate how different sub-groups of individuals with cervicobrachial pain respond to certain therapies.

Further studies should be conducted to apply other assessment methods for muscle performance such as biofeedback or cervical muscular performance tests. Additional research is needed to evaluate the prolonged impact of stabilization training on pain as well as functional disabilities. Furthermore, it would be beneficial to perform future studies to examine the effects of stabilization training specifically for older patients, Therefore, this paper conducted on the treatment of forward neck posture with stability exercise, providing more reliable evidence for future studies.

Limitations:

There were some limitations. Initially, the study encompassed a restricted group of patients, with just a small number of participants being enlisted, and no individuals withdrew from the study.

Second, there was a psychophysiological component experienced by both patient groups during testing and training that was consistent throughout the study but may have continued to the end of the study.

Conclusions:

Conclusions drawn from the extent and results of this investigation, it was concluded that stability exercise in addition to conventional treatment and biodex postural stability training were more effective in improving balance parameters and decrease the risk of fall in those with forward head posture.

Conflicts of interest:

The authors declare that there are no conflicts of interest.

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References

1- IRANI S., ABBASZADEH-AMIRDEHI M., HOSSEINI S.R., SUM S., MATLABI H. and MIRASI S.: The Effect of Head and Neck Stabilization Exercises on Dynamic Balance in the Elderly with Forward Head Posture. Journal of Modern Rehabilitation, 16 (1): pp. 9-16, 2022.

2- WONTAE GONG, CHANGSOOK KIM and YOONMI LEE: Correlations between Cervical Lordosis, Forward Head Posture, Cervical ROM and the Strength and Endurance of the Deep Neck Flexor Muscles in College Students Phys. Ther. Sci., 24: 275–277, 2012.

3- SILVA A.G., SHARPLES P. and JOHNSON M.I.: Studies comparing surrogate measures for head posture in individuals with and without neck pain. Physical Therapy Reviews, 15 (1): 12–21, 2009.

4- IRVIN R.E., VLEEMING A., MOONEY V. and STOCKHART R.: Why and how to optimize posture. In Movement, stability, and lumbopelvic pain 2nd Ed. New York: Churchill Livingston Elsevier, p. 239-52, 2007.

5- KANG J.H., PARK R.Y., LEE S.J., KIM J.Y., YOON S.R. and JUNG K.I.: The effect of the forward head posture on postural balance in long time computer based worker. Annals of rehabilitation medicine, 36 (1): p.98, 2012.

6- HARRISON D.E.: Anterior head Translation: Biomechanics measurement and treatment, AJCC, 12 (3): 1-13, 2002.

7- RHEE J.M., BRIDWELL K.H., WON D.S., LENKE L.G., CHOTIGAVANICHAYA C. and HANSON D.S.: Sagittal plane analysis of adolescent idiopathic scoliosis. Spine, 27: 2350-2356, 2002.

8- KELLY N., MOUSSET M., ALTHUBAITI A., AGARWAL R., ONWUKA A. and CHIANG T.: Using the Craniovertebral Angle to Quantify Intraoperative Ergonomic Risk. Otolaryngology Head and Neck Surgery, p.0194599821106872, 2022.

9- LEE J.H.: Effects of forward head posture on static and dynamic balance control. Journal of physical therapy science, 28 (1): pp. 274-277, 2016.

10- VILJANEN M., MALMIVAARA A., UITTI J., et al.: Effectiveness of dynamic muscle training, relaxation training, or ordinary activity for chronic neck pain: Randomised controlled trial. BMJ, 327: 475, 2003.

11- MCGILL S.M., HUGHSON R.L. and PARKS K.: Changes in lordosis modify the role of the extensor muscles. ClinBiomech (Bristol, Avon), 15 (10): 777-80, 2000.

12- HEYDARI Z., SHEIKHHOSEINI R., SHAHRBANIAN S. and PIRI H.: Establishing minimal clinically important difference for effectiveness of corrective exercises on craniovertebral and shoulder angles among students with forward head posture: A clinical trial study. BMC pediatrics, 22 (1): pp. 1-11, 2022.

13- YOO W.G., YI C.H., CHO S.H., JEON H.S., CYNN H.S. and CHOI H.S.: Effects of the height of ball-backrest on head and shoulder posture and trunk muscle activity in VDT workers. Ind. Health, 46: 289-97, 2008.

14- Salahzadeh Z., Maroufi N., Ahmadi A., et al.: Assessment of forward head posture in females: Observational and photogrammetry methods. J. Back Musculoskelet Rehabil., 27 (2): 131-9, 2014.

15- KIM E.K. and KIM J.S.: Correlation between rounded shoulder posture, neck disability indices, and degree of forward head posture. Journal of physical therapy science, 28 (10): pp. 2929-29326, 2016.

16- LEE H.S.: The Analysis of severity of forward head posture with observation and photographic method. Journal of Korean Society of Physical Medicine, 10 (3): pp. 227-235, 2015.

17- DIAB and MUSTAFA: Tthe efficacy of forward head posture correction on nerve root function and pain in cervical spondylotic radiculopathy: A randomized trial. clinical Rehabilitation, 26 (4): 351-361, 2011.

18- PROMETTI P., OLIVARES A., GAIA G., BONOMETTI G., COMINI L. and SCALVINI S.: Biodex Fall Risk Assessment in the Elderly With Ataxia. Medicine, 95 (10): e2977, 2016.

19- SAFWAT Y.M., WADEE A.N., LASHEEN Y.R. and KAMEL R.M.: Influence of Scapular Stabilization Exercises on Asymptomatic Forward Head Posture; A Randomized Controlled Trial. Indian Journal of Public Health Research & Development, 10 (12), 2019.

20- KANG J.I., CHOI H.H., JEONG D.K., CHOI H., MOON Y.J. and PARK J.S.: Effect of scapular stabilization exercise on neck alignment and muscle activity in patients with forward head posture. Journal of physical therapy science, 30 (6): pp. 804-808, 2018.

21- KIANA FATHOLLAHNEJAD, AMIR LETAFATKAR and MALIHE HADADNEZHAD: The effect of manual therapy and stabilizing exercises on forward head and rounded shoulder postures: A six-week intervention with a one-month follow-up Fathollahnejad et al. BMC Musculoskeletal Disorders 2019.

22- RUIVO A R.M., CARITA A.I. and PEZARAT-CORREIA: The effects of training and detraining after an 8 month resistance and stretching training program on forward head and protracted shoulder postures in adolescents: Randomised controlled study, Manual Therapy, 2015, http://dx.doi.org/10.1016/j.math.2015.05.001.

23- JUCHUL CHO, EUNSANG LEE and SEUNGWON LEE: Upper thoracic spine mobilization and mobility exercise versus upper cervical spine mobilization and stabilization exercise in individuals with forward head posture: A randomized clinical trial Cho et al. BMC Musculoskeletal Disorders, 18: 525, 2017. DOI 10.1186/s12891-017-1889-2.

تأثير تمارين ثبات القوام مقارنة بتمارين الثبات للرقبه علي الاتزان لدى مرضى بروز الرأس للامامى

الهدف من هذاالبحث: تهدف الدراسة الى المقارنه بين تأثير تمارين ثبات القوام وتمارين الثبات للرقبه وتاثيرهم على الاتزان لدى مرضى بروزالرأس للامام.

مواد البحث وأساليبه: اجريت هذه الدراسة بالعيادة الخارجية بكلية العلاج الطبيعى الجامعة الحديثة فى الفترة من اكتوبر ٢٠٢٣ حتي مايو ٢٠٢٤، وقد تم اختيار ستون مريض يعانوا من بروز الرأس الامامى فى هذة الدراسة تتراوح أعمارهن بين ١٨ و٣٥ عاماً وتم تقسيمهم الى ثلاث مجموعات متساويه (المجموعة الضابطة ومجموعتين للدارسة) وتم تطبيق برنامج علاج طبيعى منتقى على الثلاث مجموعات بمعدل ثلاث جلسات اسبوعياً لمدة شهرين وتم عمل تقييم فى البدايه للثلاث مجموعات يتضمن الاتى الطول والوزن ومؤشر كتله الجسم وقياس زاويه العنق والراس وتقييم توازن المرضى باستخدام جهاز البايوديكس.

النتائج: أظهرت النتائج وجود تحسن ذو دلالة احصائية فى المجموعه الاولى التى تم تطبيق العلاجات التقليديه عليها فيما يخص الاتزان الامامى الخلفى والاتزان الجانبى واحتمالية خطر السقوط.

كما اظهرت مجموعه الثانيه التى تم تطبيق العلاج التقليدى بالاضافه لتمارين الثبات العنقى تحسن ذو دلاله احصائيه فى تحسن الزاويه العنقيه الدماغيه كما اظهرت مجموعه تمارين ضبط القوام تحسن ملحوظ فى التوازن الجانبى والزاويه العنقيه والاتزان الكلى وكانت المؤشرات الاحصائيه فى صالح المجموعه الثالثه.

الخلاصة: إضافة تمارين ثبات القوام وتمرينات الثبات العنقي إلى برنامج العلاج الطبيعي التقليدي يؤدي إلتحسين الاتزان الشامل والاتزان الجانبى وقياسات الزاويه العنقيه الدماغيه بدرجة أعلى من العلاج الطبيعى وحده فى مرضى بروز الرأس الامامى.